A PROPOSED SUSTAINABILITY CURRICULUM TO ADDRESS EFFECTS OF SHIFTING CULTIVATION ON SCHOOL GOING CHILDREN OF KASEMPA DISTRICT IN ZAMBIA.

BY

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A Dissertation Submitted to the University of Zambia in Partial fulfillment of the Requirements for the Degree of Master of Education in Environmental Education.

The University of Zambia

Lusaka

2011

CERTIFICATE OF APPROVAL

The University of Zambia has approved this dissertation of KAMOCHA CHRISTOPHER as fulfilling part of the requirements for the award of the Degree of Master of Education in Environmental Education.

Signed..... Date..21/7/2011.....

Signed..... Date..22/7/11.....

Signed..... Date..22/7/11.....

DECLARATION

I Kamocha Christopher do hereby declare that the work presented in this dissertation for the Degree of Master of Education in Environmental Education is my own work and has not been presented either wholly or in part for any degree at any other University.

Signed: .....

Date: 20th July, 2011

DEDICATION

I would like to dedicate this dissertation to all my family members who, I am sure, missed my care and for their prayers and encouragement during the period this study was conducted. I am also greatly indebted to God who has preserved my life to date.

ACKNOWLEDGEMENTS

I wish to thank the Almighty God for his grace, love, mercies and for sustaining my life this far. I would also be failing in my duties if I do not acknowledge the efforts of Dr. C.M. Namafe, my supervisor, for his guidance and counsel during my course of study for the Master of Education in Environmental Education programme. Special thanks to Dr. H.N. Chabwela from the Department of Biological Sciences, for his help during my course work.

Special thanks to Mrs. Chitalu, an official at the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Documentation centre in Lusaka, who rendered immeasurable support on literature concerning the study. I wish to thank Mr. Mutanga Collins for the help he offered at the time of data analysis.

Appreciation also goes to my wife, Eris Mudenda who always assisted me in the organization and editing of the entire dissertation. I wish also to thank Mr. R. Malembeka of Kabusenga basic school for his cooperation as my research assistant and for availing his motor bike for use in impassable roads.

I wish to appreciate the efforts and cooperation of the head teachers, teachers and pupils of Shapenda Basic school, Kalombe Basic school, Kandeke Basic school, Kabusenga Basic school, Kamono Basic school and Musambelombe Basic school without whose cooperation my study would not have been a success. I wish to further thank parents in villages surrounding these schools for their time and cooperation.

Last but not the least, I wish to thank my course mates T.K. Phiri, K.M. Banda, L. Chileshe, and M. Mwanang'ono for their continued support, encouragement and help during the course of my study.

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LIST OF ACRONYMS

CBNRM	Community Based Natural Resources Management
CoP	Community of Practice
DEBS	District Education Board Secretary
EE	Environmental Education
ESD	Education for Sustainable Development
FAO	World Food Agriculture Organization
IFAD	International Food and Agricultural Development
MACO	Ministry of Agriculture and Cooperatives
MCDSS	Ministry of Community Development and Social Services
MDGs	Millennium Development Goals
MKO	More Knowledgeable Others
MoE	Ministry of Education
MOH	Ministry of Health
MTENR	Ministry of Tourism, Environment and Natural Resources
SPSS	Statistical Package for Social Sciences
UNCHE	United Nations Conference of Human Environment
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNO	United Nations Organization
ZPD	Zone of Proximal Development

ABSTRACT

Education helps in the development of rational powers of people so that they can fully understand the physical and social environment in a scientific sense. Therefore, for any country to develop, it must invest in the education of its citizens. In order to attain Education for all by 2015, the Zambian Government has been putting up infrastructure in all communities where provision of education is feasible to ensure accessibility to education.

In Kasempa District of North-Western Zambia, the regular relocations of families practicing shifting cultivation seemed to affect school going children in the sense that such children did not fully get the benefits of infrastructure put up by the Government. This happened because shifting cultivation created long distances between children's homes and the schools they attended. This made accessibility to school facilities difficult. In this regard, the study was aimed at assessing the effects of shifting cultivation on school going children. Parents in the area of study gave various reasons for practicing this farming method and they acknowledged being aware of the largely negative effects of this practice on their school going children. The research set itself some objectives of determining why the Kaonde people of Kasempa District practiced shifting cultivation; assessing how sustainable shifting cultivation was; investigating the effects of shifting cultivation on school going children; and to propose an environmental education and sustainability curriculum that could be used in order to address the effects of shifting cultivation on school going children.

The population under study comprised of the District Inspectors of Schools from the district education office, teachers and pupils from five basic schools and; parents from the villages around these school. The study had a sample size of 105 respondents.

The methodology used in this research was descriptive survey. The research was both qualitative and quantitative in design. It was qualitative in that subjective views of Inspectors of schools, teachers, parents and school going children were captured and

taken into consideration. These included experiences, views, challenges and opportunities. The research also sought to establish a variety of themes to various responses that were coming out from the interviews.

Questionnaires and interviews were employed in this study to different stakeholders as some of the data collection tools. Observations made by school going children and their parents were recorded too. Interviews were conducted with parents practicing shifting cultivation and school going children while questionnaires were administered to teachers and school inspectors from the District Education Board Secretary's office.

An inquiry in to the study revealed various findings. Among the various findings, the study revealed that parents and guardians practiced shifting cultivation in their quest for fertile soils since they could not afford artificial fertilizers to boost soil fertility on exhausted land. The findings also revealed that shifting cultivation as a method of agriculture was not sustainable to both the environment and education. Various effects of shifting cultivation were cited but disturbance of children's education was the most prominent problem they cited in connection with shifting cultivation. In view of these findings, various recommendations were made, amongst which was the need to promote environmental education through community sensitization as well as formulation of environmental clubs in schools and communities of Kasempa District. It was also recommended that conservative methods of farming should be introduced on a large scale in the study area.

CHAPTER ONE

INTRODUCTION

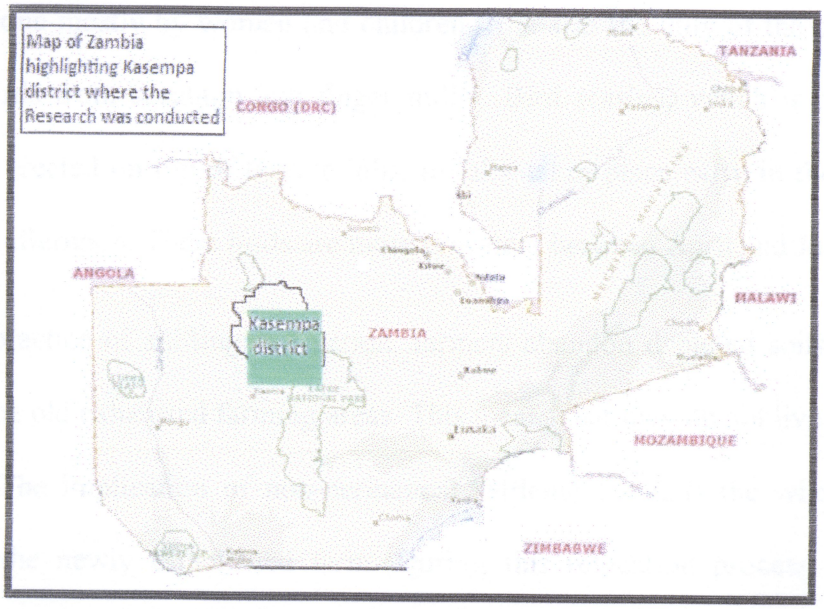
1.1 Background to the study

The livelihood of more than half of the economically active population in the developing world directly depends on the environment through agriculture, as well as animal husbandry, hunting, fishing, and forestry. To meet the expanded food needs of rapidly growing populations of developing countries, land in many areas is being unsustainably overexploited by local populations. Even as people strive to survive, it is important that they efficiently use environmental resources so as to attain sustainability. Sustainability in this case implies the need for careful balance between economic growth (improving people's quality of life) and environmental preservation. It is important to note that the future growth and overall quality of life of any country and its citizens critically depends on the quality of the environment and, therefore, the need to preserve the environment. The concept of 'Quality of life' encompasses socio-economic aspects of life which include among others, better education, better health, more jobs, higher incomes, greater attention to cultural and human values to mention but a few. In overexploiting the environment, some of these socio-economic aspects may be negatively affected.

In most African countries, of which Zambia is not an exception, subsistence agriculture has dominated the practice of local people. The development of agriculture in many African countries provides food for human sustenance and employment for its growing population. The inequality in food distribution globally and nationally leaves millions of

people near subsistence level. In the North-Western Province of Zambia, particularly in Kasempa District, many people are involved in this type of farming which is largely dominated by production for family consumption. Kasempa is one of the seven Districts of North-Western Province and it is largely inhabited by the Kaonde people. The location of Kasempa is shown on the map of Zambia in figure 1 below.

Figure 1: Location of Kasempa District on the Zambian Map



Source: Encarta Encyclopedia standard-2005 (modified)

Subsistence farming is the major livelihood in Kasempa District and of late there has been mining activities on a small scale. Farming activities in this area are dependant largely on natural rainfall, climate and soil conditions. One of the commonest agriculture practices employed by subsistence farmers in Kasempa District is shifting cultivation. This approach involves the indiscriminate ground clearance operations by cutting down of trees and shrubs, which are later on burnt to prepare the land for cropping activities.

Cultivation of the fields (majimi, as they are called in the local language) and planting of seeds are done mostly by women and children. It is also the duty of the children to scare away birds from sorghum and finger millet. Bird scaring, which is done from small shelters erected on top of termite hills, usually takes place early in the morning and late in the afternoon. These birds are more prevalent between April and June.

Through the practice of shifting cultivation, farmers abandon depleted soils for fresh sites leaving the old exhausted farming areas. This means that they do not live in a place permanently. The implication of non-permanent settlement entails the whole family relocating to the newly established farm. During this relocation process, the local farmers and their families move away from schools, health centers and sources of clean water (boreholes). This is easily done because customary land tenure is what is practiced in the district. This means that an individual, nuclear family, village, clan or ethnic group has the right to the land in their areas therefore they have the right and feel obliged to relocate to unoccupied or virgin land.

The photo in Figure 2 below shows a newly cleared land. The photo is relevant to the study as it helps in assessing how sustainable such form of land use is to the environment. According to the photo, the farmer and family cut down a small part of the forest when the dry season begins. The cut down trees are left to dry. When the cut-down trees are dry, they are burnt and reduced to ashes, which fertilize the soil. This practice is detrimental to the environment as it causes deforestation and subsequently degrading the land in question. In this regard therefore, the practice is not a sustainable form of land use.

Figure 2: A newly cleared bush

Source: (Field data, 2010)

The Kaonde people of Kasempa District practice shifting cultivation mainly because of the need for fertile land. However, the practice is unsustainable as it depletes soil

nutrients and families engaged in the practice have to keep on relocating in search of new and fertile land. Additionally, the practice of families relocating to new farms negatively affects school going children in terms of elongating the distance between their homes and the schools they attend.

Although there are many types of farming practiced in the world today, which include, among others, pastoral farming, fish farming, conservation farming to mention but a few, the most common type of farming practiced by the locals in many developing countries particularly in tropical regions is shifting cultivation. Early growers discovered the principle of shifting cultivation where a single plot was utilized for 2 to 5 years until further cultivation was no longer worthwhile because of a reduction in soil fertility or because the area had been invaded by a dense growth of vegetation from the surrounding forest. A new plot was then cleared to begin a new cycle of cutting, burning, planting and harvesting for several years. The growers learned that each abandoned patch had to be left fallow (unplanted) for 10 to 30 years to allow new growth of trees to become established and the soil to be renewed before it could again be used to grow crops (Miller: 1988) .

Some agricultural experts contend that shifting cultivation is the most environmentally sound way of growing crops on a sustainable basis in the nutrient-poor soils of most tropical rain forests (Silver and Defries, 1991). However, we could argue that this method of farming could be sustainable only if the population density and degree of land clearing both remained low. This type of farming involves a few years of cultivation on a piece of land which is then abandoned for a new virgin land, not only is there an abandonment of the exhausted piece of land but houses are also abandoned as

people re-locate. This relocation calls for the construction of new houses and cultivation of the new field preferably virgin land. It is important to note that a sustainable society implicitly entails one that is based on a long-term vision in that it must foresee the consequences of its diverse activities to ensure that they do not break the cycle of renewal. It must be a society of conservation and generational concern. It must avoid adoption of mutually irreconcilable objectives. Equally, it must be a society of social justice because great disparities of privileges will only breed destructive disharmony. Sustainable use of resources from the natural environment calls for efficient use of these resources and the preservation of biodiversity and maintenance of biological integrity. As much as humans aim at maintaining and enhancing their quality of life, Equity should be taken into consideration.

Given the limited amount of land that a farm family can cultivate in the context of a traditional technology, shifting cultivation is the most economic method used by individuals in some parts of Africa, South-East Asia and South America.

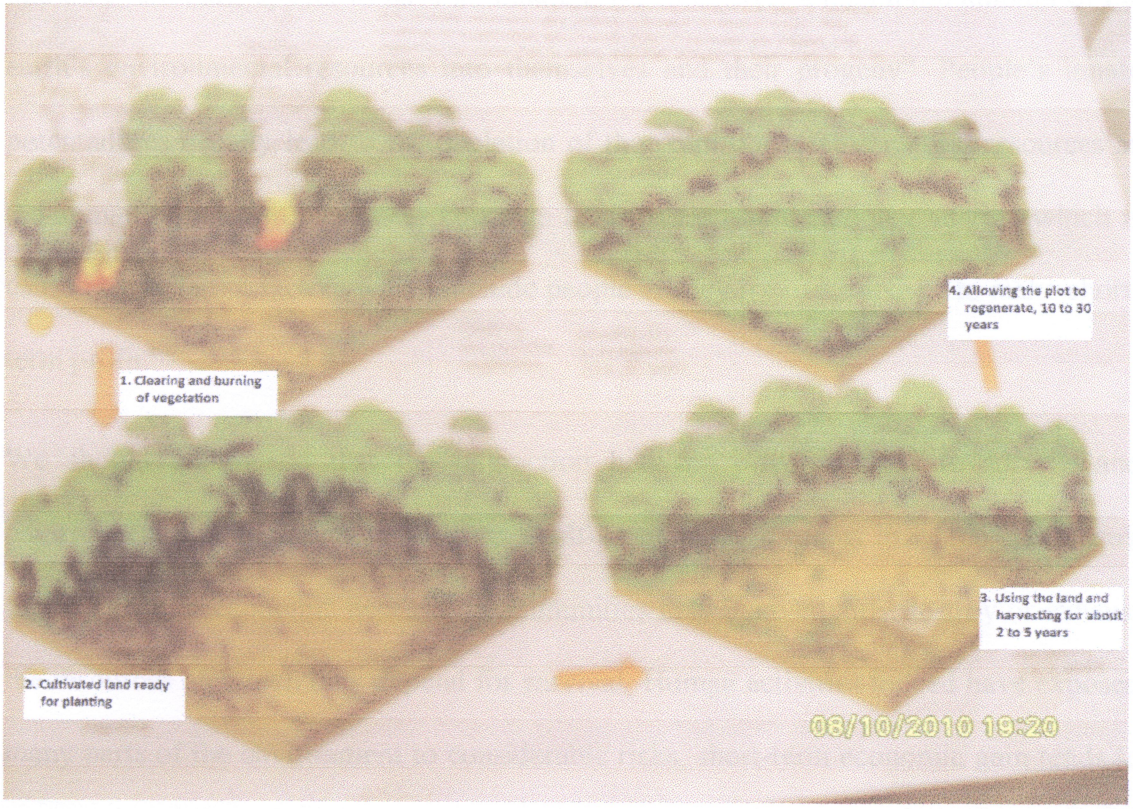
> "Shifting cultivation is practiced by primitive people in many parts of the under developed regions of South-East Asia, Africa and South America. It is known by different names in various parts of the world, for example, `Ladang' in Malaysia, `Taungya' in Burma, `Caingin' in the Philippines and `Milpa' in Rhodesia" Bunnet (2008:191).

Shifting cultivation is also practiced in the extensive savanna lands in Africa. In Zambia, for example, a number of ethnic groups practice shifting cultivation especially in areas where soil fertility is minimal. The Kaonde people of North-Western province are one of the ethnic groups that practice the shifting cultivation mode of farming. This form of cultivation is locally known by the Kaonde people as `Monde'. The process

involves cutting down the vegetation in and around the new fields and then burning them to obtain a bed of ash rich in potash, because of this, farmers do not use manure or fertilizers. This process is believed to improve the yields from the main crops which include sorghum, millet, sweet potatoes, and maize. The planting of these crops begins before the rain season starts. The same plot of land is cultivated year after year until the soil is no longer fertile. They cultivate a piece of land for about three years and then abandon it. Only after 2 to 4 years do they consider returning to it again believing that by then the soil would have retained its nutrients.

The process of shifting cultivation is demonstrated in figure 3 below. To prepare the land for planting, small patches of the forest are cleared by cutting down trees and other vegetation and then burning the underbrush, this process is shown in part 1 of figure 3. Once the land is cleared, it is then cultivated in preparation for planting as shown in part 2. The land is used for farming and harvesting for about 2-5 years as shown in part 3 of figure 3. After the plot has been used for several years, the soil would be depleted of nutrients or reinvaded by the forest. Then the farmers or growers clear a new plot once they learn that the land had become infertile. The abandoned land is left fallow (unplanted) for 10-30 years before the soil become fertile enough to grow crops again, this is shown in part 4 of figure 3 (Miller:2003).

Figure 3: The process of shifting cultivation



Source: Miller. G.T, JR. (2003: p 25)

The practice of shifting cultivation was known to be a sustainable method of cultivation several hundred years ago. This is because once the plot was left fallow for years, the patches were regenerating, and growers used it for medicines, fuel wood, and other purposes. However, the practice was sustainable only then due to the small population, but with the rapid growing population of today which is heavily dependent on the environment for survival, the practice is unsustainable as it has proved to be degrading the environment.

In an effort to survive, people have engaged themselves in activities that have brought more harm than good to the environment. Amoako-Atta (1997:1) argues that "humans, like other animals, appear to have an innate drive to convert a maximum amount of the earth's environmental resources into themselves and their progeny". People's innate potentialities usually lead to the depletion of the readily available natural resources as the human population increases. This also leads to environmental degradation which is caused by different factors which include people as they try to survive or to make short-term profit.

We should understand that the interaction between poverty, need to survive and environmental degradation can lead to a self-perpetuating process in which, as a result of ignorance or economic necessity, communities may inadvertently destroy or exhaust the resources on which they depend for survival. Human activities indeed have exposed many parts of the environment to considerable risks, short-term economic gain tends to outweigh most other considerations, including that of the environment and this is because humans have a tendency to worry more about the present than the future (Todaro:2009). Overpopulation, over consumption and greed, are some of the main problems facing our environment in this generation. Humans want too much of everything and the result is that, they are putting excessive demands and pressure on the natural environment.

It suffices to say that most forms of land degradation tend to increase with population growth, but the real situation is not that simple because environmental degradation varies with the technological methods and the type of resources people use. The total environmental degradation in a given area depends upon three factors; the number of

people, the amount of resources each person uses and the environmental degradation resulting from each unit of resource used.

The increased pressure on the natural resources caused by human activities threatens the environment's ability to supply man with adequate amounts of food, water, and other basic essentials needed for life. As environmental educators it is our duty to provide necessary environmental education to people in the study area in order to avoid the depletion of land and other important natural resources so as to facilitate the efficient use of the limited resources needed for human survival.

1.2 Relevance of Environmental Education

Environmental Education (EE) means the educational process dealing with mankind's relationship with his natural and man-made surroundings and includes the relations of population, pollution, resource allocation and depletion, conservation, transportation, technology, energy and urban and rural planning to the total biosphere. It does not merely aim at imparting knowledge and understanding of man's total environment but also at inculcating skills, attitudes and values necessary to understand and improve the biosphere and the troposphere. As we may be aware, environment is a global concept today. Therefore, environmental education is an approach to learning and not a subject to study. In other words it endeavours to create a way of thinking requiring individuals to overcome prejudices. Environmental education helps in programming learning experiences ranging from the simple to the complex. This is because we know that an environment is full of concrete things which people may examine, classify, interpret and then draw their conclusions. The principle of EE is that it makes learners' education

problem-based for understanding the environment and hazards of its pollution. Therefore, the sustainability curriculum which has been proposed in this report has taken the aims of EE as discussed in the preceding paragraphs.

1.3 Statement of the Problem

The practice of shifting cultivation among families on the outskirts of Kasempa District is one way of guarantying families of household food security. However, the practice seemed to have posed some negative effects on school-going children. There was an existing knowledge gap between the need to survive through the practice of shifting cultivation among families on the outskirts of Kasempa District and the effects of shifting cultivation on school going children in the Kasempa. It was therefore important to bring to the knowledge of people in the study area the negative effects of shifting cultivation on school-going children and through proposing a sustainability curriculum, people would be enlightened on educational activities that would help the community to engage in practices that were sustainable even as they sought means of survival. In this regard, the study was aimed at investigating the effects of shifting cultivation on the school-going children. The study also aimed at proposing a sustainability curriculum to address these effects on school-going children of Kasempa District.

1.4 Dimensions of the problem

The effects of shifting cultivation on school going children take many dimensions globally and nationally. In the Zambian case and more particularly in Kasempa District, this study made an effort to identify these dimensions. Firstly, the government spent considerable amounts of money on building schools. It did this with the hope that pupils would gain knowledge and contribute to the development of the nation. Through the

skills and knowledge imparted on pupils, they should have been in a position to help find solution to problems that threaten the livelihood of people in their communities and Zambia as a whole. In their ignorant state, parents were not in a position to offer guidance let alone solutions on how best to handle the crisis. This being the case, their children who dropped out of schools because of this practice would be considered irrelevant to the development of their communities and the nation as they did not stand up to be counted when need arose.

Secondly, the effect of this practice was a great danger to the future of the communities and the nation as a whole as it portrayed a lack of educated individuals who could develop the country in the near future, which is, leaders who would be willing to act and make a difference when duty called.

Thirdly, the effects of shifting cultivation on school going children in these communities put these communities and the nation at large in a very vulnerable position as their parents who were expected to address the problem were not doing anything about it. This therefore meant that, these effects were nowhere near an end as the people who were supposed to find workable solutions to the problem had opted to pay a blind eye to it.

1.5 Purpose of the Study

The purpose of the study was to determine the effects of shifting cultivation practiced by the local people in Kasempa District on school going children. The study also aimed at establishing Environmental Education activities to be used by the local people of Kasempa district in sustaining the education of their young children in the area of study.

1.6 Objectives of the Study

The objectives of the study were:-

1. to determine why the Kaonde people of Kasempa District practiced shifting cultivation.
2. to assess how sustainable shifting cultivation was.
3. to investigate the effects of shifting cultivation on school going children.
4. to propose an environmental education and sustainability curriculum that could be used in order to address the effects of shifting cultivation on school going children.

1.7 Research Questions

In view of the research problem described above, this study tackled the following general research questions:

1. Why is shifting cultivation practiced by the local people in Kasempa District?
2. How sustainable is this practice at the moment?
3. What are the effects of shifting cultivation on school going children?
4. What environmental Education activities should be used to address effects of shifting cultivation on school going children?

1.8 Significance of the study

The findings from this study would help people in the study area to be more conscious of their economic activities as they would strive for activities that would preserve the environment and settle in permanent places. Additionally, the information obtained during this study would help in exploring the sustainable use of land and also help the Ministry of Agriculture and Cooperatives (MACO), Ministry of Tourism, Environmental and Natural Resources (MTENR) and Ministry of Education (MoE) to apply appropriate measures in the sustainable use of natural resources like land and forests and the provision of quality education respectively.

1.9 Limitations of the study

In view of the research conducted, this study encountered a numbers of limitations which include among others:

- Limitations in time and funds which made the study to be taken just as a case of Kasempa District. This means that the findings could not be generalized to other districts in the province where this type of farming was practiced.
- Due to time and finances, the sample size was limited to about hundred and five respondents for the whole district. A bigger number of respondents would have been better so as to reduce on the margin of error.
- It was difficult or a challenge for the researcher to meet parents who practiced shifting cultivation on time due to the bad state of the roads that led to new farm lands.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This Chapter brings out literature regarding the topic under study. The chapter starts by reviewing empirical research on shifting cultivation and thereafter, discusses the theoretical framework adopted by this study in explaining the effects of shifting cultivation on school going children. Different literature is reviewed starting with the International then followed by local sources. Existing literature shows that agriculture is by far the widest form of human activity and it is more basic than any industry. The literature also reveals that shifting cultivation is a common practice among agrarian societies of Africa. Many scholars have written on effects of shifting cultivation, however, their literature does not provide all the knowledge that society requires in filling the existing knowledge gaps. The empirical research in the first part of this chapter presents some of the literature on the subject.

2.2 Empirical research on Shifting Cultivation

A research was conducted which broadly covered different aspects of shifting cultivation in Bhutan, including some details on the status of contemporary land use practices in the country and problems associated with them. This study in Bhutan was needed because the problems of shifting cultivation could not be isolated from overall land use, agricultural development and socio-economic development problems prevailing in the country. One of the objectives of the study was to give a proposal for a programme aimed at resolving some of the problems deriving from the extensive

practice of shifting cultivation through the gradual replacement of this practice with viable alternatives. The objective of this study called for much more focused analysis of land use problems in general, and shifting cultivation in particular. However, the study did not focus on the effects of shifting cultivation on school going children rather it concerned itself with the environmental effects (http://www.fao.org/docrep/006/v8380e/v8380E01.htm).

The commonly held view from the research findings was that shifting cultivation paid back low remuneration when the production per unit area was converted into market value, and that this practice also involved extensive and systematic destruction of the forest and its produce, which constituted a tremendous loss of valuable resources to the country. The findings also revealed that shifting cultivators could never enter into the cash economy since they were isolated from the market and they could hardly build surplus. Thus, shifting cultivators had limited financial resources to invest for increasing productivity, which instead remained low. Therefore, shifting cultivation was an economically inefficient land use practice. This argument was quite appealing, and to some extent could not be denied. However, the study in Pema Gatshel district revealed several contradictions.

In this district, it was calculated that a high altitude shifting cultivator harvested a crop worth the equivalent of a net daily wage amounting to Nu. 26.50, while a lower altitude cultivator harvested the equivalent of about Nu. 25 per day of labour. These returns compared very favourably to the average district wage rate, which varied from Nu. 10 to 20 per day depending on the type of work.

In Pema Gatshel, most families combined sedentary agriculture with shifting cultivation. The result was a complex set of farming systems in which farmers were diversifying production to satisfy cash income needs from permanently cultivated land and subsistence needs from shifting cultivation. If this trend continued, many subsistence farmers could become commercial farmers in a few years time.

It was undoubtedly true that there had been significant damage to national resources due to the conversion of natural forest for shifting cultivation in Pema Gatshel. On average, about 186 m3 of growing stock was cut and 5.4 m3 of net annual yield was lost for every hectare of land prepared for shifting cultivation. However, in return, the land under shifting cultivation provided fuel wood for many families, had a food production value equivalent to Nu. 890-1 500/ha/year, and provided grazing opportunities for a number of cattle.

In relation to environmental concerns often associated with shifting cultivation, the study findings in Bhutan revealed that shifting cultivation was often perceived as a destructive practice leading to accelerated environmental degradation, and previous policy documents of the government reflected this belief. It is believed that this practice had led to the destruction of forests, soil erosion and loss of soil fertility. It was also believed that it contributed to degradation of watershed conditions and the overall natural environment. A strong negative association linked to local religious traditions includes the belief that shifting cultivation was a "sinful act" since it led to the death of many insects during burning. Again, the study findings and conclusions on these issues in Pema Gatshel district somewhat contradict these views.

The study also revealed that the delicate farm environment found in most parts of Bhutan was characterized by very limited land for permanent cultivation, a scarcity of skilled farm labour for adopting mechanical conservation measures and a shortage of capital to acquire external inputs or labour. Shifting cultivation had therefore been adopted to circumvent all of these constraints. The practice was ecologically more stable than existing permanent cultivation practices. It had produced relatively less environmental impact where the farmers had strictly followed the traditional norms developed through generations of indigenous experience.

The study also revealed that in similar environmental conditions in neighbouring countries; forests had disappeared where sedentary cultivation practices had been adopted. As a consequence, serious problems of soil and environmental deterioration had occurred. Therefore, traditional shifting cultivation practices in Bhutan should probably not be qualified as "destructive."

Observation in the field confirmed that traditional shifting cultivation was an ecologically stable cultivation practice in Pema Gatshel, where the farm environment, among other things, was mainly at subsistence level and characterized by a non-monetized economy. However, owing to recent socio-economic changes, such as demographic pressures, incentives for cash cropping, changes in the traditional systems of shared communal labour and many others, the traditional norms for shifting cultivation were falling out of use. As a result, adverse environmental impacts were emerging.

Most serious problems in soil and environmental deterioration occurred where shifting cultivation and long-term fallow systems had been replaced either by drastically shortened fallows or by continuous cultivation. The problems were the result of the removal of vegetative cover and longer or continuous periods of cultivation without adequate fertility regeneration or application of soil conservation techniques (FAO, 1984).

The present rate of socio-economic change in Pema Gatshel district suggests that it would be extremely difficult to maintain the traditional norms used for cultivating tsheri land. Development of alternatives to shifting cultivation had become inevitable if the natural resources were to be used on a sustainable basis. However, such alternatives could not be developed overnight. A moderate beginning to seek alternatives had become urgent.

Another research was conducted on the primary schools of Zhejiang Province in China by Cheng Kai-ming. This research was carried out in 1996. The objective of the study was to understand the quality of school functioning and its environment. The study adopted a combination of quantitative and qualitative methods to make an in-depth analysis of five clusters of primary schools located in different parts of Zhejiang, ranging from a highly developed urban zone to an underdeveloped rural locality. Apart from identifying critical factors that explain variations of school quality in different development contexts, the study gave a number of pointers for improving the functioning of basic education services in the province of Zhejiang.

The findings from this study revealed that drop-outs at primary level occurred mainly in poor areas or areas of ethnic minorities. The reason behind these drop-outs was the nomadic way of life of the pupils' parents particularly those who practiced shifting cultivation as the practice elongated the distance between their homes and the schools they attended. The study also revealed that the large percentage of school drop-outs were either due to economic or academic reasons. The economic reasons being either the inability to bear the costs, or the attraction of more rewarding economic activities, this was especially true for large percentage of junior secondary pupils drop-out in the province. The academic reason was mainly the inappropriateness of the curriculum.

A research of a similar kind was also conducted on the primary schools of the state of Puebla in Mexico by Sylvia Schmelkes in 1996. The main concern of the study was to understand the quality of school functioning in a contextual fashion. The study adopted a combination of quantitative and qualitative methods to make an analysis of five clusters of primary schools located in different parts of Puebla ranging from a highly developed urban zone to a remote rural area. Apart from identifying critical factors that explained variations of school quality between different development contexts, the study drew a number of policy implications for improving the functioning of basic education services in the state of Puebla.

The research findings revealed that schools in communities which practiced agriculture, particularly shifting cultivation, had negative effects on school going children. There was a large percentage of school drop-out and absenteeism among pupils. The study showed that drop-outs at primary level occurred in small percentages mainly in small pockets of poor areas or areas of ethnic minorities. Heavy drop-outs occurred, however,

in the junior secondary years. Large percentages of junior secondary pupils drop-out due to economic reasons. Pupils spent their time on the farms helping parents grow food for their consumption and to a lesser extent for sale instead of attending school.

Another research was done in eastern and north eastern regions of India where Shifting Cultivation was practiced by the local communities. The research was conducted by Rajan and Upadhyay in 1999. The main objective of the study was to establish the negative effects of shifting cultivation and assess the sustainability of the practice. The research findings revealed that the practice of shifting cultivation was an extravagant and unsustainable form of land use. The study also showed that the evil effects of shifting cultivation in that place were devastating and far-reaching in degrading the environment and ecology of these regions. Additionally, the study showed that the practice of shifting cultivation had negative effects on school going children in that absenteeism among pupils had increased because the nomadic way of life of their parents elongated the distances between the pupils' homes and the schools they attended. In order to address the problem, a project was carried out and it aimed at the diversification away from agricultural to non-agricultural activities. Weaving and handcraft were introduced and when their output increased villagers did not need to rely upon upland rice for their immediate food supply and were able to generate sufficient cash resources from the sale of weaving and handcraft products to purchase their food requirements. This was also compensated for by the fact that irrigated production was substituted for shifting upland rice cultivation. Consequently, the reduction in shifting cultivation was neutralized by the irrigated production.

2.2.1 Effects of shifting cultivation on the environment

Generally, people are indifferent to their environment. Newton's third law of motion states that, 'to every action there is an equal and opposite reaction' (Muunyu: 2005). This equally applies to man's relationship with nature as it relates to application of force on inanimate objects. While humans sought domination over nature in 5,000 years of recorded history, they had in the last 50 years begun to realize that their welfare and their every existence was deeply intertwined with the natural cycle and systems.

Human beings are unique in many ways and one of these is their ability to subordinate nature and natural resources. So long as the requirements of their economic activities were small in relation to global stocks of critical natural resources, they could count on improving their welfare. However, their economic activities had increased at an exponential rate during the past several decades with the result that the earth's resource base and life support systems had become vastly depleted. The principle manifestations of these impacts were on the global climate, the intricate web of forests, ecology and diversity of living beings and increased transparency of the earth's atmospheric protective shield to harmful ultraviolet radiation. All these were related directly with people's economic activities and with each other. They all had serious implications for their future well-being (Panneerselvan and Ramakrishnan, 2005).

In relation to environmental concerns often associated with shifting cultivation, shifting cultivation was often perceived as a destructive practice leading to accelerated environmental degradation. It was believed that this practice had led to the destruction

of forests, soil erosion and loss of soil fertility. It was also believed that it contributed to degradation of watershed conditions and the overall natural environment.

Although there were many factors that influenced shifting cultivation, soil factor was the major one because different types of soil were suitable for different crops. Basically, most of the effects of shifting cultivation had to do with the quality of soil. When shifting cultivation was practiced in a place, there was clearing of trees (deforestation) which was followed by burning of the dried-up trees. The clearing of trees was done without immediate replanting of new ones; the bare soil was exposed to rain and wind erosion. In conditions of heavy rain, the water was no longer intercepted by the leaves and branches, nor absorbed by the tree roots but flowed off the slopes as a sheet of water causing sheet erosion. The fertile top-soil was removed but was usually deposited at the bottom of the slope, often in streams or river beds. When this happened the rivers were made shallower by the materials on their beds and consequently flood more easily since they could not cope with heavy run-offs. Currently many developing countries where forest removal was not matched by timely replacing were facing problems of floods.

The fire that was used destroyed practically everything thereby disturbing the ecosystem of the place. Instead of rotating the crops in the same field to preserve the fertility of the soil, the shifting cultivators moved to a new land abandoning the exhausted one. In the case of the Kaonde people, though the initial harvests from the cleared `moondes' (farms) were satisfactory because of the virgin land containing much humus and ashes, yields soon dwindled and after few years the `moondes' were abandoned again. If left untilled for many years, a secondary forest cover grew up and

soil fertility was gradually re-established. But if the fallow period was only few years, the land could not regain minerals and humus and was permanently impoverished.

Both monoculture and over-intensive multi-cropping which was mostly practiced by people in places where shifting cultivation took place were unsatisfactory because they exhausted the soil. Most plants usually made a demand on particular mineral compound and if the same type of plant was grown over a number of years, then the soil would become deficient in this mineral. When this happened, the soil deteriorated making the soil barren.

Crop rotation however allowed a wide range of crops to be grown without allowing the field to lay fallow but without depleting the soil. By growing different crops in successive years in the same field, plant nutrients used by one crop could be replaced by another. For example, potatoes require much potash but do not exhaust nitrates. Therefore, they could be rotated with wheat that uses nitrates in the soil (White: 1998).

2.2.2 Natural Resource Management

Natural Resource Management and Conservation are a key requirement to a country's sustainable development. In an effort to try and alleviate the effects of unsustainable use of natural resources, there was a growing national consensus in Zambia for the need of community based natural resources management. The Community Based Natural Resources Management (CBNRM) was the right approach for managing natural resources and also a useful strategy for alleviating poverty in the rural areas. Communities, traditional leaders and politicians alike were pressing for a larger share of the revenue benefits to be returned to community constituencies for their efforts in

conserving natural resources. From time immemorial, local communities together with their chiefs had customarily been the custodians of their natural resources. Mbewe et al (2005:19) argues that "in the Barotse kingdom, for example, as early as 1800s, several villages co-owned open access resources and designated areas as wildlife sanctuaries and forest resources. In addition, systems were in place to share benefits (harvests, off-takes) and to establish storage facilities for use in emergencies".

Although the management of these resources was done effectively by the local community in the past, it was possible because the population was small and people harvested only the natural resources to support their families. However, with the rapid increase in human population and commercial activities, it had become hazardous to leave the management of these natural resources fully under the control of the local communities because many natural resources would be exploited thus compromising the ability of the future generation in meeting its needs.

Mbewe et al (2005) further argue that Zambia's natural area (Forests, wetlands areas and Wildlife sanctuaries) extend over approximately forty percent of the country. Managing resources that were spread over such a vast area by the government alone had been prohibitively expensive and logistically impractical. As a result, enforcement of natural resource management laws in the past years had generally been difficult and many biological resources were then threatened by illegal harvesting and the conversion of wildlife habitat and forests into other land uses, mainly for subsistence agriculture (for example, shifting cultivation) which had more effects on these natural resources.

A research conducted in Bhutan revealed that there was environmental concern in Bhutan as a result of inappropriate land use and poor land husbandry practices. In spite of this, however, the degree of environmental degradation in Bhutan was not as alarming as its neighbours in the Hindukush and Himalayan ranges. Contributing factors to this comparatively better natural environment in Bhutan were the low population density and less intensive natural resource utilization, that is, the predominance of subsistence rather than market farming greatly contributed to this. (http://www.fao.org/docrep/006/v8380e/v8380E0.htm).

In the absence of adequate infrastructure and institutional arrangements, as was the case in Bhutan and many other countries, intensification of land use based on a land use capability survey was not equivalent to environmental protection. Very often, intensification of land use without adequate supporting infrastructure had resulted in adverse impacts such as depletion of soil fertility due to loss of soil nutrients and substantial soil erosion. In a fragile environment like Pema Gatshel district, where supporting infrastructure was poor, the land use practices were less damaging than high-intensity crop production practices without management. The practices relied on natural processes such as nutrient cycling to maintain soil fertility.

Resource management and conservation were key requirements for successful long-term economic growth. In Bhutan, for example, the rate of forest land degradation due to uncontrolled grazing had been documented, as had soil erosion from wetland (chushing) and rain-fed (kamshing) farming. Siltation and other physical resource problems had been reported in several watersheds in the country. Early preventive

action leading to appropriate land and water management practices was highly desirable if the mistakes committed by neighbouring countries were to be avoided.

Due to the need for natural resource management in Zambia, there had been growing recognition in recent years of the need to re-invest power and decision making process in the hands of communities and to establish principles of local ownership of natural resources. Developments of this kind had primarily been based on wildlife management but were now becoming more common within other sectors. Furthermore, significant efforts had also been made to incorporate the concept of CBNRM into the legislative and policy framework. The forest policy of 2000 (supported by statutory instrument No. 52 of 2002) reflected progress in the 'area of policy and legislative reform that made provision for new systems of national resource management. The forest Act No. 7 of 1999, which provided for community involvement, had not come into effect because of financial, legal and administrative huddles. It must be noted that non participation of the community in natural resource management denied them the intended benefits.

One of the programmes in the forestry sector was the International Food and Agricultural Development (IFAD) project working in conjunction with Africare and Keepers-Zambia, which was operating in the North Western and Luapula provinces. The project was focused on the development of honey and bamboos for the benefit of local communities. Although Keepers-Zambia had been operating in Kasempa District, information about the preservation of natural resources, Environmental Education (EE) or Education for Sustainable Development (ESD), was not provided in its programmes. In addition to what was being done, Keepers Zambia should have also aimed at sensitizing the local community on the sustained use of natural resources and

enlightening them on the negative effects of un-sustained use of natural resources. They should have further aimed at reducing the practice of shifting cultivation by introducing sustainable sedentary farming systems while providing for improved standards of living, not only from a livelihood perspective but in broader socio-economic terms.

Although some local people in Kasempa were receiving chickens under this project, the best would have been livestock like cattle and goats which could later be traded to give them sustainable income. Non-agricultural activities such as bee keeping could also have contributed to raising the standard of living for the shifting cultivators. Once this was done, the children who were usually affected by shifting cultivation would have had access to other public services such as health and education as there would have been a reduction in relocations. The project was also supposed to consider the need of introducing new approaches to land allocation, land use planning, and long-term user rights.

Kasempa District is richly endowed with natural resources which include forests that could provide a basis for sustainable development for the district. However, pressure on these resources had been on the increase due to the increase in poverty, lack of community involvement and absence of law enforcement, resulting in illegal off-take, over exploitation and environmental degradation. Rajan and Upadhyay (1999) explain the case of India where the practice of shifting cultivation in eastern and north eastern regions of India was an extravagant and unsustainable form of land use. The evil effects of shifting cultivation in that place were devastating and far-reaching in degrading the environment and ecology of these regions. In order to address the problem, a project was carried out and it aimed at the diversification away from agricultural to non-

agricultural activities. The country had a number of general and sectoral laws relating to environmental protection with a number of ministries having a bearing on the environment and several pieces of legislation. There was lack of coordination among Ministries on economic development, natural resource management and environmental protection and as a result, it became difficult to implement the laws. In addition, much of the legislation did not contain specific provisions and detailed criteria for resources. Some of the legislations' provisions were outdated and could not be enforced.

2.2.3 Environmental Constraints at Local level

In developing countries, much natural resource exploitation had been locally unsustainable and had occurred in a manner and on a scale that often by passed the poor. Poor forest management in the catchment areas had resulted in increased deforestation leading to environmental problems such as siltation, drying up of rivers and land degradation. Part of the solution was "pro-poor governance," with the genuine empowerment of poor people and their communities to assert their rights. There was therefore, need to empower local natural resources committees to improve the management of catchment areas.

In most cases, there was lack of baseline data on most of natural resources that existed in many areas. There was need to have this established to avoid a situation where decisions being made impacted negatively on the environment. A serious weakness existed when it came to monitoring of natural resources situation in most sectors. Monitoring systems did not exist and where they existed probably they had just been introduced or they were not fully functional. In some cases, the importance of these

systems had been forgotten completely. Monitoring was another area that needed attention because it should set the basis for decision making that could in turn address the problem of environmental degradation which affected many communities in the country.

2.2.4 Environmental Opportunities

Recognition was growing that insufficient action had been taken to reduce environmental hazards. However, it had been realised that regeneration of the deforested areas was vital in restoring the forestry diversity. A forestry inventory conducted in Mumbwa in 2002/2003 suggested that many areas had potential for forests to regenerate (Mbewe et al, 2005). If the regeneration going on was not disturbed then there was potential for forest resource base to improve in the near future. Protection of the remaining forest reserves against degazzeting, cultivation and lumbering was another issue that needed serious consideration.

It was sad to note that in the recent past a number of protected areas had been de-gazzeted to give room to cultivation and settlement. There was need to put in place environmental management measures that were practical and those which involved putting in place mechanisms that assisted in the regulation and control of the utilization of environmental resources which included among others land, forest, water to mention but a few. The regulatory mechanisms should have been a result of deliberate efforts made by the various actors in environmental management.

For example, Kasempa District has rich forest resource base which if tapped in a sustainable manner could provide resources to all communities. Non-timber forest

products such as mushrooms and honey were a huge potential and this could make a huge difference to the livelihood of the local communities where cash being raised from the sale of these products would go into their pockets. Producing things like honey and growing fish had proved that communities could raise enough money with minimal effort relative to crop growing more especially with the efforts needed in the land clearing.

2.2.5 Community Environmental Education

Most environmentalists believe that learning how to live more sustainably took a foundation of environmental or earth education. It had come to the realization of many people in the world today that many calamities being experienced such as floods or droughts were as a result of the un-sustainable use of the natural resources by man. Therefore, there was an urgent need to provide education that could help individuals in each community build a sustainable future. The principal focus for educators and all those concerned about humanity's environment was to see how best they could help people at all levels; individual, group or corporation to make sound social choices and decisions. This was because there was a general lack of educational programmes to plan the environmental education process from the beginning, inside and outside the formal school system. Environmental education should be aimed at developing respect or reverence for all life form. There was need to evaluate the beneficial and harmful effects of one's lifestyle and profession on the earth, today and in the future.

Environmental education is multi-faceted therefore could not be treated as a single subject entity like mathematics, biology or commerce. The need here was to provide

education in problem solving so that, faced with an environmental problem, an individual would quickly come to understand that sound environmental decisions depended upon a host of interacting factors, such as scientific principles, available technology, personal and social values, financial resources, local constraints, to mention but a few. Therefore, the emphasis should have been placed on the interdisciplinary nature of environmental education which means that it should become a part of every subject taught. In studying pollution for example, a biology class would consider its effects on health; a chemistry class would examine certain techniques for combating it, while a Commercial or an economics class would look at the costs of pollution and anti-pollution measures.

Failure to plan the environmental education process in this manner involved the failure to conceive all formal and non-formal education as mutually complementary in developing an environmentally aware and competent generation. The result was total failure in assisting both the youths and adults to become more knowledgeable concerning the environment and its associated problems, to be more perceptive, aware and skilled in efforts to solve these problems and more highly motivated to work towards their solutions. Generally speaking, environmental education would aim at inserting more harmoniously each person or group in the environmental system of which they form a part and on which they depended on for their survival.

2.2.6 Ecological problems due to Shifting Cultivation

The rise of agriculture-based urban societies created an environmental impact far exceeding that of hunting and gathering societies and early subsistence farmers. Forests

were being cut down and grasslands were ploughed up to provide vast areas of cropland to feed the growing populations and provide wood for fuel and for building shelters. Such massive land clearing destroyed and altered the habitats of many forms of plant and animal wildlife, endangering their existence and in some cases causing or hastening their extinction. It was therefore important for man to try to understand and work with the rest of nature to help sustain the natural resources, biodiversity, and adaptability of the earth's life-support systems. When nature was altered to meet human needs or wants, there was need to carefully evaluate the proposed actions and choose methods that did the least possible short and long term environmental harm. In addition, people should strive not to cause the premature extinction of any wild species. The best way to protect species and individuals of species was to protect the places where they lived and to help restore places that had been degraded. Poor management of many of the cleared areas lead to greatly increased deforestation and soil erosion thus lack of preservation of biodiversity and maintenance of biological integrity.

The practice of shifting cultivation in eastern and north eastern regions of India was an extravagant and unscientific form of land use. Rajan (2004), shows that the effects of shifting cultivation were devastating and far-reaching in degrading the environment and ecology of these regions. He indicated that the earlier 15-20 years cycle of shifting cultivation on a particular land had reduced to 2-3 years. Rajan's findings were similar to the findings established by this research.

According to the findings from this study, initially people could use one piece of land for more than 10 years. However, of late, one area could only be used just for a period of between 2 to 4 years. This had resulted in large-scale deforestation, soil and nutrient

loss, and invasion by weeds and other species. This was indicated as one of the disadvantages of shifting cultivation by pupils who said that cutting of trees leads to the abnormal growth of grass in many areas. In addition, deforestation made the indigenous biodiversity to be affected to a large extent because this practice destroyed the habitats of many organisms thereby affecting the ecosystems of the cleared forests.

To mitigate the environmental loss and to provide other alternatives of livelihood to the local population in the area of study, the researcher made an attempt in this report to suggest environmental management options (sustainability curriculum to address the effects of shifting cultivation on school going children) for parents who practice shifting cultivation.

The increase in human population, particularly in the areas where shifting cultivation was practiced, had put tremendous pressures on the land. The extension of crop lands, for increasing food production, had been directly responsible for the reduction in areas under forests and grass lands.

> "According to one estimate, about 40% of the land surface of the earth was converted into crop lands and permanent pastures by early 1990s. More than 6% area under tropical forests was converted to shifting cultivation between 1980 and 1990 across all tropical countries. About 10% of forest land was converted to shifting cultivation in Asia during the above period. It is estimated that each year approximately 1.9–3.6 10 ha land of primary close forests, 3.4–40 10 ha land of secondary close forests, and 6.9–21.9 10 ha land of secondary open forests are being lost due to shifting cultivation". World Food Agricultural Organization (FAO, 2005:)

Shifting cultivation was prevalent mostly in tropical countries. In India, the people of eastern and north-eastern region practiced shifting cultivation on hill slopes. Most of the total cultivation in northeast India was by shifting cultivation. Due to increasing

requirement for cultivation of land, cycle of cultivation followed by leaving land fallow had reduced from 20-30 years to 2–3 years. Earlier the fallow cycle was of 20–30 years duration, thereby permitting the land to return to natural condition. Due to reduction of cycle to 2–3 years, the resilience of ecosystem had broken down and the land was increasingly deteriorating (Miller, 2003).

2.2.7 Effects of Shifting Cultivation on Education

In March 1990, 155 member states of the United Nations Organization (UNO) adopted the world declaration on Education for All in Jomtein and agreed upon a Framework of action to meet fundamental educational needs capable of realizing the goals set forth in the framework. Thereafter, it was the duty of each country to achieve the goals set at the conference (Govinda & Wright, 1994). Good quality education brought many personal, social, economic and educational benefits. It enabled children to realize their potential, as they developed and prepared for adult life. It promoted desirable attitudes, values and ways of behaviour and opened the minds of pupils to new ideas. Education made the children environmentally conscious and helped them develop a desire to make the world a better place and, hence act on this desire. This was as true of basic as well as of other levels of education especially as basic education laid the foundation on which all further education was built. The goal of the MoE in Zambia was that every child should have access to nine years of good education, Ministry of Education (1996). In Nigeria the national policy on education had placed emphasis on providing unhindered access to qualitative basic education to all citizens irrespective of their gender, social class, ethnicity, occupation and religion, Tahir et al (2005). It was recognized to an extent that

there were no uniform, standard solutions to the problems arising from the expansion and improvement of basic education in the world today.

As a social need of every citizen, education could profoundly be negatively affected by a diverse range of forces. It was therefore important in any meaningful assessment of the status of education for all in a country to map out these intervening forces and their possible impact on basic education programmes. One of the forces that negatively affected education was the demographic factor. Demographic factor had to do with the population distribution features. Settlement pattern, for example, could lead to variations in population density for different parts of each country. It had been realized that the sparse population density and scattered habitation patterns of shifting cultivators posed a serious challenge to the accessibility and provision of education among school going children. In Ethiopia for instance, Wright (1994:33) discovered that "the sparse population density and scattered habitation patterns of pastoralists and agro-pastoralists in the lowlands, posed serious challenges for equitable provision of education". According to the All Indian Educational Survey of the NCERT, conducted in 1986, nearly one out of every two children enrolled in rural schools dropped out without completing even five years of schooling. This was mainly due to the nomadic way of life of their parents, Govinda (1995).

The living condition of pupils was another factor that affected education. Although physical accessibility was one of the crucial factors which had a bearing on the ability of the population to avail itself of schooling facilities, as seen from the peculiar social and physiographic conditions in which rural habitations were organized, the relationship between distances and accessibility acquired different nuances in different places which

needed to be analyzed differently. There was a well known gap in living conditions between urban and rural areas. Children from rural areas and those from marginal urban areas as well were prevented from taking full advantage of education offered to them by the absence of certain basic services such as water, electricity and by many other material problems. This situation was worsened by the practice of shifting cultivation where the relocations increased the distance between farm lands and service centres (schools, clinics and clean water).

> "in the indigenous zone of Puebla, for example, half the pupils live with their entire family in a single room, only one third of households visited have electricity and only one half have radio, in Zhejiang, half of all students in the urban site have their own room, in rural areas this is a the privilege of only one or two out of five students. To live in houses made of mud walls is still common in the less- developed areas in Zhejiang, for a large majority of the children". Carron (1996:44)

In the rural areas of Guinea and Madhya Pradesh, the situation was similar to Puebla or Zhejiang and even worse. But these material difficulties of everyday life were not the only obstacle to normal school attendance, what was worrying or perhaps even more so disturbing, was that these rural children had very limited access to the world of written communication outside school.

The high illiteracy level of parents in rural areas had contributed greatly to the increased practice of shifting cultivation. Due to their way of life, most parents had shown a lack of serious concern for their children's education. Many studies had been written on the relationship between parents' and children's education. It was often considered, with respect to the education of children that the parents' and especially the mother's level of education were of primary importance in the education of children. Carron (1996:47) gave evidence of the high illiteracy level of mothers, "In rural zones in Puebla, between 30 to 40 per cent of mothers of the interviewed families never went to school and 40 to

50 per cent attended, but did not complete primary school". Under such circumstances, the support that parents could give their children with regard to school work was inevitably very limited. A typical example here was that of homework, almost all teachers in many countries assign work to be done at home. The problem the parents had was that of not knowing how to read and write coupled with their inability to communicate with their children in the language (official) used at school.

In an effort to analyze the causes of school drop-out that continued to characterize the basic education scene in India, Govinda (1995) showed that poverty was believed to be the major reason why parents were unable to send their children to school though cultural and environmental factors also exercised a significant influence on education. Environmental factor could be problems of distance to school and danger in crossing thickets which could be homes of dangerous animals more especially to parents of young children in the early grades and beginners. Cultural issues were likely to affect girls more than boys because of the traditionally more protective attitudes towards girls. Early marriages, for example, could be another contributing factor to the high drop-out levels among girls since it was still a common feature among communities in many rural areas in many countries. Young men in the rural setup of developing countries tended to marry early so as to have some added labour on the farm. Shifting cultivation had therefore contributed to early marriages which had led to an increase in the number of school dropouts.

In an effort to curb the problems of school absenteeism and drop-out, incentive schemes could be used. In rural Indian schools the following were done: Mid-day meal program under which children in some selected schools were provided with some food

supplements in fixed quantity. This was obviously meant for the children who attended school, except in Tamilnadu, where the nutritious meal program was extended even to those children who did not attend school. Other schemes which were in operation were free textbooks, free uniforms for girls, and a fairly wide scheme of monetary incentives which was available to a large section of the poorer was the Pre-Metric Scholarship, Govinda (1995).

However, it was also possible for one to find considerable bottlenecks and anomalies in the actual operation of the various incentive schemes, reducing their effects on the learners. For instance, Govinda (1995:26) reports that "under the free textbooks scheme, the set distrust is not complete in many cases, requiring the students to still purchase books which they may not be able to do". In the case of the Pre-Metric Scholarship, it required the students to produce a caste certificate from the local authorities to establish a particular caste where the students belonged. Due to the bureaucratic red- tape procedures, many poor parents failed to complete the process, thereby making it difficult for their children to access the Scholarship.

The investigations in this chapter were based on the realization that, to enroll children in school, it was no longer sufficient just to provide the necessary pre-requisites, which was to construct schools and employ teachers. Due to relocations resulting from shifting cultivation, parents did not keep their children in school, even when schools had been constructed within their reach. Parents' willingness and ability to keep their sons and especially their daughters could not be taken for granted.

2.3 Theoretical Framework

Many theories could be used to explain the effects of shifting cultivation on school going children. These theories discussed below could help us understand these effects.

2.3.1 Social learning Theory

According to Microsoft Encarta Encyclopedia Standard (2005), the social learning theory is a theory to explain how people learn behaviour. People learn through observing other people's behaviour. If people observe positive behaviour, desired outcomes in the observed behaviour, they are more likely to model, imitate and adopt the behavior themselves.

The social learning theory is derived from the work of Gabriel Tarde, (1843-1904) who proposed that social learning occurred through four main stages of imitation: Close contact, imitation of superiors, understanding of concepts and role model behaviour. The social learning theory purports that people wish to avoid negative consequences, while desiring positive results or effects.

Therefore, if one expects a positive outcome, then there is a high probability that they will engage in that behaviour. This social learning theory suggests that behaviour is influenced by environmental factors or stimuli and not psychological factors alone. The theory incorporates aspects of behaviour and cognitive learning. Cognition refers to the process of gaining knowledge through thought, experience and the senses, while behavioural learning assumes that people's environment (surrounding) cause people to behave in a certain way. Cognitive learning presumes that psychological factors are important for influencing how one behaves. Social learning theory suggests a

combination of environmental (social) and psychological factors influencing behaviour. Social learning defines four requirements for people to learn and model behaviour, that is, attention, retention (remembering what one observed), reproduction (ability to reproduce the behaviour) and motivation (good reason to want to adopt the behaviour).

In relation to shifting cultivation, the theory implied that the abandonment of this practice could be made possible through the observance of positive behaviour. Once the desired positive outcomes were observed, the community was likely to be motivated to imitate and adopt the observed tendencies. The practice of shifting cultivation was observed from the cultivators' forefathers. People initially saw the benefits of the practice and adopted it. In order to stop the practice, there would be need for observed positive outcome resulting from the abandonment of the practice by the shifting cultivators. Once the cultivators abandoned the practice and other members of the community observed the benefits of abandoning the practice, they were likely to abandon the practice as well. In this case, all the four requirements for people to learn and model behaviour had been achieved viz-a-viz attention, retention, reproduction and motivation.

2.3.2 Social Development Theory

According to Dembo (1994), the Social Development Theory was advanced by Russian psychologist Lev Vygotsky, (1896-1934). It states that social interaction precedes development; consciousness and cognition is the end product of socialization and social behaviour.

Vygotsky's theory is one of the foundations of constructivism. It asserts three major themes as follows:

1. Social interaction plays a fundamental role in the process of cognitive development. In contrast to Jean Piaget's understanding of child development (in which development necessarily precedes learning), Vygotsky felt social learning precedes development. He stated that every function in the child's cultural development appeared twice: first, on the social level and later on the individual level; first, between people (interpsychological) and then later inside the child (intrapsychological)" (Vygotsky, 1978:68).
2. The More Knowledgeable Other (MKO). The MKO refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, coach, or older adult, but the MKO could also be peers, a younger person, or even computers.
3. The Zone of Proximal Development (ZPD). The ZPD is the distance between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability in solving the problem independently. According to Vygotsky, learning occurred in this zone.

According to Vygotsky, humans use tools that develop from a culture, such as speech and writing to mediate their social environments. Initially children develop these tools to serve solely as social functions and ways to communicate needs. Vygotsky believed that the internalization of these tools led to higher thinking skills.

In relation to shifting cultivation, the theory entails that individuals learned things through socialization in order for them to develop. The more knowledgeable others would socialize the learner through interaction, meaning that an individual developed at a social level and later at an individual level. Shifting cultivation was initially practiced by an individual in the family circle, and then later an individual would practice it on an individual once they became independent from their parents as they had learnt from the more knowledgeable others that this was one way of earning a living in their society.

2.3.3 Theory of communities of practice

According to Microsoft Encyclopedia Standard (2005), this theory was advanced by Jean Lave and Etienne Wenger in 1991 and further elaborated in 1998. Etienne Wenger summarizes Communities of Practice (CoP) as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly." This learning that takes place is not necessarily intentional. Three components are required in order to be a CoP: (1) the domain, (2) the community, and (3) the practice.

Communities of Practice could be defined in part as a process of social learning that occurs when people who have a common interest in a subject or area collaborate over an extended period of time, sharing ideas and strategies, determining solutions and building innovations, (Microsoft Encyclopedia Standard 2005).

Wenger (1991) defines Communities of practice as groups of people who share a concern or a passion for something they do and learn how to do it better as they interact

regularly. Note that this allows for, but does not require intentionality. Learning can be and often is an incidental outcome that accompanies these social processes. People see them as ways of promoting innovation, developing social capital, facilitating and spreading knowledge within a group, spreading existing tacit knowledge, to mention but a few. Communities develop their practice through a variety of methods including problem solving, requests for information, seeking the experiences of others, reusing assets, coordination and synergy, discussing developments, visiting other members, mapping knowledge and identifying gaps.

For Etienne Wenger, learning is central to human identity. A primary focus is learning as social participation – that is, an individual as an active participant in the practices of social communities, and in the construction of his or her identity through these communities. People continuously create their shared identity through engaging in and contributing to the practices of their communities. The motivation to become a more central participant in a community of practice can provide a powerful incentive for learning. Students will have a desire to develop skills such as literacy skills, if the people they admire have the same skills. That is, they want to join the 'literacy club' and will work towards becoming a member.

The community of practice theory relates with the practice of shifting cultivation in that people learned the practice as they sought identity in their communities through participation. An individual as an active participant in the practices of social communities, in this case, shifting cultivation, continuously created their shared identity through their engagement and contribution to the practices of their communities.

Children's motivation to become a more central participant in a community of practice provided a powerful incentive for learning. These children would have a desire to develop skills in shifting cultivation, if the people they admired, more particularly their parents, had the same skills.

In analyzing the problem of effects of shifting cultivation on school going children, this study adopted the theory of Communities of Practice advanced by Jean Lave and Etienne Wenger in 1991, and the Social Learning theory by Gabriel Tarde (1843-1904)

The theories would help us understand or explain the effects of shifting cultivation on school going children. Parents who practiced shifting cultivation did not realize the effects of this practice on their school going children because they had not formed a community of practice. Firstly, these parents had no common interest in the subject of the crisis. If they had the interest they would share ideas and strategies, determine solutions, and build innovations. The parents' awareness of the devastating effects of shifting cultivation especially on the communities in the area of study would encourage them to act together to improve the situation.

Furthermore, because of the absence of communities of practice, learning of new things especially things such as effects of shifting on school going children was not facilitated hence the lack of knowledge among these parents. This was so because it was through a community of practice that innovation was promoted, social capital developed and knowledge within the group facilitated and spread. Absence of the communities of practice in Kasempa meant that innovative ideas about how to mitigate or put an end to the effects of shifting cultivation would not be cultivated. Since there was no interaction

through the communities of practice, knowledge about the effects of shifting cultivation on school going children would not be facilitated let alone spread to others.

Additionally, in order for parents to be knowledgeable about the effects of shifting cultivation on school going children, the theory argues that these parents should admire people who were able to educate their children and desire to be as knowledgeable as their superiors.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

The methodology used in this research was descriptive survey since it involved the *collection of information by interviewing and administering questionnaires to a sample* of individuals in the selected population. The research was descriptive in the sense that it involved bringing out and documenting the experiences of individuals who have lived in the area of study for many years. This research was both qualitative and quantitative in design. The qualitative design is a method of experimentation used by researchers studying human behaviour and habits which entails collection of data which is non-numeric and may consist of explanatory or in-depth answers as well as discussions that are as a result of open ended questions. The study was qualitative in the sense that subjective views of inspectors of schools, teachers, parents and school going children were captured and taken into consideration. These included experiences, views, challenges and opportunities. The research also sought to establish a variety of themes to various responses that were coming out from the interviews.

The quantitative design on the other hand, is basically about quantifying relationships between variables which entail collection of numerical data which are products of structured or closed ended questions. The mixed method approach was preferred in this research for the reason that it provided complementation for the in adequacies of one design from the other, thereby enhancing a more comprehensive research and findings.

3.2 Population

The population under study comprised of the District Inspectors of Schools from the district education office, teachers and pupils from five basic schools and, parents from the villages around these schools. The schools and villages selected were mainly those on the outskirts of Kasempa district particularly those located beyond the radius of 15 kilometers.

3.3 Study Sample and Sampling Techniques

The sample consisted of three basic education district inspectors of school from the District Education Board Secretary (DEBS) office, twenty six teachers and fifty pupils sampled from the five selected schools. In addition, five parents at most were sampled from the villages around each selected school, giving a total number of twenty six parents. This brought the total number of respondents to one hundred and five.

Snowball or Chain Sampling is a sampling technique that was used in this study. This method involved asking a number of people who could identify specific kinds of cases relevant in the study.

In this regard, therefore, all the three inspectors at the DEBS' office were sampled to help in identifying basic schools which were affected by shifting cultivation in the five zones in the district. In each of the schools identified, Head teachers were used to identify school going children who were affected by shifting cultivation. Finally the pupils who were interviewed also helped to identify parents who practiced this farming method.

This sampling technique was used because of the following reasons:-

1. the researcher was targeting a group of people believed to be relevant and reliable for the study.
2. the researcher was aiming at meeting the right number of the people for the purpose of the study.
3. the population was unknown and not readily identifiable.

3.4 Sources of Data

The data was collected from both primary and secondary sources. The primary data of the study was arrived at by getting views from stakeholders who involved among others; District Inspectors of schools, teachers, parents, and school going children. In order to come up with accurate information, data was collected by carrying out in-depth interviews with parents and school going children, as well as administering of questionnaires to teachers and district school inspectors.

Secondary data was obtained from different types of literature so as to get an insight into the problem under study. The most helpful were the internet and books published by the United Nations Educational, Scientific and Cultural Organization (Unesco) an International Institute for Educational Planning. The data obtained from Unesco publications helped in comparing the education standards of children in other nomadic communities in Africa and other continents.

3.5 Research instruments

The main research instruments used in data collection for this study were questionnaires and interviews. Interviews were conducted with parents practicing shifting cultivation and school going children while questionnaires were administered to teachers and

school inspectors at the DEBS' office. Self administered questionnaires were administered to the two groups because of the following reasons:

1. It ensured anonymity of responses thereby facilitating the collection of objective data.
2. It was less time consuming hence it allowed respondents to continue with their everyday duties since the research was carried out during working hours.
3. It was standardized in order to facilitate easy comparison of responses.
4. Closed ended questions facilitated easy comparison of responses and enabled the coverage of whole sample.
5. It was cost effective.

In-depth interviews through the use of interview guides were employed among pupils and parents because of the following reasons:

1. Most parents in the villages and pupils in basic schools could not read and write effectively
2. For easy analysis of qualitative data
3. In order to get more recommendations on the issues affecting them concerning the topic under study

3.6 Data collection procedures

Data was collected with the help of the DEBS' Office and head teachers from the basic schools that participated in the study. A research assistant was recruited to help in the data collection process. This research assistant was an indigenous Kaonde man who was conversant with the local language and traditions. Different types of data collection

methods were used; questionnaires were administered to class teachers and district inspectors from the DEBS' office, while oral interviews were conducted with parents and pupils, in order to collect primary data. This data was collected in order to get an insight of how future generations would use appropriate farming methods that would not have negative effects on school going children as well as on the environment.

Head teachers from the participating basic schools assisted in indentifying pupils who were coming from villages were shifting cultivation was practiced. The sampled school going children in turn helped in identifying parents involved in this type of farming method. It is worth noting that all respondents were willing to give the information concerning this study without any reserve.

3.7 Data Analysis

Data collected was analysed both qualitatively and quantitatively. Quantitative data was analysed with the aid of Statistical Package for Social Sciences (SPSS), a computer application package. Data solicited from the three officers drawn from the DEBS' office was analysed manually. This method of data analysis tool was chosen in order to facilitate the statistical manipulation of responses. Interview notes were transcribed by writing into readable notes. Content analysis of responses was done whilst in the field. The responses from respondents were thereafter categorized under themes or codes which could be analysed with the use of the statistical package for social science. For easy analysis of data, frequency tables and charts were drawn. Secondary data from different literature reviewed was used to confirm primary data collected from respondents in the field either by accepting or disputing the findings.

CHAPTER FOUR
PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the findings of the study. The findings of the study will be presented according to the objectives of the study. The objectives of the study were: to determine why the Kaonde people of Kasempa District practiced shifting cultivation; to assess how sustainable shifting cultivation was; to investigate the effects of shifting cultivation on school going; and to propose an environmental education and sustainability curriculum that could be used in order to address the effects of shifting cultivation on school going children.

4.2 Existence of Shifting Cultivation in Kasempa District

In an effort to establish the existence of shifting cultivation in Kasempa district, school going children, parents and guardians, and teachers were asked questions that would help come up with the relevant information. In the first instance, school going children were asked to indicate their parent or guardian's occupations. The findings revealed that more than three quarters of the parents and guardians were farmers. The findings indicated that out of 50 respondents, 49 pupils indicated that their parents or guardians were farmers representing 98% while only 1 pupil indicated a different occupation representing 2%. This entailed that the majority of the population on the outskirts of Kasempa district survived on agriculture. A conclusion was made that most people were farmers and that shifting cultivation existed in Kasempa district more particularly on the outskirts of the district. Table 1 presents parents or guardians' occupations.

Table 1 Parents/guardians' Occupations

Occupation	Frequency	Percent
Farmer	49	98
Other Occupations	1	2
Total	50	100

Source: Field Data (2010)

In establishing the commonest method of farming in Kasempa district, school going children were asked to indicate which method of farming their parents and guardians practiced. The research findings revealed that out of 50 respondents, 40 parents and guardians practiced shifting cultivation representing 80% while 8 practiced other methods of farming representing 16%. Out of the 50 respondents, 2 pupils did not indicate their parents' occupation representing 4%. The distribution of parent/Guardian's methods of farming is presented in Table 2 below.

Table 2 Parents/Guardians' Method of Farming

Method of Farming	Frequency	Percent
No Response	2	4
Shifting Cultivation	40	80
Other Methods	8	16
Total	50	100

Source: Field Data (2010)

To further substantiate the commonest method of agriculture in the district, teachers were asked to indicate the method of farming that the community around the school practiced. The findings from the teachers' responses revealed that the commonest mode of farming practiced by the people around the school was shifting cultivation. This again gave efficacy to the earlier made conclusion that shifting cultivation was the main or commonest method of farming on the outskirts of Kasempa district. Table 3 presents teachers responses of the methods of farming in Kasempa.

Table 3 Types of Farming Practiced by People in Kasempa.

Type of Farming	Frequency	Percent
Shifting Cultivation	26	100
Total	26	100

Source: Field Data (2010)

In an effort to come up with conclusive evidence about the commonest method of farming in Kasempa district, parents were also asked to indicate which mode of farming they practiced. The research findings indicated that the majority of parents and guardians practiced shifting cultivation. Out of 26 respondents, 25 indicated shifting cultivation representing 96.2% while 1 parent indicated conservation farming representing 3.8%. These findings gave efficacy to the conclusion that shifting cultivation existed in Kasempa district and it is the commonest mode of farming practiced. Table 4 present parents' and guardians' responses on their modes of agriculture.

Table 4 Type of Agriculture Practiced by Parents/Guardians

Types of Agriculture	Frequency	Percent
Shifting Cultivation	25	96.2
Conservation Farming	1	3.8
Total	26	100

Source: Field Data (2010)

4.3 Reasons for Practicing Shifting Cultivation in Kasempa

Amongst the various objectives of this study, was that of establishing reasons for practicing shifting cultivation. In an effort to establish these reasons, parents/guardians and teachers were asked to indicate the various reasons for the practice of shifting cultivation in Kasempa. According to the research findings, various reasons were given for practicing shifting cultivation in Kasempa. Among the reasons, that of the search for fertile soils or land came out to be the most outstanding. Out of 26 respondents, 24 parents indicated the search for fertile land as their reason for practicing shifting cultivation while 1 parent indicated inability to afford artificial fertilizers. Safety of crops from pigs, goats and other domesticated animals was another reason cited by one (1) parent. This means that 92.4% of the parents and guardians interviewed revealed that they practiced shifting cultivation in their quest for fertile soils or land. On the other hand, 3.8 % representing 1 parent practiced shifting cultivation as he/she felt that crops were safer from domestic animals such as goats and pigs. The other 3.8 % of the respondents indicated that he/she practiced shifting cultivation as it proved to be a cheaper mode of farming since they could not afford the cost of other artificial inputs

such as fertilizer. With regard to these research findings, a conclusion was made that the people of Kasempa district practiced shifting cultivation mainly in their quest for fertile land or soils. Table 5 outlines the various reasons advanced by parents and guardians for practicing shifting cultivation.

Table 5 Reasons for Practicing Shifting Cultivation

Reasons	Frequency	Percent
Search for Fertile Land/Soils	24	92.4
Cannot afford artificial fertilizers	1	3.8
Crops are Safer From Goats, Pigs and Other Domestic Animals	1	3.8
Total	26	100

Source: Field Data (2010)

To establish the reasons for the insistence on the use of shifting cultivation by the local community in Kasempa as a mode of agriculture, teachers were selected as the target group. The teachers were asked to give reasons for the persistence of the practice by the local community. The research findings from the teachers' responses indicated that people in Kasempa had continued to use shifting cultivation because of their search for fertile soils as they could not afford artificial fertilizers. Of the 26 respondents, 21 teachers indicated that the practice of shifting cultivation persisted because people could

not afford artificial fertilizers while only 1 teacher gave a different reason for the practice. The other 4 teachers did not respond to this question. In other words, these findings revealed that 80.8 % of the teachers interviewed cited that the people in Kasempa insisted on the use of shifting cultivation due to their inability to afford artificial fertilizers while only 3.8% gave a different reason for the practice. On the basis of these findings, a conclusion was made that the people of Kasempa district had insisted on using shifting cultivation because of their search for fertile soils resulting from their inability to afford artificial fertilizers. Table 6 presents teachers' reasons for the insistence on the use of shifting cultivation by the local community.

Table 6 Teachers' Reasons for Insistence on the Use of Shifting Cultivation by the Local Community

Reasons	Frequency	Percent
None Response	4	15.4
They Can Not Afford Artificial Fertilizers	21	80.8
Any Other Reasons	1	3.8
Total	26	100

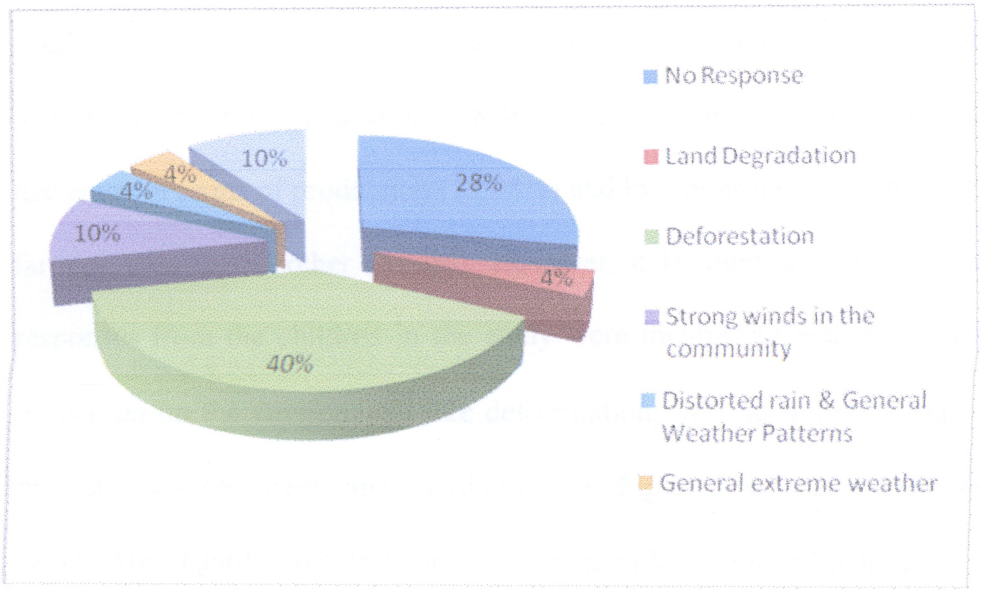
Source: Field Data (2010)

4.4 Problems associated with Shifting Cultivation.

One of the major objectives of this study was to investigate and determine the effects and problems associated with the practice of shifting cultivation in the area of study. The research findings indicated that there were various problems people of Kasempa

faced resulting from the practice of shifting cultivation as a mode of agriculture. These problems were twofold: environmental and educational. Details of these problems are outlined by specific responses given by all categories of respondents in the study below;

Figure 4: Negative Effects of Shifting Cultivation on the Environment



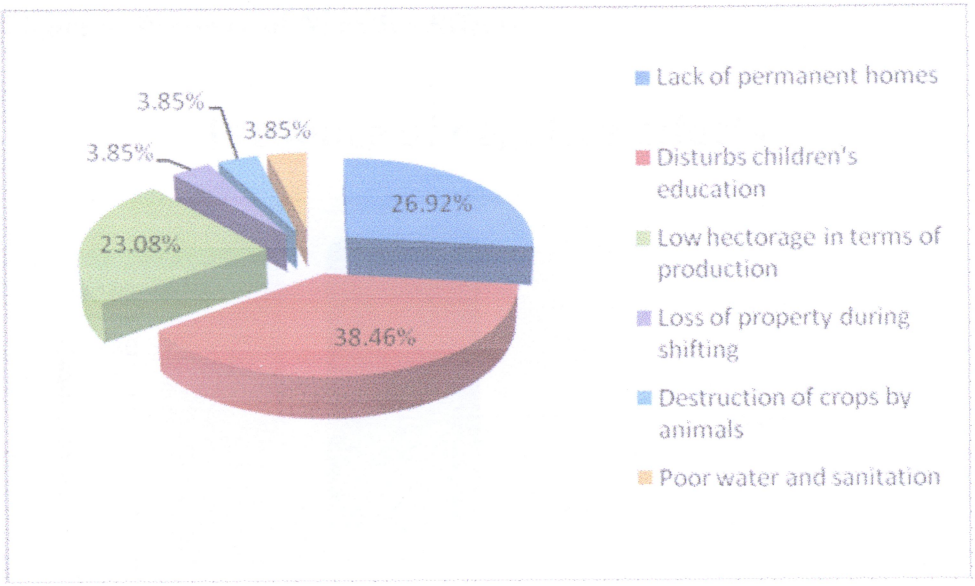
Source: Field Data (2010)

According to the research findings, various environmental problems were associated with shifting cultivation. From Figure 4, out of 105 respondents, 42 respondents representing 40% cited deforestation as one of the environmental problems while 10% cited strong winds and another10% cited increased growth of grass in the fields and community. The findings also revealed that 4% cited land degradation, 4% cited distorted rain and weather patterns, and the other 4% cited general extreme weather. However, 28% of the children interviewed did not respond to this question. From the research findings, a conclusion was drawn that shifting cultivation had serious

environmental problems ranging from deforestation to general extreme weather patterns.

Parents were also asked to state whether they knew the negative effects of shifting cultivation in general. The findings indicated that parents and guardians had knowledge of the effects of shifting cultivation. There were various problems cited relating to the negative effects of shifting cultivation in general, these included among others; disturbing children's education (38.46%), lack of permanent homes (26.92%), low hecterage in terms of production (23.08%) and loss of property during shifting from one farming area to the other (3.85%). However, it is important to note that while most responses from the children in the study were inclined to negative effects of shifting cultivation on the environment like deforestation, this did not come out strongly from the responses the parents and guardians gave. Figure 5 reflects the responses given by parents with regard to the problems associated with shifting cultivation.

Figure 5: Problems Associated with Shifting Cultivation

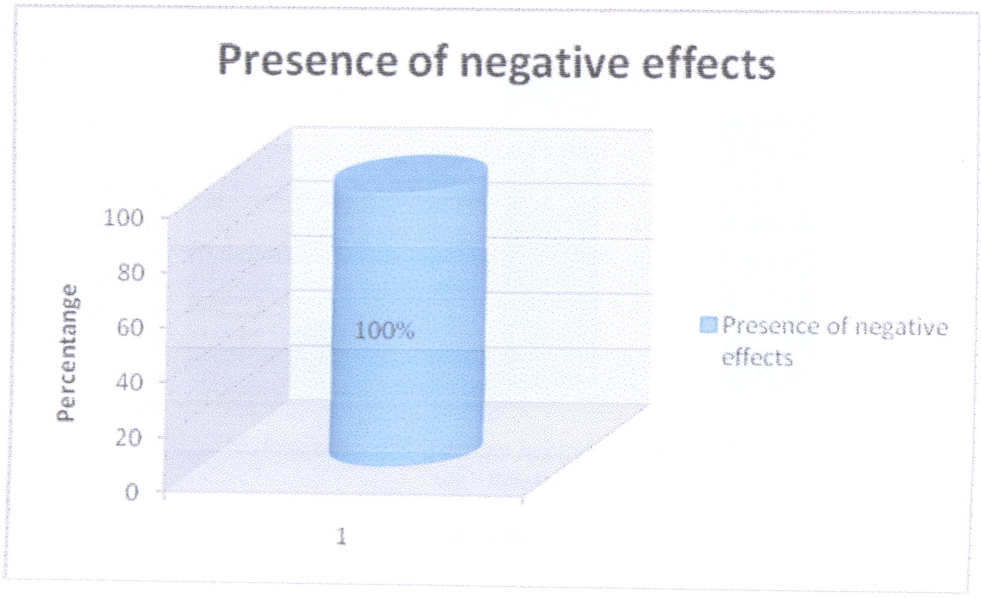


Source: Field Data (2010)

4.5 Negative effects of Shifting Cultivation on Education in Kasempa

The primary interest of the research was to find out the effects of shifting cultivation on children's education in Kasempa district. In order to solicit information on negative effects of shifting cultivation on education, a number of questions were asked to all the categories of respondents. For instance, to establish the effects of shifting cultivation on education, school teachers in Kasempa were asked to indicate whether or not shifting cultivation had any effect on school going children. All the 26 teachers representing 100% of the teachers' responses indicated that shifting cultivation had negative effects on school going children as shown in figure 6 below.

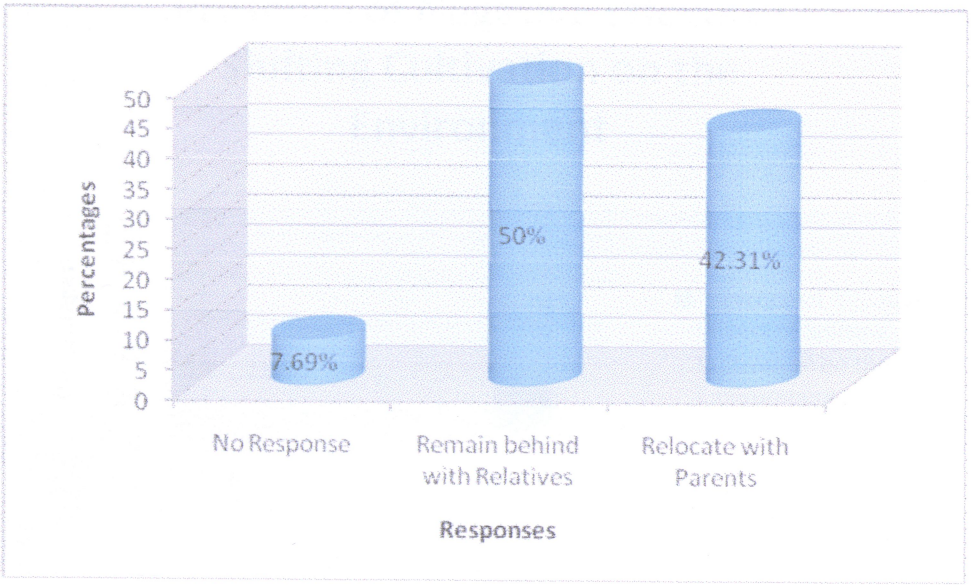
Figure 6: Presence of Negative Effects



Source: Field Data (2010)

Equally, in Figure 5 parents and guardians were asked to indicate the problems associated with Shifting Cultivation in the foregoing segment of this report. Disturbance of children's education was the most prominent problem parents and guardians associated with shifting cultivation. This was because shifting to a new farm land came with transfer of children from one area to another. Sometimes it brought challenges of lack of parental care and guidance in cases where children remained behind when parents or guardians relocated. Furthermore, children complained of increased distances to schools when they relocated with parents as shown by Figure 7 below. A conclusion was made that shifting cultivation had negative effects on school going children in terms of accessibility to educational infrastructure.

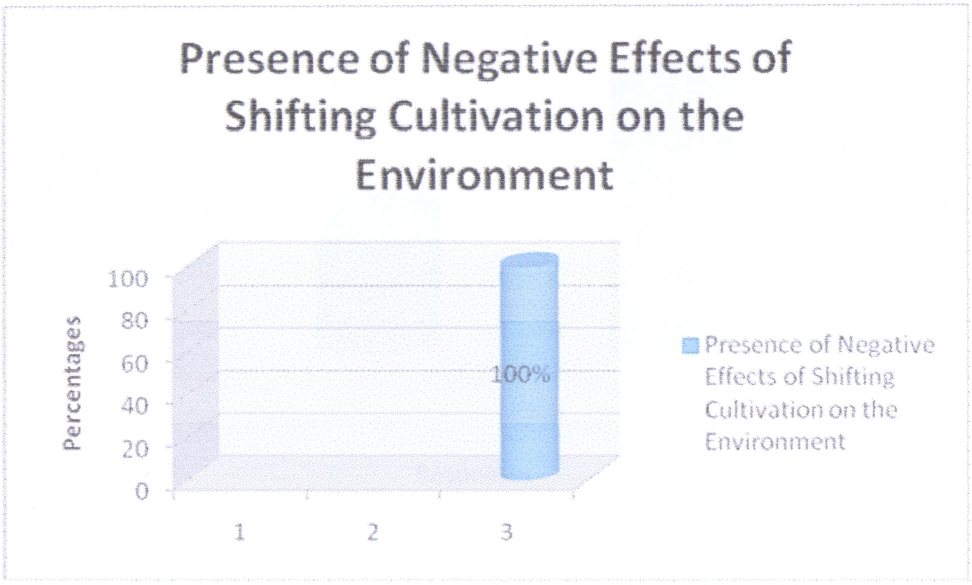
Figure 7: Residence of School Going Children When Parents Relocate to New Farm Lands



Source: Field Data (2010)

District inspectors from the District Education Board Secretary's office were interviewed on the effects of shifting cultivation on education in Kasempa. The research findings indicated that shifting cultivation had negative effects on education, the major one being on enrolment. Figure 8 below indicates the effects of shifting cultivation on school enrolment. From the district inspectors' responses it was clear and undisputable that shifting cultivation had negative effects on education as all the 3 officers (100%) who answered questionnaires indicated that shifting cultivation had negative effects on school enrolment in Kasempa. On the basis of these findings, a conclusion was made that shifting cultivation had a negative effect on school enrolment.

Figure 8: Presence of Negative Effects of Shifting Cultivation on the Environment

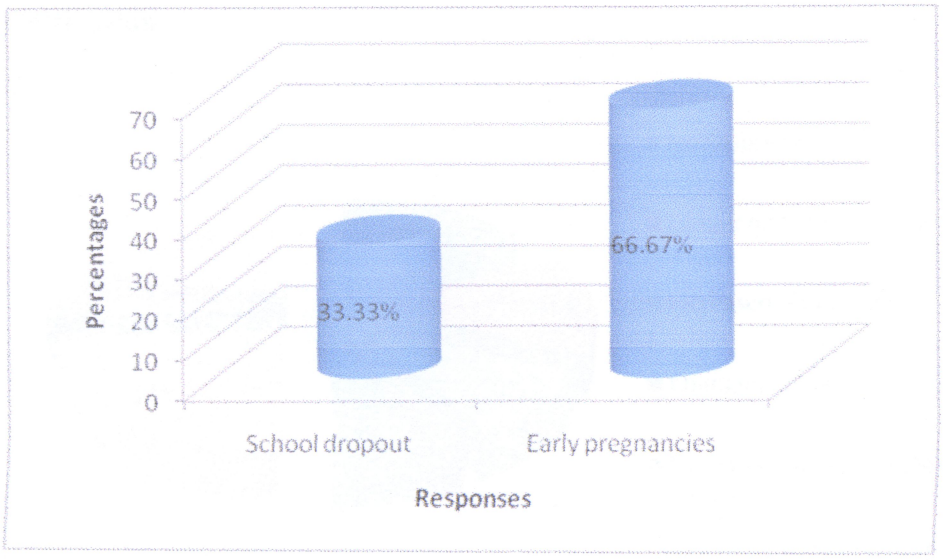


Source: Field Data (2010)

The study went further to investigate general and specific negative effects of shifting cultivation on education. It was aimed at finding out whether shifting cultivation contributed to increased levels of pregnancies and increased school drop outs among pupils. This was with much regard to those children who remained on the old farm lands once their parents/guardians relocated to new farms lands.

Figure 9 below indicates some of the negative effects of shifting cultivation as identified by the respondents. The research findings indicated that 66.67% and 33.33% of respondents said shifting cultivation had contributed to high levels of pregnancies and drop out of school respectively.

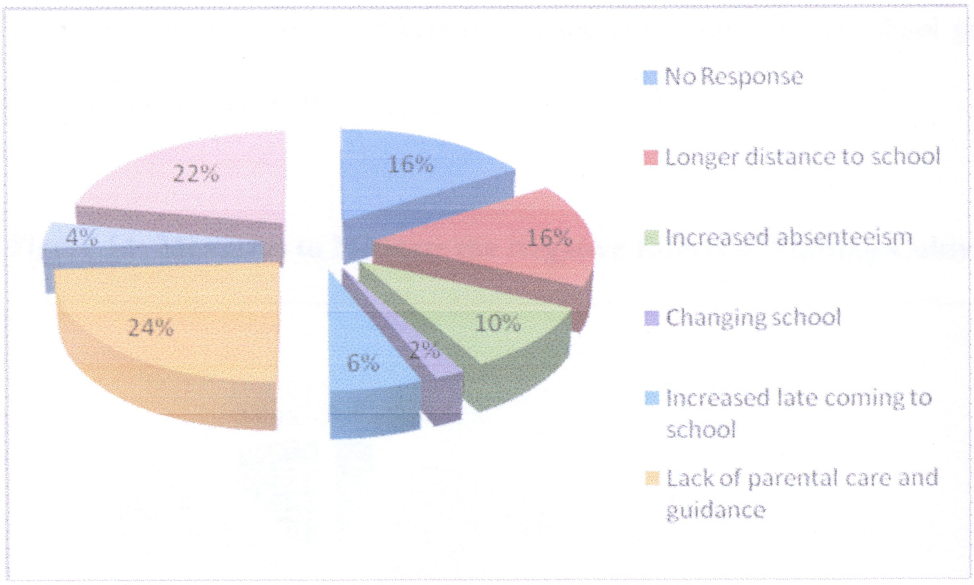
Figure 9: Negative Effects of Shifting Cultivation on Education



Source: Field Data (2010)

In an effort to investigate the negative effects on shifting cultivation on education in Kasempa, the school going children were asked to mention problems they faced as a result of their parents practicing shifting cultivation. The research findings indicated that the major education problems faced by the school going children due to this practice included among others; long distances to schools, increased workload coupled with poor nutrition, frequent changing of schools, and lack of parental care and guidance in their education as their parents were usually busy with farm work. On the basis of these findings, the researcher made a conclusion that the practice of shifting cultivation had serious negative effects on education particularly on the school going children. Figure 10 shows educational related problems faced by school going children as a result of the practice of shifting cultivation in Kasempa District.

Figure 10: Problems Faced by School Going Children Resulting from Shifting Cultivation



Source: Field Data (2010)

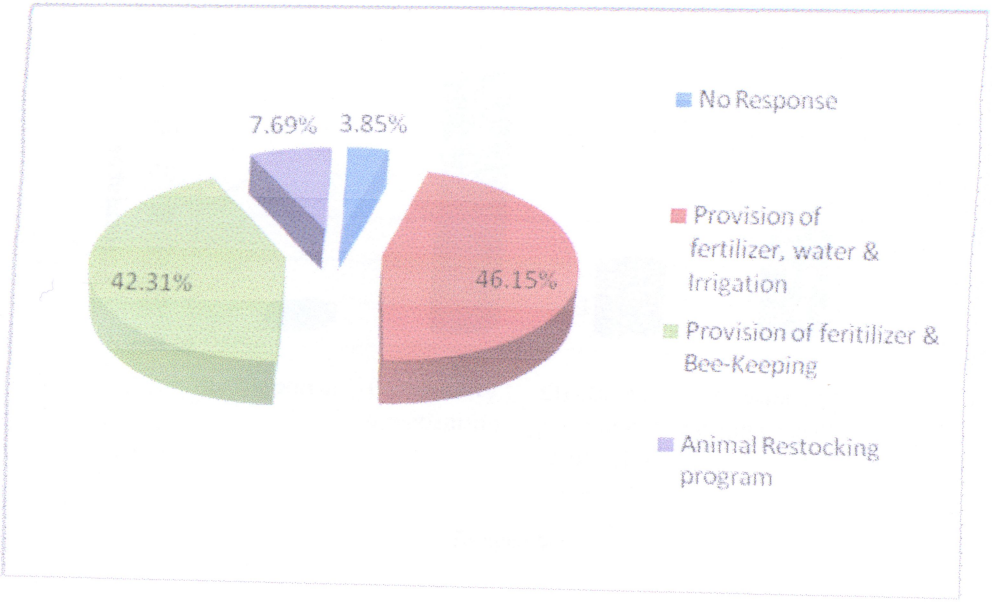
4.6 Measures to mitigate effects of Shifting Cultivation on Education

Having established the negative effects of the practice of shifting cultivation on education, more particularly on the school going children in Kasempa, the study went further to ask respondents to propose solutions that would help to mitigate the negative effects of shifting cultivation on education. Various propositions were made by parents.

The research findings indicate that 46.15% of the respondents proposed the provision of fertilizer (Grants or Loans), and establishment of settlement schemes where water for irrigation would be provided while 42.31% of the respondents proposed the provision of artificial fertilizers and bee-keeping as a way of stopping parents and guardians from practicing shifting cultivation and subsequently mitigating the effects of shifting cultivation on education in Kasempa. The other 7.69% of respondents said animal

restocking in Kasempa would equally reduce the practice of shifting cultivation while 3.85% did not respond to this question. Figure 11 shows some of the proposed solutions by parents to the negative effects of shifting cultivation on the school going children and education in general.

Figure 11: Measures to Mitigate the Negative Effects of Shifting Cultivation

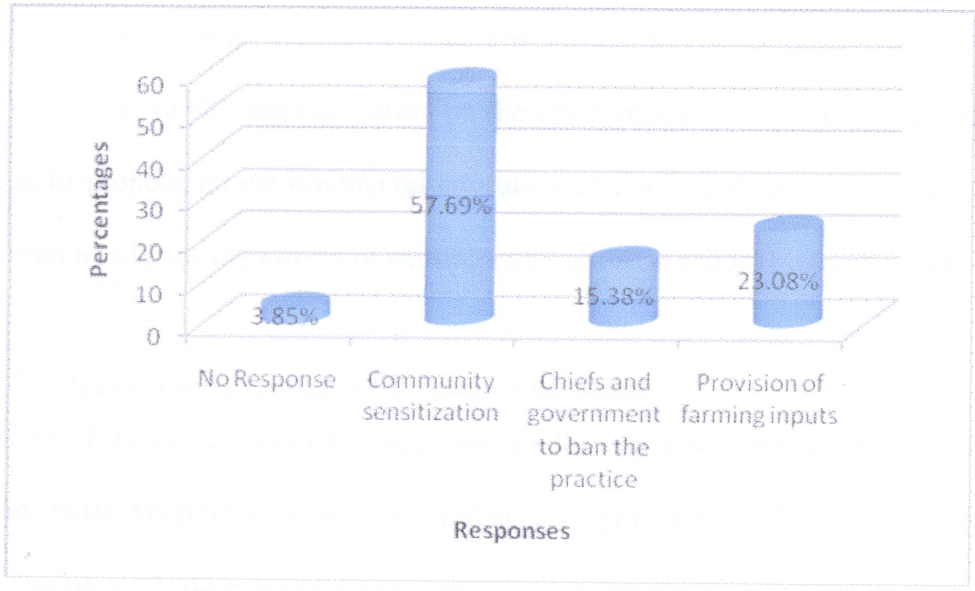


Source: Field Data (2010)

Proposals of the solutions that would help mitigate or reduce the negative effects of shifting cultivation on education in Kasempa were also given by the school authorities. The research findings indicated that 57.67% of the respondents proposed community sensitization of farmers on negative effects of shifting cultivation as one of the measures that could be put in place to mitigate or reduce the negative effects of shifting cultivation on education, and 23.08% of the teacher respondents proposed the provision of farming inputs to the farming community while 15.38% proposed asking chiefs and

governments to ban the practice of shifting cultivation in Kasempa as a way of reducing the impact of shifting cultivation on education in the district. The other 3.85% of the teachers did not respond to this question. Figure 12 below shows the responses of school authorities on proposed solutions to the effects of shifting cultivation.

Figure 12: Solutions to Address Negative Effects of Shifting Cultivation



Source: Field Data (2010)

CHAPTER FIVE
DISCUSSION OF STUDY FINDINGS

5.1 Introduction

This chapter presents the interpretation of study findings based on the objectives of the dissertation. The first part of the objectives of the study aimed at investigating why the Kaonde people of Kasempa District practiced shifting cultivation and assess how sustainable shifting cultivation was. The second part of the objectives was to determine the effects of shifting cultivation on the environment and school going children as well as to propose an environmental education and sustainability curriculum that could be used to address the effects of shifting cultivation on school going children.

5.2 Reasons for practicing Shifting Cultivation

One of the objectives of the study was to determine why the people of Kasempa district in North Western Province of Zambia have practiced shifting cultivation to this day. The research discovered various reasons for the persistence of the practice of shifting cultivation in Kasempa. Amongst the various findings, the study found that three quarters of respondents (92.4%) overwhelmingly said that shifting cultivation was practiced mainly in the search of fertile soils. This was owing to the high cost of artificial fertilizers in Kasempa district. Therefore, farmers had to migrate from one piece of land to the next once the soil fertility of the old land had reduced.

The study also found that shifting cultivation was considered as a very integral part of the culture of the Kaonde people. Therefore, the practice of shifting cultivation to some people in the district was merely a way of life. It was a practice that had been passed on

to them from their forefathers and therefore, felt obliged to carry on with the trend. Further, the Kaonde people rear domestic animals like goats and pigs which could be very destructive to crops in the fields. Again rearing domestic animals was very central to the Kaonde culture. Due to the fact that they reared animals as well as grew crops for their domestic consumption and for sale, they had to relocate their farming fields far away from their homes to ensure that domestic animals did not destroy their crops.

The findings from our study relates well with the study findings revealed in Bhutan where the delicate farm environment found in most parts of Bhutan was characterized by very limited land for permanent cultivation, a scarcity of skilled farm labour for adopting mechanical conservation measures and a shortage of capital to acquire external inputs or labour. Shifting cultivation had therefore been adopted to circumvent all of these constraints. The practice was ecologically more stable than the existing permanent cultivation practices. It had produced relatively less environmental impact where the farmers had strictly followed the traditional norms developed through generations of indigenous experience.

The Bhutan research findings also revealed that shifting cultivators could never enter into the cash economy since they were isolated from the market and they could hardly build surplus. Thus, shifting cultivators had limited financial resources to invest for increasing productivity, which instead remained low. Shifting cultivation was an economically inefficient land use practice (http://www.fao.org/docrep/006/v8380e/htm). These findings are similar to our research findings which gave efficacy to the reasons for practicing shifting cultivation by the local community in Kasempa.

These findings relate very well with the postulation of the social learning theory used in this study, which states that people learn through observing other people's behaviour. If people observe positive behaviour, desired outcomes in the observed behaviour, they are more likely to model, imitate and adopt the behavior themselves. The Kaonde people of Kasempa District observed the practice of shifting cultivation from their forefathers. The practice of shifting cultivation was a culture for the Kaonde people of Kasempa, the people initially saw the benefits of the practice and then adopted it. They paid attention to the activities of their forefathers and tried to remember what they had observed. They later exercised their ability to reproduce the behaviour they observed on the basis of the positive outcomes observed. In this regard, all the four requirements for people to learn and model behaviour as advanced by the social learning theory were achieved, that is; attention, retention, reproduction and motivation.

Amongst the various findings, the study also revealed that there were other ethnic groupings in Kasempa other than the indigenous Kaonde who equally practiced shifting cultivation for some reasons other than culture. These people practiced shifting cultivation as a way of earning a living. These findings are also in accord with the social learning theory where a practice is imitated because of the observed positive outcomes. Other ethnic groups noticed the benefits associated with shifting cultivation hence saw the need to copy the practice so as to earn a living. On the basis of these findings, a conclusion was made that the main reason for practicing shifting cultivation was the need and search for fertile soils or land as people could not afford the purchase of artificial fertilizers.

5.3 Assessing the Sustainability of Shifting Cultivation

Assessing the sustainability of shifting cultivation as a mode of agriculture was one of the objectives of this study. After an inquiry into the study, the findings from the responses given by all the four categories of respondents indicated that this method of farming was unsustainable as it caused deforestation and land degradation in the study area. The contemporary manifestations of the above effects also brought competition for land and conflicts among the various occupying farmers as each farmer wished to occupy the most fertile piece of land. In addition, the increasing number of people in these villages meant that there would be a greater number of human interactions with the forest through the practice of shifting cultivation, hence making shifting cultivation an unsustainable method of farming. Distorted rain and weather patterns are other effects of shifting cultivation given by respondents. These disturbances in rain and weather patterns also help to confirm that shifting cultivation was not a sustainable method of farming amidst the fast growing population. However, the shifting cultivators showed no signs of abandoning the practice because they were not aware of the benefits associated with abandoning the practice.

These findings relate very well with the findings of Rajan (2004) in his study of the practice of shifting cultivation in eastern and north eastern regions of India. This study found that the practice was unsustainable as it proved to be an extravagant and unscientific form of land use. The study also showed that the effects of shifting cultivation were devastating and far-reaching in degrading the environment and ecology in the area of study. Rajan's findings are similar to the findings of this study on the assessment of sustainability of shifting cultivation to the environment. The findings of

both studies revealed that shifting cultivation was an unsustainable method of farming and had detrimental effects on the environment.

This study's research findings were also similar to the research findings of the study conducted in Bhutan which revealed that in similar environmental conditions in neighbouring countries; forests had disappeared where shifting cultivation practices had been adopted particularly in the Hindukush and Himalayan ranges. As a consequence, serious problems of soil and environmental deterioration had occurred. The study also revealed that despite the recent socio-economic changes, such as demographic pressures, incentives for cash cropping, changes in the traditional systems of shared communal labour and many others, the traditional norms for shifting cultivation were not showing any sign of falling out of use.

These research findings could also be related with the theory of Community of Practice which was defined as a process of social learning that occurred when people who had a common interest in a subject or area collaborated over an extended period of time, sharing ideas and strategies, determining solutions and building innovations. In contrast to this theory, the people of Kasempa District who practiced shifting cultivation did not realize the negative effects of shifting cultivation on the environment because they had not formed a community of practice. In the first analysis, the shifting cultivators had no common interest in the environmental impact of the practice. There was no evidence of efforts to try and determine the causes of environmental degradation let alone try and address the negative effects of the practice, partly established to be the cause of the damage. If these farmers had displayed a common interest they would have shared ideas

and strategies, determined solutions and built innovations thus came up with a more sustainable method of farming.

Additionally, the absence of a community of practice in Kasempa meant that innovative ideas about how to mitigate or put an end to the effects of shifting cultivation could not be cultivated as there was no interaction. In order for people to be knowledgeable about the effects of shifting cultivation, the theory argues that people should learn through social participation. However, this was found lacking amongst communities in Kasempa district. There were no interactions as a community to try and find solutions to their problems, people lived on past trends.

Based on the research findings, a conclusion was made that shifting cultivation is an unsustainable mode of agriculture as it proved to have detrimental effects on the environment.

5.4 Effects of Shifting Cultivation on Education

The major objective of this study was to determine the effects of shifting cultivation on school going children in Kasempa district. To achieve this goal, the research in the first analysis wanted to ascertain whether shifting cultivation had a negative impact on education from the point of view of all the respondents in the study.

Investigations found that all the respondents in the study overwhelmingly said that shifting cultivation had a negative impact on education. The study findings showed that when parents or guardians relocated to new farming areas, school going children in most cases relocated with them to the new farming areas leading to children transferring from one school to another. This practice of transferring from one school to another

frequently was said to be disturbing children's concentration, attendance and performance at school. Relocating with their parents to new farm lands meant that children had to cover long distances from these new farm lands to their schools. This made children miss school and in most cases younger ones stopped going to school as they could not manage to cover long distances and pass through thickets every day.

In some cases, when parents or guardians relocated to new farming areas, children remained behind either on their own or joined other relations in the family. In instances where children remained behind either on their own or with another family, children complained of reduced parental care and guidance which reduced parents' academic support hence contributing to their low academic performance. In addition, the lack of close parental care and guidance left the children vulnerable to unwanted pregnancies and early marriages hence leading to a high school dropout rate.

From the District Inspectors of schools' point of view, shifting cultivation led to low enrolment levels in schools on the outskirts of Kasempa especially in lower grades and particularly among children aged between 6-10 years who could not cover the increased distances to school resulting from the search for fertile land by parents. Most teachers who responded to the data collection tools in the study revealed that the school enrolment was generally not very good in Kasempa due to the practice of shifting cultivation in the district.

Additionally, some of the parents and guardians who participated in the study shared similar views with other respondents in the study and revealed that they were aware that shifting cultivation impacted negatively on education. However, they found it very difficult to stop this practice of shifting cultivation as they could not afford artificial fertilizers among other reasons for insisting on the practice of shifting cultivation. The parents insisted that they could not find another cheaper form of agriculture that would assure them of a higher yield and sustenance.

The study also found that shifting cultivation contributed very immensely to the high incidences of teen pregnancies in Kasempa. It had been observed that when children dropped out of school due to long distances to school, they tended to indulge in pre-marital sex which led to teen pregnancies becoming the common order of the community. These children were vulnerable to social accidents due to lack of recreational facilities and activities. Equally, high levels of sexual harassment among school going children either by their fellow school going children or adults was exacerbated by the increased long distances to school which children had to cover to access school. Even those who remained in the villages were exposed to sexual harassment as they became vulnerable due to lack of parental care. The majority of respondents in the study attributed pre-marital pregnancies among school going children to shifting cultivation which they said contributed significantly to dropping out of school by children because schools became too far away from their homes or areas their parents relocated to.

The study further investigated on the specific problems faced by the school going children in terms of their education. From the children's point of view, the research findings indicated that among the direct related problems school going children faced due to the practice of shifting cultivation included; long distances to school, increased absenteeism, low levels of concentration in school and late going to school. Furthermore, children complained of reduced parental guidance and care in instances where parents relocated to new farming areas leaving them behind. All the aforementioned negative effects of shifting cultivation led to low levels of school enrolment and increased dropout rate of school going children particularly those in the lower grades.

These findings relate very well with the findings of Govinda (1995) on 'Status of Primary Education of the Urban Poor in India', particularly his study on the All Indian Educational Survey of the NCERT conducted in 1986. This survey found that nearly one out of every two children enrolled in rural schools dropped out without completing even five years of schooling. This was mainly due to the nomadic way of life of their parents. This is similar to the findings of this study on manifestations of the effects of shifting cultivation on school going children.

On the basis of the above findings, a conclusion was made that the practice of shifting cultivation had negative effects on education more particularly on the school going children as it reduced their accessibility to, and concentration at school.

5.5 Proposed Solutions to Negative Effects of Shifting Cultivation on Education

Having established the negative effects of shifting cultivation on the environment and education, the researcher went on to ask the concerned stakeholders to propose possible solutions to these effects. From the research findings, it was discovered that people of Kasempa had continued to practice shifting cultivation mainly due to the fact that it was their main source of earning a living. Most of these farmers could not afford to meet the high cost of artificial fertilizers. In this regard therefore, people engaged in shifting cultivation and tended to shift from one farmland to another in search of soils which were more fertile. Considering the above scenario, the provision of artificial fertilizers in form of grants and loans to the farming community would help reduce the practice of shifting cultivation among the people of Kasempa and subsequently, its impact on education.

Another proposed solution towards the reduction of negative effects of shifting cultivation on education and the environment was the act of community sensitization. School going children, teachers and the district inspectors of schools identified that most of the farmers in the district did not know the long term effects of shifting cultivation on education as well as the environment hence the need for community sensitization. The general consensus by the respondents was the need to make people aware of the negative effects of this farming method on both education and the environment. Once the farmers understood the gravity of these effects, they would more likely find other options that would help mitigate or reduce these detrimental effects of shifting cultivation on education and the environment.

The findings of this research were similar to the findings in the research conducted in Bhutan which revealed that under the present technological, socio-economic and institutional conditions, shifting cultivation as a farming system must be replaced with other sustainable modes of agriculture which were socially accepted, economically rational and scientifically sound. Owing to emerging socio-economic transformations, the present practice required certain changes and modifications if it were to continue.

It was expected that changes to traditional shifting cultivation would increase the carrying capacity of lands by introducing better levels of control and management. Use of improved soil management to improve soil fertility would permit farmers to increase the period of cultivation and decrease the fallow period, and the introduction of tree crops and new crop varieties besides maize would increase the productivity per unit area.

The research findings also related well to the two theories of Community of Practice and Social Learning theory. The negative effects of shifting cultivation could best be addressed if the shifting cultivators observed positive behaviour from others in society. In this regard therefore, if the people of Kasempa were sensitized on the negative effects of shifting cultivation and advised on better and more sustainable methods of farming they would more likely abandon shifting cultivation and engage in more sustainable methods. The theories imply that the abandonment of the practice could be made possible through the observance of positive behaviour and the need for social participation as individuals seek identity in their communities.

A conclusion was made that for shifting cultivation to be abandoned, there was need for government intervention through the provision of artificial fertilizer and other agriculture subsidies. It was also concluded that another solution to the problem was community sensitization on the effects of shifting cultivation with the hope of making improvements in the farming methods.

5.6 A Proposed Sustainability Curriculum to Address Effects of Shifting Cultivation on School Going Children of Kasempa District

In an effort to economically develop and survive, communities inadvertently destroy or exhaust the resources on which they depend for survival. Human activity on the environment has led to a serious environmental crisis. Specific activities such as shifting cultivation had not only impacted negatively on the environment but had negatively affected the educational system in the areas where it was practiced. After a study on the effects of shifting cultivation on school going children in Kasempa district, the research findings indicated how unsustainable the practice was on school going children. In a more general sense, sustainability refers to "meeting the needs of the present generation without compromising the needs of future generations" (Todaro and Smith, 2009:485).

In trying to earn a living, most parents on the outskirts of Kasempa compromised the ability of their children to meet their needs in future since they were not getting the education needed for a successful future. Most parents had ignored the effects of shifting cultivation on the education of the school going children. With regard to this

scenario. there was therefore need to put measures in place in order to address the effects of shifting cultivation on education in Kasempa. This proposed sustainability curriculum for people in Kasempa district was aimed at creating an awareness on the effects of shifting cultivation on school going children and equip them with skills to adopt other sustainable methods of farming that would help them do away with shifting cultivation and its effects. This type of education would be based on the following objectives:

1. To have concern for the local realities which in turn need to be integrated into all forms of educational process, general and specialised in communities and in formal schools.
2. To develop knowledge to help social groups and individuals gain a variety of experiences and acquire a basic understanding of the environment and its associated problems.
3. To acquire skills for identifying and solving environment problems.
4. To acquire knowledge and skills which would help them use the environment in a sustainable manner.

The proposed curriculum would be based on the decentralization policy that would empower local people to participate in the governance of their environment by strengthening the provision of educational services and making the local villagers more accountable of everything they do. Ministry of Education (2005) brought out the goals of decentralization as follows:

- Enhance coordination of development efforts.

- To promote community participation in all matters related to national development.
- Alleviate poverty through the introduction of a localized curriculum with relevant practical life skills.

The most important point to note at this stage is that the curriculum proposed here would empower both the old and young generations living in Kasempa with the knowledge on the effects of practicing shifting cultivation. With such knowledge at hand, the people who are still involved in this practice are likely to find a precautionary strategy to avoid these effects. The elders should adopt new strategies or means of survival that would preserve the environment and promote accessibility to education so that the younger generation could be well equipped for the future. This is because a family is one of the agents of socialization, therefore, children normally copy what their parents do. Children should be given good survival skills if the environment is to be preserved and their future assured. With regard to the proposed curriculum on sustainability of education, it would give the school going children a great advantage if this proposed curriculum was mainstreamed in the formal education syllabus.

Table 7. Proposed Sustainability Curriculum to address Effects of Shifting Cultivation on School going Children of Kasempa District

Specific objectives	Educational Actions	Educational delivering Mechanism	Stakeholders	Learning outcomes
1.1 -to improve the living standards of people in the communities in Kasempa District through the use of sustainable methods of farming. (eg Conservation farming)	-Formation of Co-operative societies in the communities that will help to introduce sustainable methods of farming and necessary survival skills in the area that will guarantee food security and income among the concerned households.	Information dissemination about sustainable methods of agriculture through Co-operative societies, seminars and workshops to communities practicing shifting cultivation.	Ministry of Agriculture and Co-operatives (MACO), Ministry of Community Development and Social Services (MCDSS), Ministry of Education (MoE) and the Chief and his Head men.	- Individuals in communities will adopt Sustainable methods of farming such as conservation farming, crop rotation, Honey collection or weaving to replace shifting cultivation. Sustainable methods of farming will make farmers to establish permanent homes which will in turn reduce the disturbances on school going children.

1.2 -to conserve the Natural Resources in the communities practicing shifting cultivation.	-Formation of conservation clubs in the affected communities that will help educate communities on the importance of local management of the Natural resources such as forests and water resources. Proper management of natural resources reduces the depletion of forests, watersheds and other detrimental effects to the environment. -Formation of village committees to spearhead the allocation of land to every household for the establishment	- to educate concerned communities about the importance of conservation of nature through the local radio, workshops and seminars.	-MACO, MCDSS, MoE, Village head men and the local Chiefs.	-Individuals will acquire Natural Resource management skills leading to the conservation of natural resources hence a reduction in the practice of shifting cultivation as farmers will adopt more sustainable, efficient, productive and profitable sedentary farming systems. -Households will stop the abandonment of exhausted land in favour of virgin land. This can be achieved by adopting more sustainable farming methods such as conservation

	of permanent settlement schemes which must be used in a sustainable manner.			farming and crop rotation.
1.3 -to reduce poverty levels among the people in the study area.	-Formation of co-operative societies to educate communities on other survival skills such as bee keeping and weaving by using local resources.	-Community sensitization on other survival skills by co-operative societies and local radio.	-Ministry of Tourism Environment and Natural Resources (MTENR), Keeper Zambia an NGO operating in Kasempa district, The local council, MACO, MoE and the clergy in district	- Reduced number of people living in poverty in Kasempa district as the acquisition of survival skills by members of the communities will enable them to earn a living through other means. -There will be a major change in the vision and knowledge of the local people thereby adopting market-oriented diversification of farming methods.

1.4-to increase food production in the district through the use of sustainable methods of agriculture.	-Formation of co-operatives societies to teach the use of irrigation schemes and multi-cropping methods. -Formation of conservation clubs in communities and schools to impart skills in leadership Development and Community Organization. -Seek Ministerial re-enforcement of the activities of the Agriculture extension officers so that they can train and monitor the progress of farmers.	Dissemination of information through co-operative societies, workshops and seminars on effective production of winter crops through irrigation schemes (locally known as Mapoka). - Education to farmers by co-operative societies on the use of multi-cropping methods instead of mono-cropping. - Skills training in conservation farming, Leadership Development and Community organization to be carried out in communities	-Agriculture extension officers, MCDSS, local Chiefs, Teachers in Schools and Church leaders	- Individual farmers in villages will adopt sedentary farming systems which will be based on land ownership, sound land planning, good market opportunities and improved social conditions - Parents and School going children in the communities will gain skills and information on sustainable methods of farming which in turn will increase household food security. -People will establish permanent homes which will reduce the disturbances on school

		and in Schools through conservation Clubs. -Training of farmers by agriculture extension officers and field visits to the farms to monitor progress.		going children.
1.5 –to Prevent deforestation, soil erosion and forest fires	-To form Conservation Clubs in communities and schools so that they educate the communities on the need to reduce the indiscriminate cutting down of trees, late burning of forests and unsustainable extraction of forest product.	-Community forest management groups to be formed in the villages to help people in the communities manage and protect forests and soil.	-MTENR, local Council, teachers and Church leaders	-Individuals in the communities reduce the unnecessary cutting down of trees, late burning and take community forest management seriously.
2.1 –to strengthen and build the capacity of Institutions concerned with agriculture.	-To establish integrated Natural resource management groups among	-Field activities and support services to be conducted in the	-MACO, MTENR, MCDSS, local council, traditional leaders and	- Part of the customary land will be allocated to households on a permanent

(a) Capacity strengthening for land use planning and allocation. (b) Strengthening of agriculture and forest services	people in the area of study. -To create Village development committees consisting of Farmers committees and traditional leaders that will ensure that adequate women representation exists in these committees as they play a vital role in food production in the village set up.	communities -Farmers in the communities to be trained in sustainable farming methods (eg conservation farming and crop diversificatio n) by the Natural resource management group	NGOs (eg Keeper Zambia operating in the area of study.	basis by traditional leaders with the help of the central government through the local council. -Effective management and use of land and other natural resources by villagers in a planned manner.
2.2 –to diversify agricultural methods in the study area.	- Formation of agriculture co-operative societies that will equip farmers with necessary skills in fish	- Hold training workshops and seminars to train farmers in fish farming, livestock	-MACO, NGOs, Traditional leaders, Ministry of Fisheries and Livestock,	Farmers will acquire knowledge and skills in new farming methods (i.e crop diversification

	farming, livestock rearing, bee keeping, multi-cropping and winter gardening. Diversification in farming methods will reduce the reliance on shifting cultivation as there will be other options.	rearing, bee-keeping, multi-cropping and winter gardening.	and MTENR.	and bee keeping), hence adopt them and reduce the practice of shifting cultivation
2 .3 –to enhance Village based development. (Village and community capacity building). (a) Irrigation development.	-Formation of committees of farmers in the villages that will provide education on irrigation techniques or schemes to villagers. The use of irrigation systems will encourage the farmers to produce crops throughout the year hence reduce their dependence on shifting cultivation.	Dissemination of information by village committees to farmers in the villages and teaching them how to make canals to be used in irrigation to move from the traditional methods of using buckets and containers.	-Agriculture extension officers and Community development officers, from MACO and MCDSS respectively, traditional leaders and teachers of agriculture science	-Villagers will be guaranteed of food security as they will produce enough food from their winter gardens -There will be an Increase in household income from the sales of produce from their gardens, hence school going children will not be engaged in economic

				activities. -People will have permanent homes where they will settle in order to allow their children have access to school and other social services like clinics
(b) Water supply and sanitation.	-Seek the help of the district council and concerned NGOs to help put in place clean water facilities and provide relevant information to villagers on the importance of accessing clean water. -Formation of committees to spearhead the care and protection of	-With the help of the local council and NGOs, sink boreholes. - Sensitization of communities on proper use of boreholes and on the importance of clean water use. -Local council and NGOs to sink boreholes near social	-District council, NGOs (eg Keeper Zambia), MCDSS, MACO, traditional leaders, community members and the Ministry of Health (MOH)	-People in villages will have access to clean water in their communities and have more time to engage in more productive activities instead of spending time drawing water. -Many individuals will have the privilege to settle near

	the boreholes by putting up good drainages.	services like schools and clinics.		sources of clean water (boreholes) and there will be an improvement in people's health and general standards of living
(c) Village housing development.	-Formation of village committees to sensitize people in the villages on the importance of using available grass (locally known as Lweo) or buying iron sheets to construct their houses so as to enhance good and strong housing units in their villages. -Establish settlement schemes in which farmers	-Sensitization of communities by village committees on the importance of good and strong housing construction. This to be done through workshops and seminars.		-People will live in strong permanent houses that will guarantee them comfort and safety. Permanent homes will help school going children to attend school regularly.

	should settle permanently so as to avoid disturbing children's education.			

Major Components of Sustainable methods of agriculture to address the effects of shifting cultivation in summary could include the following:

1. Reliance on organic fertilizers from crop and animal wastes rather than expensive commercial inorganic fertilizers. This include:

(a) Animal manure which contains the dung of cattle and poultry, and other forms of animals. Application of animal manure would improve soil structure, increase organic nitrogen content and stimulate the growth and reproduction of bacteria and fungi necessary for the growth of some plants.

(b) Green manure which includes fresh or still-growing green vegetation ploughed into the soil to increase the organic matter and humus available to the next crop.

(c) Compost which is a rich natural fertilizer that is produced by pilling up alternating layers of carbohydrate-rich plant wastes (such as cuttings and leaves) animal manure and topsoil, providing a home for micro-organisms that aid the decomposition of the plant and animal manure layers.

2. Emphasis on conservation of soil, soil nutrients and water to enhance short and long-term crop productivity and reduce water pollution.
3. Emphasis on cultivation of perennial crops that replant themselves rather than annual crops whose seeds must be purchased each year.

4. Emphasis on poly-culture in which several different crops are planted in the same field to reduce vulnerability to crop losses from pests and diseases
5. Emphasis on biological rather than chemical control of pests and weeds to reduce water pollution

5.7 Reflections on Extent to which Research Questions have been addressed.

In view of the research problem under discussion, this study tackled both general and specific research questions. The general research questions tackled during the study were to investigate why shifting cultivation was practiced by the local people of Kasempa District and to assess how sustainable the practice was by then. In view of these questions, the research findings revealed that the major reason for practicing shifting cultivation was the search for fertile soils as most of the local population on the outskirts of Kasempa District could not afford the purchase of artificial farm inputs such as fertilizers to boost soil fertility in the affected areas. Among other reasons cited for the practice, culture and safety of crops from domestic animals equally stood out. With regard to whether the practice of shifting cultivation was sustainable or not, the research findings revealed that the practice was ecologically and socially unstable and unsustainable than the existing permanent cultivation practices. The practice produced more detrimental environmental impact where the farmers had strictly followed the practice. It proved unsustainable as it caused deforestation and subsequently, land degradation in the study area.

The specific research questions tackled in view of the research problem were to establish the effects of shifting cultivation on school going children and to find out what environmental education activities could be used to address effects of shifting cultivation on school going children. In view of the extent to which these research questions have been addressed, the study revealed that the practice had negative effects on school going children in the district in that the tendency of parents relocating to new farmlands tended to elongate the distances between pupils' homes and the schools they attended. This proved to disturb the children's concentration, attendance and performance at school, and education in general. The long distances to school also made girl children vulnerable to sexual encounters which led to pregnancies which subsequently increased school drop-out rate in the district.

With regard to what environmental education activities could be employed to address effects of shifting cultivation on school going children, the study revealed that there was need for government intervention in terms of provision of grants and loans to enable farmers purchase the artificial agriculture inputs. Furthermore, it was proposed that there was need for community sensitization on both short and long term effects of shifting cultivation on both the school going children and the environment

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

This study brought out various important issues regarding the practice of shifting cultivation practiced by the Kaonde people of Kasempa District in North Western Province of Zambia. The study highlighted the reasons behind the continued practice of shifting cultivation as well as its effects on school-going children and education in general.

The study revealed that shifting cultivation was practiced by the Kaonde people in their quest for fertile soils as they could not afford to buy artificial fertilizers since they had no regular income. In addition, the study also revealed that shifting cultivation had persisted in Kasempa as it was part of the culture of the people which they inherited from their fore fathers as a way of life. Despite the reasons advanced for the practice of shifting cultivation, the study findings revealed that the practice was unsustainable as it had negative effects on both the environment and school going children.

Furthermore, the study revealed that shifting cultivation had numerous negative effects on school going children and education in general. The low levels of school enrolment and high incidences of children dropping out of school were attributed to the practice of shifting cultivation. Further, school going children in Kasempa revealed that shifting cultivation contributed to low levels of concentration in school as they walked or covered long distances to school. Children further complained that they were usually late at school due to long distances covered to school from their parents and guardians

settlements. Additionally, school going children also attributed their increased absenteeism from school to the practice of shifting cultivation as they were usually too tired to attend school after helping on the farm.

6.2 Study recommendations

This subsection provides recommendations and suggestions on how the practice of shifting cultivation and its negative effects on education and the environment could be mitigated. The following were identified as possible alternatives to shifting cultivation that could be gradually introduced in the course of a programme for phasing out this practice or mitigating it for better natural resource management within communities. The advantages and/or disadvantages of each model are presented and its potential for implementation is also discussed.

Based on the research findings, it is recommended that:

1. The Ministry of Education should embark on community sensitization of the people in Kasempa on both the short term and long term effects of shifting cultivation on school going children in the district. This is based on the finding that most of the farmers in the district did not know the long term effects of shifting cultivation on education, particularly on school going children.

2. The Environmental Council of Zambia should equally embark on sensitization of people in Kasempa District on the challenges shifting cultivation poses to the goal of environmental sustainability in the country. This is in line with the

findings that people (farmers) in the district were not aware of the negative effects of the practice of shifting cultivation on the environment in general.

3 The Ministry of Agriculture and Cooperatives and its partners should scale up the provision of Education on sustainable methods of farming like conservation farming and crop rotation to the farming community in Kasempa to curb the practice of shifting from one farmland to another in search of fertile land at the expense of children's education. This will address the finding that the relocation of parents from one farm land to another in search of fertile soil disturbs the attendance, concentration and later on the performance of school going children. Once sustainable methods were learnt, parents would live in permanent settlements and children's education would not be disturbed.

4. When parents or guardians relocate to new areas in search of fertile land, they should be encouraged to either leave their school going children behind or settle near schools. This is based on the finding that the relocation of parents to new farm lands elongated the distances school children had to cover between their homes and the schools they attended which resulted in high levels of absenteeism and drop-out.

5. There is great need to promote environmental education as well as formation of Environmental Clubs in schools and communities in Kasempa District. This will

address the finding that most people who engaged in the practice of shifting cultivation were ignorant about the negative effects of the practice on both the environment and education.

6. Since shifting cultivation had been identified as one of the major causes of the depletion of forest wealth. It is recommended that the practice should therefore be abolished if the forest is to be conserved. One way of conserving the forests is through nationalization of all land under shifting cultivation. In order to avoid hardships to the present population dependent on this practice of cultivation within forest areas, a payment of appropriate compensation to the dispossessed is recommended. This concept contains several implicit assumptions. It is assumed that:

- farmers who are solely dependent on shifting cultivation will likely adopt alternative vocations by utilizing cash compensation paid to them by the government;
- farmers with permanently cultivated land will invest the compensation paid to them to increase production from dry land and wetland; and
- the degraded land presently under shifting cultivation will automatically stabilize as soon as it is reverted back to forest after nationalization.

This alternative is a direct and short-cut approach to phasing out shifting cultivation as it will address the finding that the practice of relocating from one farm land to another is encouraged by the fact that land is customary, hence people feel obliged to relocate whenever they feel the need. A pre-requisite for this method is the

preparation of a master plan to resettle the displaced farmers, which is a very complex and expensive project in itself. This alternative, therefore, is neither economically feasible nor socially desirable to implement on a large scale. However, limited application of this approach may be desirable for rapid protection of strategic watersheds, road slopes and other places of particular importance from further deterioration.

7. As for those shifting cultivators who cannot find better and more rational alternatives to the practice, improvement to the existing shifting cultivation system is yet another recommendation. The concept behind this alternative is that, under the present technological, socio-economic and institutional conditions, shifting cultivation as a farming system must remain: it is socially accepted, economically rational and scientifically sound. However, owing to emerging socio-economic transformations, the present practice requires certain changes and modifications.

   This model would lead to an increase in the production per unit area from shifting cultivation without a substantial departure from traditional fallow cultivation. Since the concept does not depart significantly from the present practice, it would be acceptable to the majority of small farmers practicing shifting cultivation. The appropriate technology envisaged in this approach is not readily available and all activities that have been proved successful elsewhere need to be tested on a pilot demonstration scale.

It is expected that changes to traditional shifting cultivation would increase the carrying capacity of farm lands by introducing better levels of control and management. Use of improved soil management to improve soil fertility would permit farmers to increase the period of cultivation and decrease the fallow period, and the introduction of tree crops and new crop varieties besides maize would increase the productivity per unit area.

If selected for implementation in Kasempa District, this alternative will involve preparatory activities such as the survey and demarcation of all the land under shifting cultivation, including identification of ownership. It would necessitate land evaluation, treatment-oriented classification of all the land under shifting cultivation and the preparation of guidelines for the improvement of each category of land.

6.3 Future Research

In line with the findings of this study, the following areas of future research were suggested:

(a) A study on the impact of shifting cultivation on land and rain patterns in North Western Province, and Kasempa District in particular.

(b) A focused study on the contribution of tradition or culture to the practice of shifting cultivation in Kasempa District.

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Appendix: 1

THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

SCHOOL OF EDUCATION

DEPARTMENT OF LANGUAGE AND SOCIAL SCIENCES DEPARTMENT

SECTION OF ENVIRONMENTAL EDUCATION

Questionnaire for district inspectors of school

Dear Respondents,

I am a second year student in the school of education reading for a Masters degree in Environmental Education (EE) and I am now conducting a research as a partial fulfillment of the degree. You have been randomly selected as part of the sample in this research. I humbly ask for your sincere cooperation to answer this questionnaire and your answers will be treated confidentially.

Research topic: A Proposed Sustainability Curriculum to address effects of Shifting Cultivation on school going children: The case of Kasempa District.

Instructions: - Tick in the given boxes for an appropriate answers.

-Where blank spaces have been provided, please explain or give reasons

Thank you.

1. Sex (a) Male ☐ (b) Female ☐

2. What is your position? .....

3. How many basic schools do you have in Kasempa district? .....

4. How is the pupils' enrolment in these schools?

(a) V. good ☐ (b) good ☐ (c) bad ☐

5. Some parents around some of th.ese schools practice shifting cultivation. Does this farming Method have any effects on school going children? (a) Yes ☐ (No) ☐

6. If your answer to question 5 is yes, list down the effects of shifting cultivation on school going Children.....

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7. List down the effects of shifting cultivation on the environment.....

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8. If your answer to question 5 above is yes, give examples of schools in the district where some school going children have been affected by shifting cultivation

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9. As an office, do you have any measures you use to help the affected pupils in these schools? (a) Yes ☐ (b) No ☐

10. If your answer to question 9 is yes, list down measures you have put in place to help school going children who are affected by shifting cultivation?

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11. Are the parents aware of the negative effects of shifting cultivation on the school going children and on the environment? (a) Yes ☐ (b) No ☐

12. Have you ever organized meetings to sensitize parents who stay around the affected schools on the effects of shifting cultivation on school going children and on the environment? (a) Yes ☐ (b) No ☐

13. If you answer to question 12 is yes, what reasons did the parents give to why they practice shifting cultivation? .....

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14. What measures do you think should be put in place in order to address the effects of shifting cultivation on school going children and on the environment? .....

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End of questionnaire

Appendix: 2

THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

SCHOOL OF EDUCATION

DEPARTMENT OF LANGUAGE AND SOCIAL SCIENCES DEPARTMENT

SECTION OF ENVIRONMENTAL EDUCATION

Questionnaire for teachers

Dear Respondents,

I am a second year student in the school of education reading for a Masters degree in Environmental Education (EE) and I am now conducting a research as a partial fulfillment of the degree. You have been randomly selected as part of the sample in this research. I humbly ask for your sincere cooperation to answer this questionnaire and your answers will be treated confidentially.

Research topic: A Proposed Sustainability Curriculum to address effects of shifting Cultivation on school going children: The case of Kasempa District.

Instructions:- Tick in the given boxes for an appropriate answers.

-Where blank spaces have been provided, please explain or give your reasons

Thank you

1. Sex (a) Male ☐ (b) Female ☐

2. How long have you been teaching in this school? .....

3. What position do you hold in this school?

(a) Class teacher ☐ (b) Deputy Head teacher ☐ (c) Head teacher ☐

others, specify .....

4. How is the enrolment of pupils in this school?

(a) V. good ☐ (b) good ☐ (c) poor ☐

5. Give reasons to support your answer to question 4

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6. What is the common occupation of most people around this school?

(a) Farming ☐ (b) Charcoal burning ☐ (c) others specify .....

7. If your answer to question 6 is farming, what method of farming do they practice?

(a) Shifting cultivation ☐ (b) Fish farming ☐ (c) Others, specify .....

8. If your answer to question 7 is shifting cultivation, does this farming method have any negative effects on school going children? (a) Yes ☐ (b) No ☐

9. If your answer to question 8 is yes, has shifting cultivation affected some of the school going children in your school? (a) Yes ☐ (b) No ☐

10. If shifting cultivation has affected some pupils in your school, indicate clearly how some Pupils have been affect.....

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11. Are parents aware of the negative effects of shifting cultivation on school going children? (a) Yes ☐ (b) No ☐

12. Do you teach environmental education in this school? (a) Yes ☐ (b) No ☐

13. If you teach environmental Education, do you teach pupils on the effects of shifting cultivation on school going children and on the environment?

(a) Yes ☐ (b) No ☐

14. Have you ever organized meetings to sensitize parents who stay near your schools on the effects of shifting cultivation on school going children and on the environment?(a) Yes ☐ (b) No ☐

15. If you answer to question 14 is yes, what reasons did the parents give to why they practice shifting cultivation? .....

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16. What do you think should be done in order to address effects of shifting cultivation on school going children and on the environment?.....

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End of questionnaire

Appendix: 3

Interview guide for school going children

1. Sex (a) Boy ☐ (b) Girl ☐

2. How old are you?

   (a) 6 to 8 years ☐ (b) 9 to 12 years ☐ (c) above 12 years ☐

3. What grade are you doing?

   (a) grade 1 to 4 ☐ (b) grade 5 to 7 ☐ (c) grade 8 and 9 ☐

4. What is the name of your village? .....

5. What is the occupation of your parents or guardian? .....

6. If the occupation of your parents or guardians is farming, do they practice shifting cultivation? (a) Yes ☐ (b) No ☐

7. If your answer to question 6 is yes, where do you live when they relocate to new farming Place? .....

8. What problems do you face with your school programmes when your parents relocate to a different farming area? .....

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9. What negative effects do you think shifting cultivation has on the environment and on school going children? .....

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10. Do you know any children who have stopped school because of their parent relocating to places which are far away from school because of shifting cultivation?

(a) Yes ☐ (b) No ☐

11. Do you learn environment education at school? (a) Yes ☐ (b) No ☐

12. If your answer to question 11 is yes, how do you use the knowledge you gain from Environmental education lessons from your school? .....

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13. What do you think should be done in order to address the effects of shifting cultivation on the environment and on school going children? .....

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End of questionnaire

Appendix: 4

Interview guide for Parents who practice shifting cultivation

1. Sex (a) Male ☐

   (b) Female ☐

2. Age (a) Below 20 years ☐

   (b) 21 to 30 years ☐

   (c) 31 to 50 years ☐

   (d) 51 and above ☐

3. What is the name of your village? .....

4. Marital status

   (a) Single ☐ (b) Married ☐ (c) Divorced ☐ (d) Widowed ☐

5. What is your occupation? (a) Farmer ☐ (b) Charcoal burner ☐

   (c) Others, specify.....

6. If your answer to question 5 is farming, what type of farming do you practice?

   (a) Shifting cultivation ☐ (b) Conservation farming ☐

   (c) Others, specify.....

7. If you use shifting cultivation, give reasons why you use this type of farming.

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8. If you use shifting cultivation, for how long do you use one field before relocating to a new virgin land? (a) 1 year ☐ (b) 2 years ☐

(c) 3 years ☐ (d) 4 years ☐

9. What happens to the abandoned land? .....

10. Do you have children or dependants who go to school? (a) Yes ☐ (b) No ☐

11. If your answer to question 10 is yes, what happens to your school going children or dependants when you relocate to a new farming area? .....

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12. Do you think shifting cultivation is a good farming method to practice with the rapid growing population? .....

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13. Is the food you produce enough to see your family survive from one farming season to the other? (a) Yes ☐ (b) No ☐

14. If your answer to question 13 is No, how do you survive when you run out of stock?

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15. What problems do you face when practicing shifting cultivation? .....

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16. Have you ever received any information on the effects of shifting cultivation on the environment and school going children? (a) Yes ☐ (b) No ☐

17. If your answer to question 16 is yes, has it helped you in any way? .....

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18. What do you think should be done to address the effects of shifting cultivation on the school going children and the environment?.....

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End of questionnaire