

**SMALL SCALE WOOD CARVING ENTERPRISES AND THEIR CONTRIBUTION  
TO RURAL LIVELIHOODS IN WAMUNYU, MACHAKOS COUNTY, KENYA**

**Shedrack Mwendwa Muthini**

**N50/CTY/PT/30834/2015**

**A Research Project Submitted in Partial Fulfillment for the Degree of Master of  
Environmental Planning and Management in the School of Environmental Studies of  
Kenyatta University**

**January, 2017**

**DECLARATION**

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

Shedrack M. Muthini

Department of Environmental Planning and Management

Signature..... Date.....

This research project has been submitted with my approval as the University supervisor.

Dr. Sammy Letema

Department of Environmental Planning and Management

Kenyatta University

Signature: ..... Date: .....

## **DEDICATION**

I dedicate this work to the glory of God Almighty, my beloved father and mother, Mr Onesmus Muthini and Mrs Sarah Muthini for their moral and financial support throughout my education.

## **ACKNOWLEDGMENT**

First and foremost I would like to express my sincere gratitude and appreciation to my supervisor Dr. Sammy Letema for his guidance and support throughout this study and Kenyatta University for granting me the opportunity to carry out this study. Secondly, I thank my colleagues who took their time to assist me in my research by collecting data, their dedication and commitment to the process was significant.

I also thank the Wamunyu Handcraft Cooperative Society manager Mr Joseph Mutuku together with the chairman of the society Mr Francis Kimeu who were helpful during the study. An earnest thanks to the carvers, workshop workers, shopkeepers and the locals who shared valuable data and their experiences with me to make this study complete through their co-operation and support.

## TABLE OF CONTENTS

DECLARATION .....	ii
DEDICATION .....	iii
ACKNOWLEDGMENT .....	iv
TABLE OF CONTENTS .....	v
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
LIST OF PLATES .....	x
ACRONYMS AND ABBREVIATIONS .....	xi
ABSTRACT .....	xii
CHAPTER ONE .....	1
INTRODUCTION .....	1
1.1 Background to the study .....	1
1.2 Statement of the problem .....	3
1.3 Research Questions .....	4
1.4 Research Objectives .....	4
1.5 Significance of the study .....	4
1.6 Theoretical Framework .....	4
1.6.1 Sustainable livelihood Approach .....	4
1.6.2 Asset Based Community Development Model .....	7
1.6.3 The Basic Resources Theory .....	8
1.7 Conceptual Framework .....	9
CHAPTER TWO .....	11
LITERATURE REVIEW .....	11
2.1 Introduction .....	11
2.2 Woodcarving practices .....	11
2.2.1 Traditional wood carving practices .....	11
2.2.2 Modern woodcarving practices .....	13
2.3 Problems constraining development of the woodcarving industry .....	14

2.4 Contribution of woodcarving to the socio-economic welfare of the woodcarvers .....	17
2.5 priority areas for value addition in woodcarving products .....	16
2.6 Literature Gap .....	19
CHAPTER THREE .....	20
RESEARCH DESIGN AND METHODOLOGY .....	20
3.1 Study Area.....	20
3.1.1 Location and Extend.....	20
3.1.2 Climatic Conditions.....	22
3.1.3 Vegetation.....	23
3.1.4 Geology and Soils .....	24
3.1.5 Socio-Economic Activity .....	24
3.2 Research Design.....	25
3.3 Sampling procedure and sample size .....	25
3.3.1 Purposive sampling.....	<b>Error! Bookmark not defined.</b>
3.3.2 Field surveys.....	<b>Error! Bookmark not defined.</b>
3.3.3 Simple random sampling.....	<b>Error! Bookmark not defined.</b>
3.3.4 Sampling size.....	<b>Error! Bookmark not defined.</b>
3.4 Data collection.....	26
3.4.1 Questionnaire.....	27
3.4.2 Observation.....	27
3.4.3 Photography.....	27
3.4.4 Interview .....	27
3.5 Data analysis .....	28
CHAPTER FOUR.....	29
RESEARCH FINDINGS AND DISCUSSION.....	29
4.0 Introduction. ....	29
4.1 Woodcarving practices in Wamunyu location, Machakos County .....	29
4.1.1 Traditional and modern .....	29
4.1.2 Value addition measures.....	34
4.1.3 Challenges facing the wood carving enterprise in Wamunyu .....	36
4.2 Contribution of woodcarving to the socio-economic welfare of the woodcarvers .....	38

4.2.1 Woodcarving as a source of income.....	39
4.2.2 Woodcarving as an employment opportunity.....	45
4.2.3 Wood carving as way of preserving tradition and culture.....	47
4.2.4 Promotion of the tourism industry.....	47
CHAPTER FIVE .....	49
SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATION .....	49
5.0 Introduction .....	49
5.1 Summary of the Findings .....	49
5.1.1 Woodcarving Practices in Wamunyu location, Machakos County .....	49
5.1.2 Contribution of Woodcarving to the Socio-Economic Welfare of the Woodcarvers	50
5.2 Conclusion.....	50
5.3 Recommendations Based on Findings .....	51
5.3.1 Short-term Recommendations .....	51
5.3.2 Long- term Recommendations .....	52
5.4 Areas for Further Studies .....	53
REFERENCES .....	54
Appendix 5.1: Household Questionnaire .....	61
Appendix 5.2: Institutional Questionnaire .....	67
Appendix 5.3: Interview Schedule for Wamunyu Handcraft Cooperative Society .....	70
Appendix 5.4: Observation Sheet for Wamunyu Woodcarvers .....	71

## LIST OF TABLES

Table 1: Level of education of the sample population of Wamunyu woodcarvers .....	33
Table 2: Main occupation of the woodcarvers in Wamunyu .....	39

## LIST OF FIGURES

Figure 1: Sustainable livelihood framework adopted from Knutsson, (2006).....	7
Figure 2: A Conceptual framework for the improvement of the woodcarving sector.....	10
Figure 3: Map of Machakos County showing location of Wamunyu.....	21
Figure 4: Average Temperature ( <sup>0</sup> c) for Wamunyu, Machakos County .....	22
Figure 5: Average Rainfall in (mm) for Wamunyu, Nairobi County .....	23
Figure 6: Woodcarving methods in wamunyu location.....	30
Figure 7: Willingness of woodcarvers to adopt modern woodcarving technologies.....	32
Figure 8: Response on value addition for the wood carved products .....	34
Figure 9: Value addition measures by Wamunyu woodcarvers .....	36
Figure 10: Challenges facing the woodcarving sector .....	37
Figure 11: Income from woodcarving as the main source of income.....	39
Figure 12: Response as to why woodcarving was being practiced.....	40
Figure 13: Age group of the woodcarvers .....	41
Figure 14: Wamunyu Handcraft Cooperative Society income per fiscal year .....	42
Figure 15: Start of woodcarving by the carvers.....	45
Figure 16: Type of labor used by woodcarvers .....	46
Figure 17: Wamunyu Handcraft Cooperative Society Turn Over per fiscal year .....	48

## LIST OF PLATES

Plate 1: Drilling Machine.....	30
Plate 2: Bench grinder.....	30
Plate 3: Traditional woodcarving tools.....	31
Plate 4: Woodcarver using Traditional tools.....	31
Plate 5: Carvers smoothening Scuyptures.....	32
Plate 6: carvers drilling holes on Sculptures.....	32
Plate 7: Women decorating sculptures.....	43
Plate 8: Woman gluing Giraffe sculptures.....	43
Plate 9: Broker curio shop at Wamunyu Market.....	44

## **ACRONYMS AND ABBREVIATIONS**

ECDP	Eastern Community Development Programme
DFID	British Department for International Development
USD	United States Dollar
FAO	Food and Agriculture Organization
WHCS	Wamunyu Handcraft Cooperative Society
NGOs	Non-Governmental Organisations
KFS	Kenya Forest Services

## ABSTRACT

At a time of rising food insecurity and high rates of poverty as a result of drought, rural communities have to find alternative means of livelihoods apart from crop and livestock agriculture which are susceptible to drought. Woodcarving is one of the sole most important alternative forms of livelihood in the rural areas. Despite documented potential benefits of high value markets and value addition, wood carved products are majorly produced and marketed locally with or no value addition. This study therefore sought to evaluate small scale wood carving enterprises as an alternative source of livelihood and their contribution to rural livelihoods with focus in Wamunyu Location, Machakos County, Kenya. The study was designed to assess woodcarving practices in Wamunyu location, examine the contribution of woodcarving to the socio-economic welfare of the woodcarvers in Wamunyu location and finally, suggest measures that can be put in place to improve the woodcarving sector in Wamunyu location. The study aimed at providing additional information which would be of importance to the relevant stakeholders in mainstreaming woodcarving as an alternative source livelihood in policy formulation, strategies and development programmes. The study used the case study design. Primary data was collected using questionnaires, interview schedules, photography and observation guides. Secondary data was obtained through reviewing previous research work related to woodcarving. Qualitative and quantitative data analysis techniques were used due to the nature of the data collected. Quantitative data was presented by use of pie charts, tables and figures. Qualitative data was organised into themes and presented through discussions and narratives. The findings showed that, despite large number of woodcarvers willing to adopt modern woodcarving technologies, traditional woodcarving remained to be more rampant due to lack of capital to purchase modern woodcarving machines and lack of skills to operate them. The findings also indicated that only small proportion of the woodcarvers did full value addition to their sculptures. Majority of the woodcarvers embarked on partial value addition while a small proportion never added value to their sculptures. They noted lack of capital to hire labour, lack of market for the finished sculptures and value addition being a tiresome and time consuming activity as the main reasons they never added value to their products. Consequently, they received low value for their investment. Additionally, the findings indicated that despite woodcarving positive contribution to the rural livelihoods through provision of income, employment creation, preservation of culture and tradition and promotion of tourism sector the industry faced a lot of challenges. These challenges included; lack of sufficient market, lack of enough and good quality wood, lack of sufficient finances, lack of machinery, lack of collaboration with the forestry department, lack of support by the government and poor working environment for the carvers. Future interventions such as establishment of national woodcarving strategy, developing market information systems, reformulation of tourism, forestry and culture policies to recognise woodcarving as a source of livelihood and allowing woodcarvers to have access to some hardwood tree species through the forestry department are some of the measures the county and national government should put in place to improve the woodcarving industry in Kenya.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the study

The woodcarving sector has been a source of livelihood to millions of people in the urban and rural areas for many years, particularly in developing countries (Laurent, 2009). In the arid , semi-arid and areas with low agricultural potential, woodcarving is a primary source of self-employment deriving its primary raw materials from the natural environment (Amoh, 2009). Conversely the woodcarving industry is an alternative source of income in agriculturally potential areas (Oladimeji, 2013). As an informal economic activity, the industry has employed large number of people worldwide who rely on it as their source of livelihood (Sunderland and Ndoeye, 2004).

Woodcarving industry is one of the oldest crafts surrounded by myths while on the other hand it is the source of numerous useful products. Over the years, it has been used successfully for functional and decorative purposes (Azeez, 2011). The work of the early artist developed as an art some six thousand years ago and reflected a system of beliefs, faith and the socio-cultural context in which the items were made (Mutinda, 2014). Wood carved products have not been able to survive like those similar products made of bronze and stone due to the fact that they are easily attacked by insects and they degrade as time goes by (European commison, 2004). Contribution of woodcarvings to livelihoods is now well researched in, South Africa, Uganda, Zimbabwe, Indonesia, Mexico and India (Pandey *et al.*, 2007). Woodcarving is one of the lucrative industries in Bali and the country earns approximately US\$100 million annually from the export of the wood carved products (Pandey, 2016). In India the woodcarving industry is well dispersed throughout the country with the traditional woodcarving practices being mostly practiced. The traditional woodcarving skills have been passed from one generation to another through family lineage system over the years (Penh, 2010). The industry has employed about four million people and it's the highest exporter to Rome, Greece, Portuguese and Dutch (Liao and Chang, 2013). The country has commercialized the woodcarving industry and as a result

the country is estimated to have earned US\$ 113.55 million in the year 2002-03 (Williams, 2014).

In some countries of Africa such as Egypt and South Africa, wood carving was being practiced as early as the 7<sup>th</sup> Century (Nyahunzvi, 2016). In Ghana Woodcarving industry has been there for centuries with the profession being transferred from generation to generation informally through the family lineage system (Amoh, 2009). It is seen as a means to express people's thoughts, beliefs and way of life through symbols designed to communicate specific messages (Dary, 2012). Annual income for carvers in the past was derisory, because the local market was small and there were no external market for the products. Also, carving was not a full time job for most of the carvers, but a side line activity to boost income from their farms (Mayers, 2008). Ghana sells more than USD 3,000,000.00 worth of handicraft and mostly wood carvings (Hülsemann, 2015). Likewise, woodcarving in South Africa provides household income between USD500-2000 per year, which is about 80% of the household cash (Pandey *et al.*, 2007).

Woodcarving in Kenya is one of the enterprises with extremely interesting history dating back to 1919 (Kusters and Belcher, 2004). It had basic characteristics in that it was survival based and it was used to support life on a day-to-day basis through harnessing and using local resource (Mutinda, 2014). It was guided by a set of cultural norms describing how affairs of a community were to be conducted. Further, it was not geared towards mass production, but was restricted to satisfying immediate domestic consumption (Pandey *et al.*, 2007). In Kenya wood carving industry has gradually expanded over the years and it is estimated to support livelihoods of approximately 80,000 carvers and their 500,000 dependents, generating export earnings of \$US20 million to external markets in North America, Europe and Asia (Sunderland and Ndoye, 2004). In Kenya, woodcarving stand out amidst the other forms of craft especially in terms of the commercialization and the number of people supported by woodcarving business among the Akamba people (Githiomi, 2014). In particular, and from which this study draws its drive, woodcarving has gained in popularity and prominence amongst the Akamba from Wamunyu Location of Mwala District of Kenya (Mutinda, 2014).

Traditionally, woodcarving amongst the Akamba was largely utilitarian and was performed with a high sense of appreciation and excellence (Mbithi, 2015). Over the past years, the art of woodcarving has evolved to take a new thematic orientation of commercialization dimension (Sunderland and Ndoye, 2004). Despite the commercialization of the woodcarving sector the wood carvers are languishing in poverty due to low returns they get from selling their carved products. This study was therefore designed to assess wood carving enterprises and their contribution to rural livelihoods among the wood carvers in Wamunyu, Machakos County.

## **1.2 Statement of the problem**

Wamunyu has a long history in woodcarving. Despite woodcarving immense potential to empower rural communities economically, poverty and food insecurity have defined their livelihoods (Mutinda and Kiumbuku, 2014). Their livelihoods are mainly agro-based, dependent on crop and livestock production (Githiomi, 2014). However due to poor climatic conditions characterized by frequent and prolonged drought, crop production has been very low (ECDP, 2010). Livestock production has also been adversely affected by these trends, leaving woodcarving business as the only viable alternative for the woodcarvers since it is less dependent on, or affected by climatic variations and is not resource intensive (Mutinda, 2014). Nevertheless, majority of the woodcarvers sell their products to middle men and sell without adding value to them. Consequently, they receive low value for their investments. The potentials of value addition and strengthening of market links for wood products have not been fully investigated and applied among the carvers in Wamunyu. Equally, investigation of the challenges facing the woodcarving industry in Wamunyu has not been studied. Perhaps this may enable poverty alleviation and enhancement of rural livelihoods. This study evaluated woodcarving industry and its contribution to sustainable rural livelihoods.

### **1.3 Research Questions**

1. What are the woodcarving practices in Wamunyu Location?
2. What is the contribution of woodcarving to the socio-economic welfare of the woodcarvers in Wamunyu Location?
3. Which measures can be put in place to improve the woodcarving sector in Wamunyu Location?

### **1.4 Research Objectives**

1. To assess woodcarving practices in Wamunyu location, Machakos County.
2. To examine the contribution of woodcarving to the socio-economic wellbeing of the woodcarvers in Wamunyu location, Machakos County.
3. To suggest measures that can be put in place to improve the woodcarving sector in Wamunyu location, Machakos County

### **1.5 Significance of the study**

The findings of this study are useful in promoting woodcarving enterprise in Machakos County and replicate in other areas facing similar opportunities. By addressing challenges facing the woodcarvers is imperative for improving the livelihoods of the communities dependent on the subsector. The study is helpful in giving insight to woodcarvers on where they can find high value markets for the products. Additionally, the study is helpful in the formulation of policies that could go a long way in enhancing livelihoods of woodcarvers and woodcarving entrepreneurs.

## **1.6 Theoretical Framework**

### **1.6.1 Sustainable livelihood Approach**

The sustainable livelihoods approach which puts the poor at the centre of any development program has recently been used widely in developing countries to execute developments programmes in the rural areas (Ofukwu, 2009). It aims at going a step further to address the

communities' vulnerabilities and public inclusion in development programs rather than embarking on the definitions and various approaches to poverty eradication which are seen to be too narrow (GB Oxfam, 2013). Leaders of development programs in the rural areas should give more attention to the various factors and processes that inhibit or increase capability of the community to make a living in an economically, ecologically and socially sustainable manner (Much *et al.*, 2012). A livelihood is made up of powers, properties and activities required to generate income to live on; and a livelihood is said to be sustainable when it can withstand and recuperate from stress and shocks, be able to retain and increase its potentials and assets, provide prolonged sources of income which can be transferred from one generation to another and be able to support the other sources livelihood at the local, regional and global level now and in the future sustainably (Morse *et al.*, 2009).

The first step in applying the sustainable livelihood approach is identifying the different capital assets owned by different households and which they have full control over (De Haan, 2012). Households combine different capital assets readily available to them in different ways in order to undertake a livelihood activity which enables them to earn a living (Carney, 1999). The five capital assets as explained by Carney 1999 are discussed as follows;

**Physical capital:** This is the basic infrastructure such as buildings, roads and production equipment's required to support people undertake a livelihood activity. It includes affordable transport and energy, secure shelter, production equipment's and access to information. Although physical capital is in many cases considered as public goods, the income poor do not have ready access to it, this inhibits them from undertaking livelihood activities which may have resulted to increased incomes and improved wellbeing in general. Due to the lack of this form of capital they are forced to come up with their own approaches which would support them in making their living. Poor communities are typically involved in communal activities such as constructing and maintaining feeder roads, schools, health centres, irrigation ditches and flood protections.

**Financial capital:** The financial asset that inhibits or enhances livelihoods includes formal and informal credits and debits, pension, savings, wages and remittances. When people are able to

access these financial assets easily, they end up undertaking their livelihood activities comfortably and sustainably. Financial capital is believed to empower and improve wellbeing of communities especially when the available services increase and are readily accessible to the community.

**Social capital:** Social capital in the context of sustainable livelihoods refers to the range of connections on which people draw in their daily lives. These are social resources, including networks, social relations and associational memberships, based on the trust, mutual understanding and shared values on which people draw when there is a need for cooperation.

**Human capital:** Human capital is the possession of an ability to use skills, knowledge and good health to pursue livelihood strategies. Poor health and lack of education are core dimensions of poverty. Therefore, overcoming these conditions is both a primary livelihood objective in itself and a prerequisite for making effective use of other assets that enable the income poor to improve their livelihoods.

**Natural capital:** Natural capital ranges from intangible natural resources such as the environment and biodiversity to tangible natural resources which include land, aquatic resources, forest products, wildlife, trees and forest products. People use these natural resources to undertake their livelihood activities. Natural capital can be depleted by expanding populations, declining resources and adverse terms of trade. The sustainability of natural resources is also affected by the levels of solidarity and sense of common purpose in a community. The relationships between these five capitals are as shown in figure 1 below

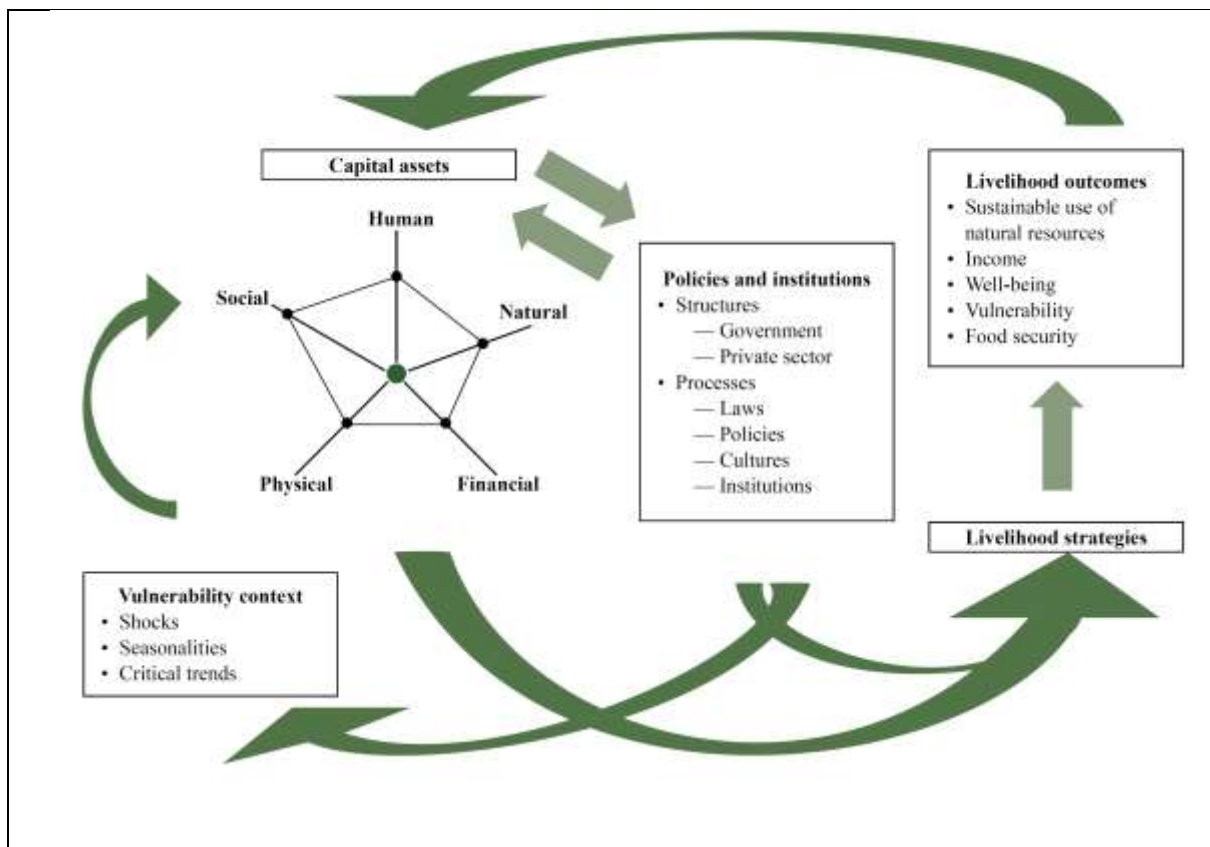


Figure 1: Sustainable livelihood framework adopted from Carney (1999)

### 1.6.2 Asset Based Community Development Model

Asset based community development model (ABCD) is a community driven development approach that puts community members at the centre of any development by using the assets that are readily available and unrecognised in the community (Haines, 2009). Community members, organisations and associations are mobilized to identify the assets they have and afterwards build on them (Un Habitat, 2009). A long period of time is spent identifying the assets found in the community, organisations and associations after which the assets are matched as per the people needs and requirements (Green and Haines, 2003). Asset based community development recognises the fact that institutions are no longer capable of solving all the problems faced by communities due to many problems they face. It also recognises the fact that everyone in the community has a gift and a resource that he/she can share and solve a problem experienced by another member of the community (Ryan and Roche, 2016).

In the past community members used to seek assistance from other members of the community but as time went by professionals turned community members their own clients and made them believe they had special needs that could only be addressed by them as professionals. They made them have a strong believe on the professional assistance rather than seeking help from their neighbours (Haines, 2009). Community based model seeks to discourage this approach of solving problems in the community by encouraging citizens to use resources that are found within them and build on them rather than embarking on their needs (Klee *et al.*, 2014). In asset based community development approach members of the wider community are encouraged to participate by asking questions pertaining to the problem they are facing rather than giving answers (Peters *et al.*, 2009). Leaders of institutions have begun to appreciate the fact that should lead by “stepping back” in order to create opportunities for the members of the public to participate in development programs and promote real democracy (Green and Haines, 2003).

This model can be linked to woodcarving as a small scale enterprise in that, the two associates with identification and mobilization of individuals and community assets such as skills and abilities of individuals within the community, identification of voluntary community organizations and networks and what they offer or could offer in terms of skills, interests and experience that can help strengthen the community, look at what institutions (for example, non-government organizations, government agencies, businesses) are already connected to the community.

### **1.6.3 The Basic Resources Theory**

This is one of the earliest approaches to be adopted by developing countries in promoting rural development. It states that the economic development in any particular area depends on the availability, quality and magnitude of the natural resources found in that area (Code *et al.*, 2008). The availability of natural resources in a given area would attract investment capital that would result to increased income and employment opportunities to the rural communities (Code *et al.*, 2008). However, the availability of the natural resources in the rural areas is not a guarantee of development in that area unless there is a skilled man power to harness that

potential (Anonymous, 2010). This theory states that it would be wrong to assume obvious development in a given economic region due to the mere availability of enough and high quality natural resources (Davis and Cobb, 2009). In relation to woodcarving, development of woodcarving as a small scale industry is due to the presence of enough resources within a specific area. For example, availability of high quality wood species that supports woodcarving in terms of providing wood for carving. The development of this industry would lead to increased income among the woodcarvers, employment creation and also development of infrastructure such as modern transport infrastructure which is very crucial in woodcarving as an industry. However, the economic value of the woodcarving industry in any given area cannot be fully harnessed unless there is a skilled manpower on woodcarving issues.

### **1.7 Conceptual Framework**

The conceptual framework (figure 2) in this work was based on the sustainable livelihoods model as a way of linking socioeconomic and woodcarving practices in a cohesive technological relevant manner (Cobbett *et al.*, 2015). The sustainable livelihoods serve as an integrating factor that allows policies to address development, sustainable resource management, and poverty eradication (DFID, 2008).

Woodcarving industry has a direct impact on socioeconomic characteristics, of the people of Wamunyu location. Socioeconomic characteristics are influenced by traditional woodcarving practices, hence the need for constant review of these practices and integration of the beneficial practices in Machakos county subsector development. Proper application of the traditional and modern practices in value addition along various value chain platforms contributes to sustainable woodcarving development and therefore transforms livelihoods of woodcarvers. Continuous monitoring and evaluation of modern and traditional practices in the sub-sector, priority areas for investment emerge. Requisite allocation of resources in the priority areas for investment will increase economic empowerment and independence of the targeted communities in the County.

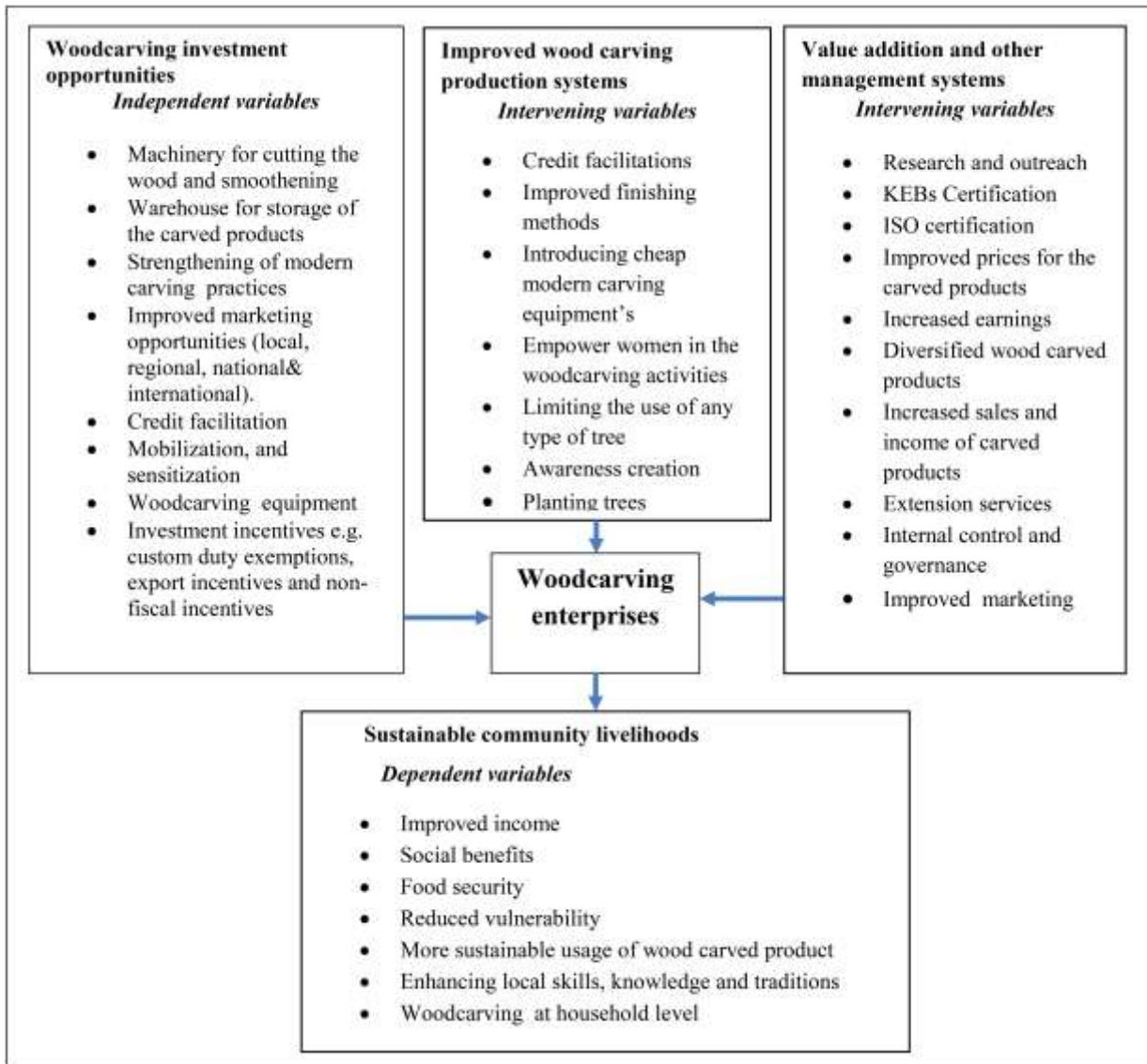


Figure 2: A Conceptual framework for the improvement of the woodcarving sector.

Source: Author, 2016

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

Worldwide, millions of people living in the rural and urban areas of third world countries depend on woodcarving industry as their source livelihood (Mutinda, 2014). Economic benefits of woodcarving industry are now widely recognised in many parts of the world due to its commercialisation, traditionally it started as way of expressing people's culture through symbols sculptured to represent specific messages, people's beliefs and thoughts (Brusatte, 2012). In south Africa, Oaxaca and Mexico, the industry contributes around USD500, USD 2000 and USD 2500 respectively annually. Commercialization of the wood carving industry in Ghana has made its earnings from the industry rise up to more than USD 3000000 in 1996 as compared to USD 60000 in 1989 (Laurent, 2009). In Zimbabwe the woodcarving industry has been an important rural livelihood method since the carvers are able to meet their primary needs and have been able to acquire property through it (Fadiman, 2008)

Woodcarving is considered as one of the best uses of wood in Kenya both in terms of its income returns and creation of employment opportunities to the woodcarvers. It is estimated to earn the country an annual income of more than USD 20 million through exports and supports over 80000 woodcarvers who are breadwinners for over 400000 (Sunderland and Ndoye, 2004).

#### 2.2 Woodcarving practices

Traditional and modern woodcarving practices are the two carving practices used by carvers in most parts of the world (Melorose *et al.*, 2015). The two practices are discussed below;

##### 2.2.1 Traditional wood carving practices

Traditional woodcarving is one of the oldest technologies which started during the stone and iron ages (Pandey *et al.*, 2007). Traditionally woodcarving was carried out with the primary purpose being; preservation of culture and tradition of people, expression of the immediate way of life of people and it was also done for religious and sociocultural values (Shokorova

and Turlyun, 2013). It was used to produce wood carved products which were used for aesthetics of most places and its artistic value (Koenig *et al.*, 2016). Traditionally woodcarving was considered to be a male occupation because it was hardy, tiresome and indecent activity to be executed by women but as years passed by women started woodcarving but on their own peril (Amoh, 2009).

Traditional woodcarving was best demonstrated through decorating homes of most people but as time went by this tradition changed and wood carved products were used almost everywhere including hotels and other big institutions (Azeez, 2011). The type of wood used for carving was selected depending on the purpose of the sculpture and the beauty needed on the carving by the consumer. For example pine tree was used to make carvings surface shinny and clean, Cedar was used make big dishes while light wood was used to make large masks because it was not so heavy on the head (Azeez, 2011). Impervious wood not easily damaged by termites and hard wood were the two characteristics considered by ancient woodcarver before felling any tree for carving functions (Utaberta *et al.*, 2014).

Traditional woodcarving method was preferred but it changed as time went by depending on the purpose of the wood carved products (Dokter, 2010). Using green wood as the main raw material the traditional woodcarver carved simple products such as handles for spears, hoes, ploughs, arrow shafts and axes (Melorose *et al.*, 2015). Over time, the skills were inherited from the outgoing and older wood carvers to their family members through inheritance and apprenticeship (Tobergte and Curtis, 2013). Traditional woodcarvers used simple tools which were made by local blacksmith to carve their objects (Weikop, 2008). Some of the local tools used by ancient woodcarvers included; knives used to trim, cut and smoothen wood; gouges which are of different shapes and sizes and had a curved cutting edge for sweeping curves, carving hollows and rounds (Pye, 2006). The chisels are of small and large sizes and have straight cutting edge which does the work of cleaning up flat wood surfaces; adze is another important tool used for blocking (Amoh, 2009). Other tools found in the carvers kit includes, spoke shave, machete, files, mallets and scrapper (George, 2007).

### **2.2.2 Modern woodcarving practices**

Modern woodcarving technology came into its own as a specific method of woodcarving in the last few decades (Pye, 2006). This was as a result of traditional woodcarving being a tiresome, time consuming and labour intensive activity. Adoption of modern woodcarving technologies was expected to produce any kind of wood carved sculptures faster and without spending a lot of energy (Shokorova and Turlyun, 2013). Use of modern machines produces complex wood carved sculptures which would have been difficult to produce using traditional method which is dominated by use of simple tools made by local blacksmiths (Utaberta *et al.*, 2014).

In most cases it becomes very difficult to purely use modern machines to carve sculptures (Peters, 2007). As a result woodcarvers combine both the traditional and modern woodcarving methods to make their sculptures (Weikop, 2008). The combination of these two methods produces impressive sculptures which are highly attractive to the eyes (Utaberta *et al.*, 2014). The main advantage of using machines is that, speed of producing wood sculptures is increased and this makes cost of the sculptures to go down (Koenig *et al.*, 2016). Consequently, families with low income levels can afford to buy wood carved products without much strain (Peters, 2007). Another advantage of using machines in woodcarving process is that, tiny wood carved sculptures are quickly produced with high accuracy levels (Peters, 2007).

Modern woodcarving practices are characterised by use of modern carving machines such as the chain saw machines, Electric sanders, jig saws, planers, drilling machines and Bench grinder (Tobergte and Curtis, 2013). These tools depend on electricity for their operation (Weikop, 2008). Species of the wood and its hardness should be the key factors a woodcarver puts into consideration before selecting the machine to use in his/her work (Shokorova and Turlyun, 2013). Any person intending to adopt modern woodcarving technologies must possess carving skills, have skills on how to operate modern carving machines and be able to use computer soft wares such as the adobe illustrator (Shokorova and Turlyun, 2013). This helps in designing their sculptures and drawing the sketches the carver intends to produce (Weikop, 2008). These skills can be learned from schools, woodcarver workshops and from other experienced woodcarvers who have the skills (Tobergte and Curtis, 2013).

### **2.2.3 Problems constraining development of the woodcarving industry**

In the developing countries there are numerous challenges facing woodcarvers and sellers in the woodcarving industry. Lack of adequate wood supply is the biggest problem constraining the development of the woodcarving industry. Wood carvers lack enough wood to carve their products and hence reducing the quantity of carved products supplied to the sellers. To get the available inadequate wood, wood carvers have to travel for long distances since the wood nearby has already been exploited. This condition is being experienced by woodcarvers both in Kenya and Ghana (Mohapatra, 2011).

Lack of financial assistance is another challenge facing the woodcarving industry. Woodcarvers are not able to employ other people to assist them in carving their products and also they are not able to modernise the industry since they lack capital to hire people for assistance, purchase modern machines and carving tools, hence stuck at the traditional wood carving methods (Tobergte and Curtis, 2013). Lack of markets for the finished wood carved products has also been a big challenge to the woodcarvers. Both the government and the woodcarvers don't take the necessary actions to attract buyers to the wood carved products. This can be achieved through advertisements and opening websites for their products (Amoh, 2009).

Additionally lack of market information channels hinders development of the woodcarving industry in most parts of the world (Dokter, 2010). Most woodcarvers do not know where they can sell their products, the selling price for the carved products and the quality of wood carved sculptures needed (Christian *et al.*, 2016). For instance the Ahwiaa woodcarvers in Ghana produce large quantity of carved products but sell them locally at very low prices because they are not connected to the international market (Amoh 2009). The same challenge is faced by woodcarvers of Arnhem Land in north Australia. Although they produce quality products, they lack customers for their carved products due to poor connection to the potential buyers.

As a result of lack of sufficient market for the carved products, the woodcarving industry in Australia is underdeveloped (Koenig *et al.*, 2016).

Moreover, lack of modern woodcarving machines especially to rural woodcarvers inhibits development of the woodcarving sector (Laurent, 2009). Traditional woodcarving which uses simple tools such as chisels and knives remains to be used for carving in most parts of the world compared to modern woodcarving which involves use of machines (Peters, 2007). Lack of capital to purchase the expensive woodcarving machines is the reason as to why machines are not yet used in carving work (Pandey *et al.*, 2007). Also woodcarving is majorly practiced by illiterate people in the rural areas hence they lack skills to operate the machines (Koenig *et al.*, 2016). Due to lack of woodcarving machines, woodcarvers in Ghana still use simple tools made by local blacksmiths to make the sculptures (Melorose *et al.*, 2015). In Bali Indonesia the woodcarving industry has remained to be traditional due to lack of modern carving machines and this has resulted to under production of the wood carved products in the country although they have a promising and diversified market for their products (Eddy and Gorda, 2016).

Lack of development support to woodcarvers is also another challenge constraining development of the woodcarving industry (FAO, 2012). In most cases support to carvers is much localized and is mainly provided by NGOs (Rogerson, 2005). Many countries lack national woodcarving policy which would guide the carvers on the readily available markets for their products, prices for their products and the quality needed on their wood carved sculptures (Pandey *et al.*, 2007). There is also lack of cooperation between the relevant stakeholders such as the tourism sector, cultural and the forestry department. Lack of cooperation between these stakeholders drags the woodcarving sector back (Dokter, 2010). The contribution of the woodcarving sector to the rural livelihoods is not recognized by many governments in the world (Christian *et al.*, 2016). Many countries have not formalized their woodcarvers in that they sideline them from credit facilities and any other form of help that small and medium enterprises receive (Christian *et al.*, 2016). For example in South Africa the woodcarving industry is not familiar to the Small Business Development Corporation (Rogerson, 2005). Also woodcarving industry in Jharkhand and Rajasthan districts of India is

not supported by the government as its source of revenue and a plan for reducing poverty in those areas (Pandey *et al.*, 2007).

Working space for the woodcarvers is also a big challenge. Most of the woodcarvers work under temporary structures with majority of them working under trees. This makes woodcarving uncomfortable especially when it rains (Mohapatra, 2011). A high price of wood is another problem facing the industry. The prices of the wood have gone up as a result of ban of felling of some tree species by the authorities and also due to lack of availability of the high quality wood needed. Lack of control of quality of the products produced is another challenge constraining development of the wood carving industry (Tobergte and Curtis, 2013).

#### **2.2.4 Priority areas for value addition in woodcarving products**

Value addition is changing the form characteristics of a product to characteristics more preferred in the market place .The high prices of wood carved products are determined by value added in each production chain of the carved products. The price of the finished carved products in the market is greatly depended on the phases of production from supply of the inputs, processes of production and the post production handling (Eddy and Gorda, 2016).

Branding is one of the priority areas for value addition in the woodcarving sector; branding is a statement used to show the legal ownership of a product in order to protect actual owners against imitators (Keller, 2009). Branding of the finished wood carved products makes its consumers perceive them as of high quality and they end up buying the products at higher value as compared to unbranded product which consumers perceive them to be of low quality and show greater decline in buying them (Bihar, 2013). In order to remain competitive and fetch higher value for their products woodcarvers should brand their products which will show their legal ownership of the carved wood product (Parts *et al.*, 2011). In addition woodcarvers should come up with new designs of their products, ergonomics and the beauty features that will provide additional value to the end consumers (Son and Pearce, 2005).

Good finishing of the wood carved products extends its lifespan, color and luster (Jespersen, 2010). The kind of finishing the carvers chooses depends on which one will give him/her the

best results and the final purpose of the carving (Kies, 2013). Woodcarvers can use the best paints which suit their work to add colouring to their products depending on how they want their final product to look like (Parks, 2013). In most cases, oil finishes are the best because of the soft luster they give the final products and also because of their deepening of the colour of the product (Melorose *et al.*, 2015). Good finishing adds value to the wood carved products and woodcarvers (Parts *et al.*, 2011). Consequently, woodcarvers receive high value for their products. Smoothing can also be used to add value to the wood carved products (Mohapatra, 2011). Gouges, chisels and knife can be used too smoothen the wood through a technique known as shaving (Lee, 2010). Shaving gives the wood even flowing surface and to give the wood a pristine surface an appropriate sand paper is used. After using the sand paper any sanding dust is removed with a tact cloth and polishing is done using tan which is applied liberally (Works and York, 2014).

### **2.3 Contribution of woodcarving to the socio-economic welfare of the woodcarvers**

The socio-economic benefits of woodcarving industry are being recognised in many parts of the world especially in the developing countries which used to perceive woodcarving a way of expressing peoples thoughts and beliefs through symbols made to communicate clearly defined messages (Hülsemann, 2015). Worldwide, woodcarving industry is a main source of livelihood to more than 100 million carvers and their families who depend on them (Brusatte, 2012).

The following are some of the socio-economic benefits of wood carving industry; woodcarving sector is a sustainable source of income to many third world countries and to the woodcarvers themselves (Mutinda, 2014). It is a sustainable source of income to over hundred million woodcarvers and they are able to support their families through this sector. Woodcarving also serves as alternative source of income when the other sources become limited. In Kenya, the woodcarving industry has the potential of improving the livelihood of the people living in the rural areas (Obeng, 2011). It is the primary source of income to over 80000 woodcarvers and their dependents (Hülsemann, 2015). Kenya exports wood carved products to markets in America and Europe and earns foreign currency worth USD 20million; this trend is rising at a rate of 1.8% per year (Githiomi, 2014). Wood carved products in Ghana have gained huge

local and external markets due to government promotion of non-traditional forest products in the country and the industry has risen to become the highest exporter in the country (Amoh, 2009). In South Africa 80% of the cash used at the woodcarvers homes comes from the woodcarving sector (Shackleton and Shackleton, 2004). In Bali woodcarving industry is a source of income to many people than any other part of the world and it earns the country approximately USD 100 million annually (Castillo, 2009). Woodcarving sector is one of the lucrative industries of India and exports from this industry earns the country US\$ 65 million per year (Pandey *et al.*, 2007).

Wood carving has led to generation of employment opportunities to many people in many parts of developing countries (Tobergte and Curtis, 2013). In Tanzania woodcarving has employed approximately 1500 people while in Kenya 60000 people engage in woodcarving as their main source of employment (Laurent, 2009). Those who engage in woodcarving as their source of employment are mostly the vulnerable groups such as the poor, the elderly, physically challenged persons, women and ex-prisoners. Through working in the woodcarving industry carvers are able to produce interior decorations, ornaments, wooden jewels, utensils and furniture which are sold to generate income which can meet their basic economic needs and purchase some property. They are also able to overcome some of the impact of drought and poverty (Tobergte and Curtis, 2013).

Wood carving has been used in many parts of the world to preserve culture and tradition of the people engaged in the activity (Azeez, 2011). Over the years, woodcarving have played an important role in the art and beauty that extends to happiness and fulfilment of the culture and tradition of a given community (FAO, 2012). In India woodcarving started the same time human civilisation started and since then it has being practised majorly for aesthetics and cultural preservation (Mohapatra, 2011). Woodcarving enterprise promotes the tourism sector by attracting tourists to areas with unique carved product. They bring foreign income to the country and also improves the livelihoods of the carvers through buying their product at relatively higher prices compared to the local buyers (Williams, 2014). The woodcarving industry in South Africa is highly dependent on the tourism industry. Approximately carvers make sales of between USD 500-2000 per annum to tourists and this account to 80% of

woodcarvers' household income (Rogerson, 2005). Many Tourists visit the island of Bali in Indonesia with their primary purpose being to see different handcraft wood sculptures made in the island. As a result of the boost in revenue generation from the woodcarving sector the countries revenue increased from RP 57billion in 2007 to RP 261 billion by 2010 (Eddy and Gorda, 2016).

## **2.4 Literature Gap**

Many studies have been done regarding both positive and negative environmental impacts associated with woodcarving, Effects of woodcarving on indigenous and exotic tree species, Gender and educational dimension of the woodcarving industry and the implications for policy development to make the woodcarving industry more sustainable. No studies have been done on potentials of value addition and strengthening of market links for wood carved products specifically in kenya. Therefore this study aimed at looking on the potentials of value addition for the woodcarved products and strengthening its market links. The study also aimed at establishing challenges that inhibit development of the woodcarving industry in Wamunyu.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Study Area**

##### **3.1.1 Location and Extend**

This study was executed in Wamunyu Location which is in Yathui division of Mwala sub-county in Machakos County, Kenya (Figure 2). The Yathui division has a coverage area of 533.0 Km<sup>2</sup>. Agriculture is the main economic activity although the division is one of the areas mostly affected by poverty in Kenya (Mutinda, 2014). Water scarcity is very acute and residents walk up to 10 kilometres in search of the commodity for both livestock and domestic needs. Over the past years, this division has been relying on the government for food supply almost permanently. Consequently, the division is amongst four poorest divisions in Machakos county (Mutinda, 2014). The population of the location is 65567 (KNBS, 2013).

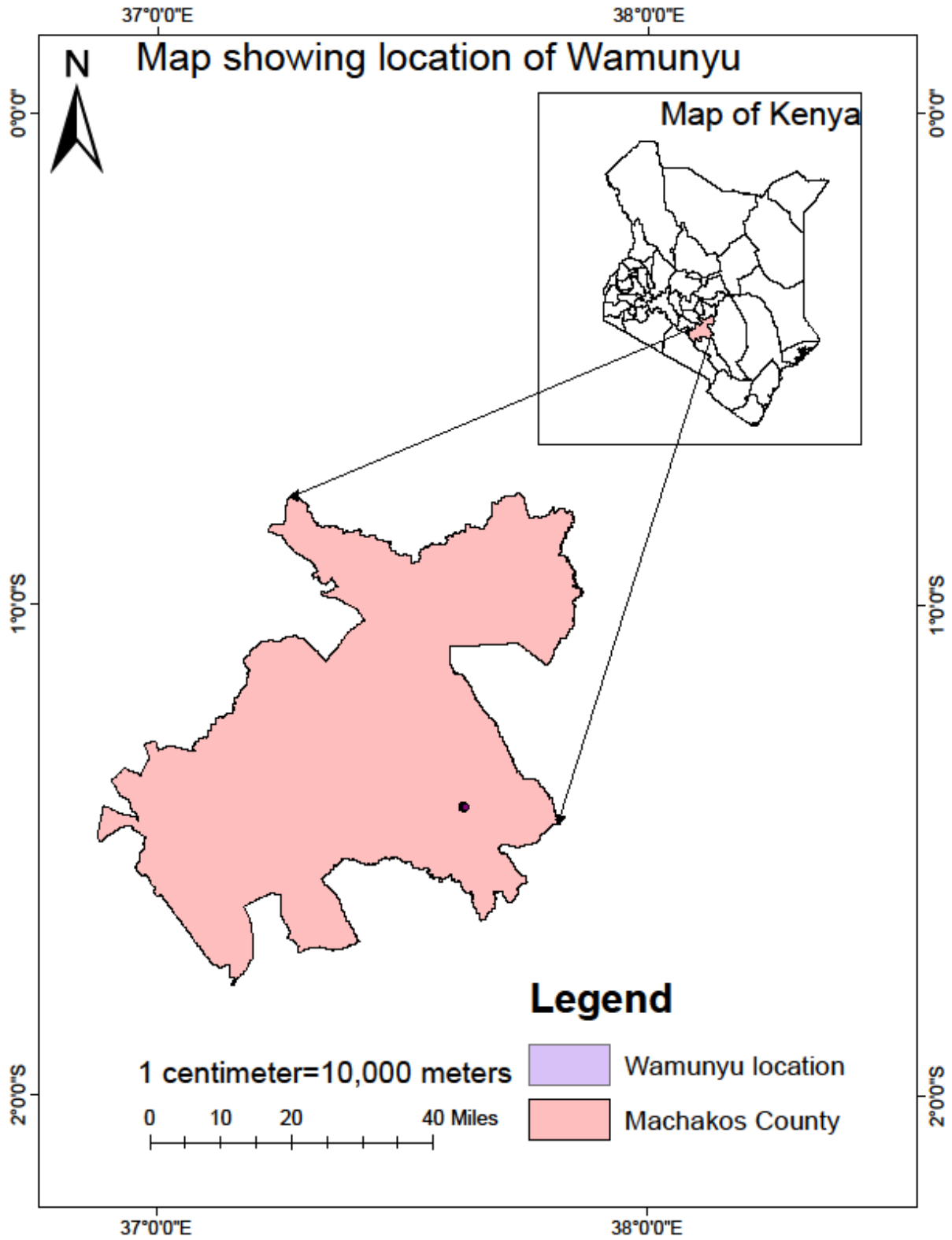


Figure 3: Map of Machakos County showing location of Wamunyu.

Source: Kenyatta University Arc GIS Data (Author, 2016)

### 3.1.2 Climatic Conditions

Wamunyu enjoys a warm and temperate climate (semi-arid). Average annual rainfall ranges from 500 mm to about 900 mm, which is unevenly distributed and very unreliable (World weather online, 2016). The area has two rainy seasons, that is, October to December which are short rains and long rains which occurs between the months of march to May (World weather online, 2016). Lowest rainfall is received during the month of June which goes to as low as 4mm, while the highest is received during the month of November which goes up to 600mm (Figure 3.3). Rainfall received during the two rainy seasons is very high. The dry periods are between February to March and August to September during which very little rainfall is received (Figure 3.3). The temperatures of Wamunyu Location range from a minimum of 12°C to a maximum of 27°C (Figure 3.2). The hottest months are March and October each with an average monthly temperature of 21.5°C and 20.5°C respectively (Figure 3.2). Coldest month is July with an average monthly temperature of 17.5°C (Figure 3.2). The average annual temperature of Wamunyu Location is about 19°C (World weather online, 2016).

**Average Temperature (°C) Graph for Wamunyu**

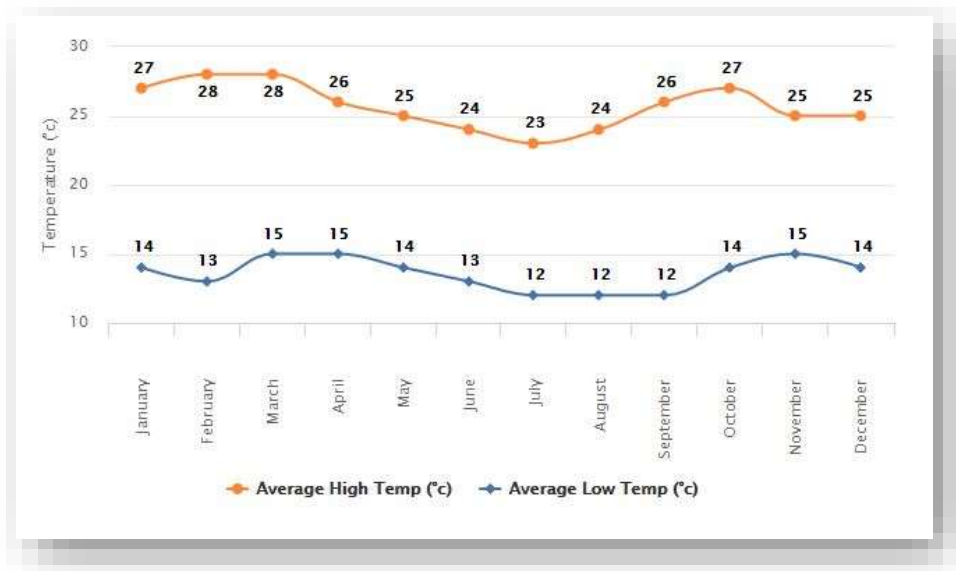


Figure 4: Average Temperature (°C) for Wamunyu Location, Machakos County  
Source: World Weather Online, 2016

### Average Rainfall (mm) Graph for Wamunyu

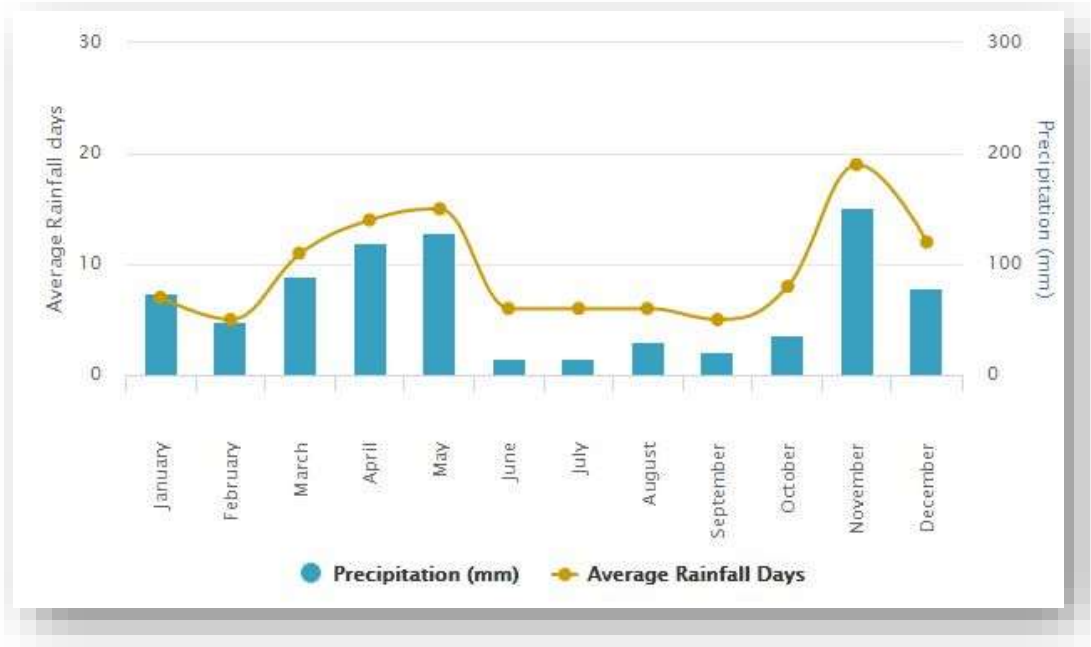


Figure 4: Average Rainfall in (mm) for Wamunyu Location, Machakos County  
Source: World Weather Online, 2016

### 3.1.3 Vegetation

There are no gazetted forests in the area of study, there is also no notable agro-forestry practiced in the area (Mayers, 2005). Due to the carving activity, the area has lost most of its vegetative cover (Mutinda, 2014). Some of the indigenous tree species such as *Dalbergia melanocylon* (Elbony) and *Brachyleana huillensis* have become extinct in the study area due to the carving activity (Githiomi, 2014). However, there exists some indigenous tree species such as *Euphobia trucalli* and shrubs with, grass dominating the open spaces (Wambua, 2014b). In order to maintain sustainable supply of wood for carving, carvers have started planting trees such as *Senna siamea* (Mukengeta in Kamba Siamese senna in English) *Azadirachta indica* (Neem Tree), *Eucalyptus* sp. (Msanduku in Swahili), *Grevillea robusta* (Silky Oak), fruit trees and *Croton Megalocarpus* (Muthulu in Kamba Croton in English) on their farms (Mutinda, 2014). The increase in the demand for wood has contributed to the destruction of trees so as to cater for the increasing pressure on the land

resources (Musimba *et al.*, 2015).

#### **3.1.4 Geology and Soils**

The study area is underlined by the Precambrian basement rocks particularly the metamorphic rocks consisting of gneisses and migmatites as the main components (Karuma *et al.*, 2015). The pedon of the study area is well drained and very deep with dark brown to dark yellowish brown topsoil overlying brown to strong brown sandy clay loam to sandy clay subsoil (Karuma *et al.*, 2015). The study area is highly potential for farming since the soils are rich in nutrients (Enya, 2004). However, crop production in the study area is very difficult under rain fed conditions due to very low, erratic, and poorly distributed and unreliable rainfall (Mutinda, 2014). Due to low rainfall amounts, droughts are frequent and crop production which is done in small scale fails in at least one out of every three seasons (Mwangi and Mundia, 2014). The situation has further lead to depletion of pastures resulting to death of livestock. Wood carving remains to be practiced by most of the residents of Wamunyu since it is less affected by climatic conditions.

#### **3.1.5 Socio-Economic Activity**

Agriculture and livestock keeping which are highly affected by climatic conditions are the main economic activities carried out in Wamunyu (Ogara, 2014). They account for the population's household heads main sources of income (Kavoi *et al.*, 2010). The two sub-sectors contributes 70% of the household income in Wamunyu Location (Mutinda, 2014). They are the leading sub-sectors in terms of employment, food security and contribution to socio-economic welfare of the population (Kavoi *et al.*, 2010). About 80% of Wamunyu residents are employed by the agricultural sector while 80% work in the livestock sector (Mutinda, 2014). Sparsely distributed human settlements structures are the main features in the area of study (Willett, 2015). The area is characterized by mixed land use patterns which include residential plots and business premises such as petrol stations, commercial premises, shops and educational institutions (Ogara, 2014). Woodcarving in the study area is quite vivid (Mutinda and Kiumbuku, 2014).

### 3.2 Research Design

A research design is a basis for doing a study with paramount control over the factors that have a possibility of interfering with the effectiveness of the findings (Agnes, 2003). This study used the case study design which entails answering the how and why questions of events which the researcher has little or no control over them (Melorose *et al.*, 2015) . In case studies, the events are contemporary and their behaviour cannot be manipulated (Starman, 2013). Case studies use data from different sources such as interviews, artefacts and observation (Yin, 2006). Wamunyu wood carving was the case for this study. The idea was to produce an intensive and a detailed analysis of the case (Laurent, 2009).

### 3.3 Sample size and Sampling procedure

A sample of the entire population of the woodcarvers was drawn to give the representation of information about the population at the shortest time possible and least cost since the study did not cover the entire population (Phrasisombath, 2009).

The sample size was determined using the formula recommended by Nassiuma (2000) as follows:

$$n = \frac{NC_v^2}{(C_v^2 + (N-1)e^2)}$$

Where n= Sample size

N= Population

Cv = Coefficient of variation (take 0.5)

e= Tolerance of desired level of confidence, take 0.05% at 95% confidence level

Since the number of woodcarvers who were registered by Wamunyu Handcraft Cooperative Society was 2000 the formula was applied as follows:

$$n = \frac{2000(0.5)^2}{0.5^2 + (2000-1) \times 0.05^2}$$

This gave 96 woodcarvers as the sample size. The target population included woodcarvers who were registered with the Wamunyu Handcraft Cooperative society and officials from the Society.

Sampling methods used included:

Purposive sampling- This is a non-probability sampling method where the researcher knowingly selects who to include in his/he research based on the ability to provide data needed (Teddlie, 2007). It assists the researcher to reach the target sample quickly without much struggle (Agnes, 2003). In this study, purposive sampling was used to get information from the practitioners of woodcarving and officials of Wamunyu Handcraft Cooperative Society based on the objectives of the study.

Field surveys- These are non-experimental designs that do not control for or manipulate independent variables or treatments, but measure these variables and test their effects using statistical methods (Krosnick, 1999). Field surveys capture snapshots of practices, beliefs, or situations from a random sample of subjects in field settings through a survey questionnaire or less frequently, through a structured interview and focused group discussions (Canada, 2010). For these reasons, this study adopted this type of research design. Nonetheless, it is crucial to note that ,because of their non-temporal nature- internal validity (cause-effect relationships) it is difficult to infer, and surveys may have been subjected to respondent biases which further hurts internal validity (Glasow, 2005).

Simple random sampling- This is a sampling technique whereby each unit in the total population has equal chances of being selected for the study and selection of the units is not interfered by selection of other units in the study population (Utara, 2011). The main idea was that each Wamunyu woodcarver would have equal chance of being included in the sample.

### **3.4 Data collection**

Primary and secondary sources of data were used to provide data for this study. Questionnaires (both structured and semi-structured) were used to collect data on information related to

woodcarving from the woodcarvers. Interview schedule was used to collect data from the key informants.

#### **3.4.1 Questionnaire**

Questionnaire is a set of questions prepared by the researcher with an aim of obtaining information about a certain subject from the respondent (Canada, 2010). In order to obtain good results and ensure effective analysis, the researcher should be very clear when restructuring the questions (Earl, 2013). For the purpose of this study both open-ended and closed ended questionnaires were used. Data from woodcarvers was obtained using this method.

#### **3.4.2 Observation**

Observation involves measuring directly the characteristics the research is interested in while in the field or laboratory (Canada, 2010). Flexibility is needed in observation in order to observe the key components the researcher intends to see (Driscoll, 2011). Observation was done to examine the woodcarving practices and the different types of value addition applied by the woodcarvers.

#### **3.4.3 Photography**

Photography is the use of pictures to represent observed information. The viewer should be able to analyse and interpret the photographs in order to understand the information the researcher wanted to pass (Petersen and Ostergaard, 2003). Digital cameras were used to collect the data for this study; the data included raw materials for wood carving, wood carvers on their daily activities, wood carved products and woodcarving practises being used.

#### **3.4.4 In-depth Interview**

Due to its cost effectiveness and strength in acquiring empirical data the interview method was used to collect data for this study (Kothari, 1990). Interviews were used to gather first-hand information from key informants and relevant institutions through use of interview schedule.

### **3.5 Data analysis**

Collected data was analysed using both qualitative description and quantitative techniques. The quantitative data analysis was achieved through editing, coding and subjecting the coded data to descriptive statistics in the Statistical Package for Social Scientists (SPSS) software. Frequencies, percentages and means were generated and the final results presented by use of charts, tables, graphs and figures. To analyse the descriptive statistics, data from the questionnaires, observation, interviews and photographs were keenly arranged descriptively into themes which were presented in discussion and narrative form and citations done through transcription.

## CHAPTER FOUR

### RESEARCH FINDINGS AND DISCUSSION

#### 4.0 Preliminary information

This chapter presents findings of the study and discussion of the findings based on the data gathered in the field. The study findings are presented and discussed as per the study objectives. The first section provides an overview of the characteristics of the sampled population. The second section provides analysis of the challenges facing woodcarving industry, woodcarving practices and value addition measures in Wamunyu location. The third section presents analysis of the socio-economic contribution of woodcarving industry to the welfare of woodcarvers in the study area, consisting of income generation, employment creation, preservation of culture and tradition and tourist attraction.

#### 4.1 Woodcarving practices in Wamunyu location, Machakos County

This section presents analysis of the woodcarving practices, value addition measures and challenges facing woodcarving industry in Wamunyu.

##### 4.1.1 Traditional and modern

The study sought to find out which of the two woodcarving practices was commonly being used by Wamunyu woodcarvers. The kind of tools which were used to carve the wood was used to distinguish traditional from modern carving methods. The results (Figure 6) show that 86.7% of the woodcarvers were practising traditional method of woodcarving while 13.3% practised a mixture of traditional and modern wood carving methods (Figure 6). None of the woodcarvers was purely practising modern woodcarving method. This can be attributed to modern woodcarving machines being expensive compared to the tools used in the traditional wood carving exercise. Capital to purchase modern woodcarving machines is a great challenge to the woodcarvers. Another reason as to why traditional woodcarving is more rampant is because the main buyers of the wood carved products, tourists from United Kingdom and United States appreciated carved products made by use of traditional methods rather than the modern methods, which uses machines. Lack of skills to use modern woodcarving machines also lead to slow adoption of the modern woodcarving technologies.

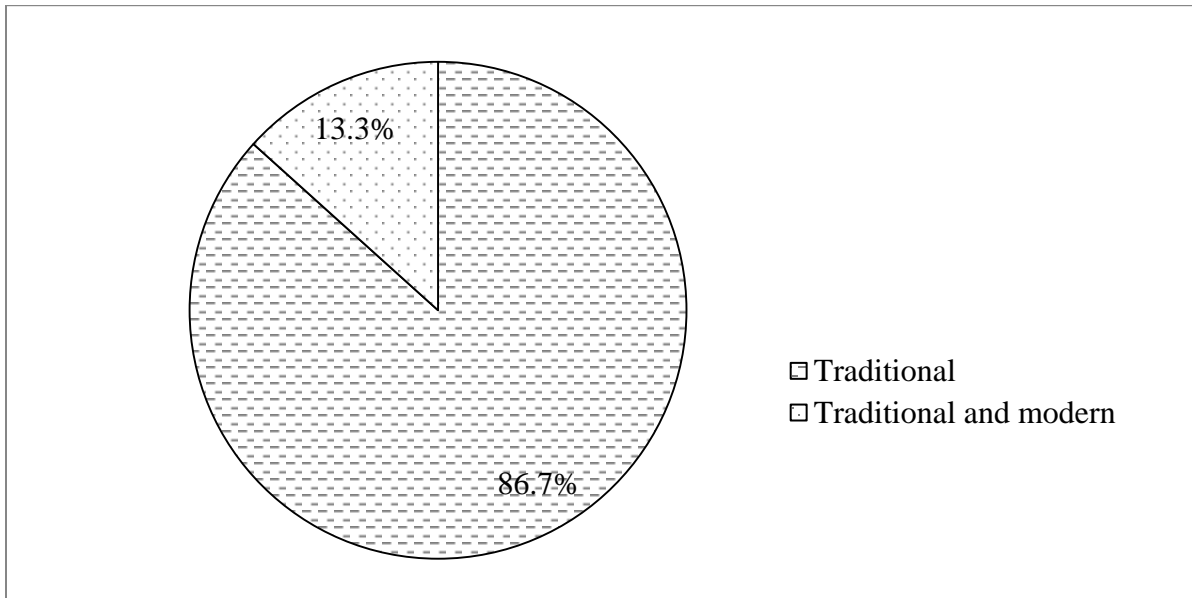


Figure 5: Woodcarving methods in Wamunyu

Source: Field Data 2016

Plate 1 and 2 show photographs of some of the modern woodcarving machines used in Wamunyu handcraft co-operative society workshop. The machines were donated to the Wamunyu handcraft co-operative society by a non-governmental organisation known as Land and lakes to help woodcarvers in the society drill holes on their sculptures, cut bones which are used to decorate sculptures and smoothen their wood carved products.



Plate 1: Drilling Machine

Source: Field Data 2016



Plate 2: Bench grinder.

Source: Field Data 2016

Plate 3 shows some of the tools used to execute traditional woodcarving exercise while Plate 4 shows a woodcarver using the same tools to make his sculpture



Plate 3: Traditional woodcarving tools  
Source: Field Data 2016



Plate 4: Woodcarver using Traditional tools  
Source: Field Data 2016

About 83% of the respondents showed willingness to adopt modern woodcarving technologies while 17% were unwilling to adopt modern woodcarving technologies (Figure 7). Those who were unwilling to change was because there was already no sufficient market for their handcraft products and if they adopted machines they would produce more products, which would lack market and end up having large quantity of surplus in market.

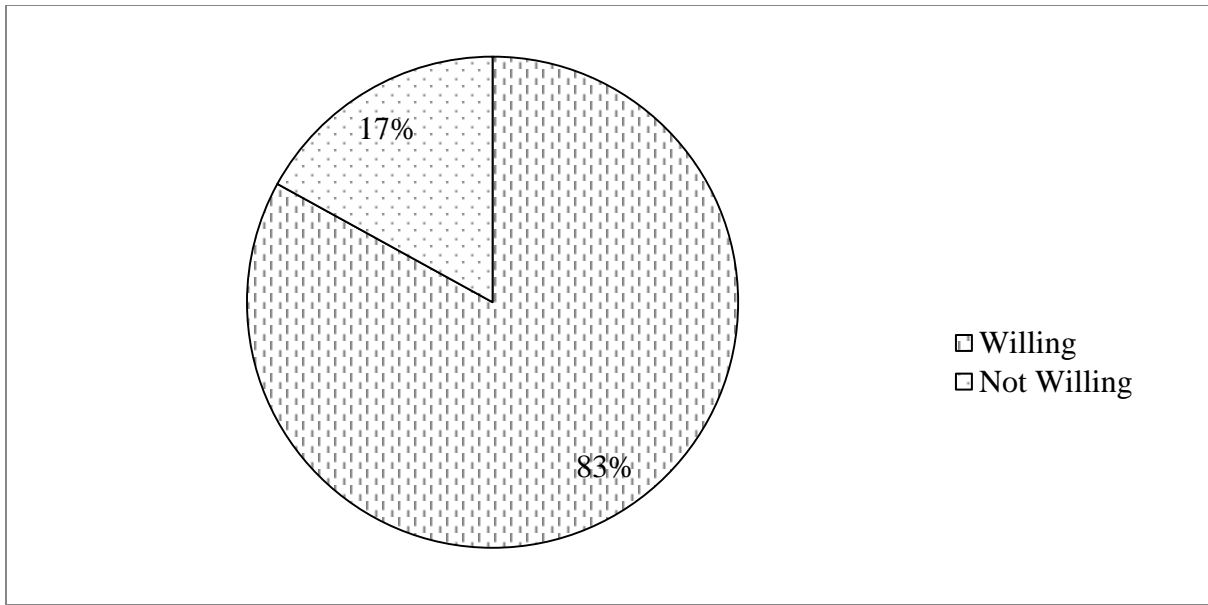


Figure 6: Willingness of woodcarvers to adopt modern woodcarving technologies

Source: Field Data 2016

Plate 5 and 6 show wood carvers using both traditional and modern woodcarving methods. Using machines to drill holes and smoothen the wood carved products saves on the time spend on the work and improve the quality of wood carved products.



Plate 5: Carvers smoothening sculptures

Source: Field Data 2016



Plate 6: Carvers drilling holes on sculptures

Source: Field Data 2016

The education levels of the woodcarvers were quite encouraging since 47.3%, 23.3% and 13.3% had completed primary, secondary and tertiary education respectively (Table 1). Only 16.1% of the study population had not attained formal education (Table 1). This reveals that majority of the woodcarvers have had basic education and thus capable of adopting modern woodcarving technologies, which would in turn lead to the development of the woodcarving subsector. Education is very critical in innovation and adoption of new technologies in any sector of the economy (Amollo, 2005). Wambua (2014) concluded that in places where the level of education is high the quicker the adoption of new technologies. In most cases education is seen to change people’s attitude towards acceptance of new changes especially those pertaining acquiring of new information and management issues (Riddell and Song, 2011).

Table 1: Level of education of the sample population of Wamunyu woodcarvers

Source: Field Data 2016

<b>Education level</b>	<b>Frequency</b>	<b>Percentage</b>
Never completed primary school	15	16.1
Primary education	46	47.3
Secondary education	22	23.3
Tertiary education	13	13.3
<b>Total</b>	<b>96</b>	<b>100</b>

The results of this study concurred with findings of a study done in Ghana by Amoh (2009) on new trends and their implication for art education a case of Ahwiaa Wood Carving Industry. The results acknowledged that lack of capital to purchase modern woodcarving machines and lack of skills to operate the machines were the main factors inhibiting adoption of modern woodcarving practices in Ghana. The results of this study are also in line with a study which was done in Ghana by Melorose *et al.*, (2015) that noted that woodcarvers in Ghana embarked on simple woodcarving tools made locally due to lack of skills on how to apply modern woodcarving technologies and lack of capital to purchase modern woodcarving machines.

#### 4.1.2 Value addition measures

About 93.3% of woodcarvers acknowledged that they apply one of the many value addition measures to their products (Figure 8).

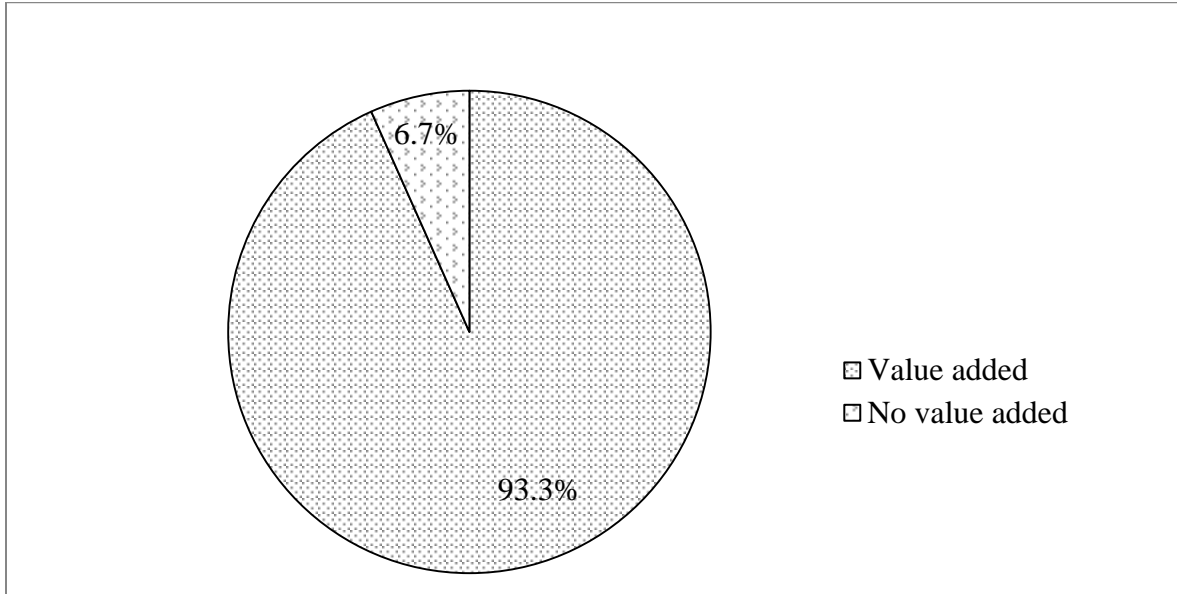


Figure 7: Response on value addition for the wood carved products

Source: Field Data 2016

Although 93.3% of the woodcarvers' added value to their wood carved products' only 32.1% did full value addition to their products compared to 67.9% who did partial value addition (Figure 9). 53.6% of those who did partial value addition did it to the painting stage, that is, smoothing, polishing and painting (Figure 9). 14.3% of the partial value addition woodcarvers did only smoothing and polishing of their products (Figure 9). The main reasons given by the woodcarvers as to why they practiced partial value addition was that doing full value addition requires large amount of money to purchase the value addition machineries, basic value addition tools and equipment's and hire skilled labour. Value addition was noted to be tiresome and time consuming; production cost of the value added products was higher compared to the selling price at the market. Lack of ready market for the full value added products made most of the woodcarvers to sell their partially value added products to brokers who purchased in bulk from the woodcarvers without transportation cost.

Factors that motivate woodcarvers to do complete value addition are connections to international markets, need for ready wood carved products for use by individual buyers and finished products fetch high amount of money when displayed in the workshop since the main buyers in the workshop were international tourists.

Lack of value addition to products was attributed to buyers especially brokers, did not want finished products. Value addition was a tiresome and time consuming activity. Their buyers (mainly brokers) provided ready market to their unfinished products compared to the finished products, which most of the time lacked ready market; hence they did not see the need to add value to their products. They also lacked machinery and basic woodcarving tools and equipment's required to carry out value addition. Value addition is viewed as very expensive activity.

Lack of capital, ready market, low returns and low level of technology are the major challenges that inhibit development of small and medium enterprises in many part of the world (Kutazo, 2008). The findings of this study are in line with a study done by Koenig *et al.*, (2016) on the production cost and the income woodcarvers get from the woodcarving industry in Arnhem Land, north Australia. In the results of their study they argued that value addition of wood carved products is a time consuming, expensive and tiresome activity. They further indicated that most of the woodcarvers do not add value to their products due to these factors thus inhibiting development of the woodcarving sector. The results of this study also concur with a study done by Sunderland and Ndoye (2004) on the woodcarving industry in Kenya. In the results of their study they suggested that most individual carvers in Kenya do all the woodcarving work on their own and they end up selling their wood carved product in unfinished form. They also indicated that the market for wood carved products in Kenya is dominated by brokers who buy the unfinished products from the woodcarvers at low prices and sell them at higher prices after adding value to them.

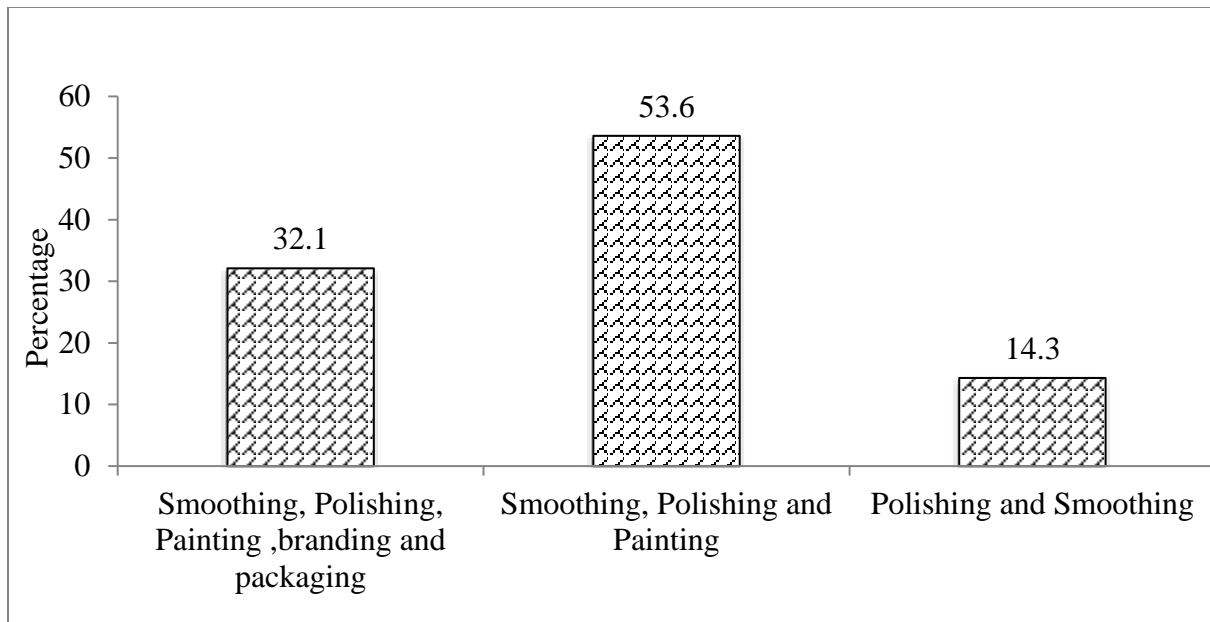


Figure 8: Value addition measures by Wamunyu woodcarvers

Source: Field Data 2016

#### 4.1.3 Challenges facing the wood carving enterprise in Wamunyu

Figure 10 show main challenges facing woodcarving industry in Wamunyu Location. The problems were ranked according to their weightiness to the carvers. Large number of the woodcarvers (75.3%) noted lack of sufficient market for their sculptures as the main problem facing the woodcarving industry. This was associated with the decreasing number of tourists visiting the Location. Due to insecurity facing the whole country as a result of Al-Shaabab attacks, the number of tourists had gone down and the same had been replicated in Wamunyu. Lack of advertisement channels where woodcarvers would advertise their products also lead to lack of sufficient markets. About 12.4% of woodcarvers noted lack of wood as the main problem facing the woodcarving sector in Wamunyu (Figure 10). This was associated with the government restrictions on cutting down of some important tree species in the forests e.g mahogany, elbony, terminalia, silver oak, and olive; which produced high quality wood had been banned by the government. This had in turn lead to production of low quality wood carved products since the trees they could access were those which produced low quality wood such as Jacaranda, Neem tree, Croton and silver wood. Most of the woodcarvers bought their wood locally while others went to as far as Kitui County which is 50km from Wamunyu in

search of wood. There was no importation of wood from outside Kenya since all the woodcarvers got wood from within the country.

About 5.3% of the woodcarvers said lack of finance was the main challenge they faced in the woodcarving sector (Figure 10). Lack of machines was a main problem to 7% of respondents (Figure 10). They could not afford the machines since they were being sold at very high prices. Consequently, this led them to waste a lot of energy and time doing a single piece of an object. .Other problems facing the industry included presence of brokers who bought the wood carved products at very low prices, poor working environment characterized by semi-permanent structures build of iron sheets which gets too hot during sunny days and lack of collaboration with Kenya forest services and other relevant stakeholders.

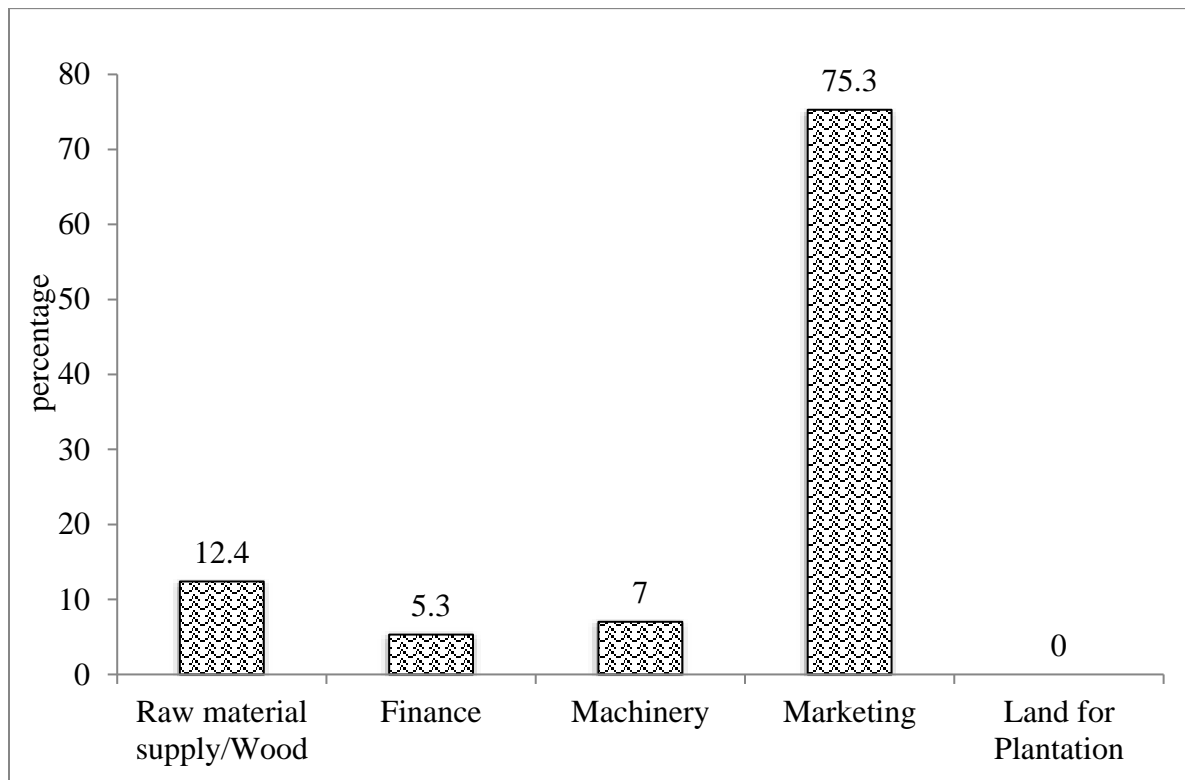


Figure 9: Challenges facing the woodcarving sector

Source: Field Data 2016

The results of this study concur with a baseline study and value chain analysis of craft artisans done by Dokter (2010) in Kpando District in Ghana. The results of her study indicated that unreliable demand of wood carved products and lack of information on market and price of the wood carved products as the main problems facing wood carvers in Kpando District in Ghana.

The results of this study support findings of a study done by Melorose *et al.*, (2015) on the implications of new trends to socioeconomic growth of the Ahwiaa Woodcarving Industry in Ghana. The results of their study concluded that wood carved products had plenty and expansive markets since they have heavy customer demand both locally and internationally. They further indicated that inadequacy in wood supply and lack of new skills inhibited growth of woodcarving industry in Ghana. The results of another study which was done by Laurent (2009) on small and medium enterprises and sustainable development for Makonde people in Tanzania are in line with the results of this study. In his study Laurent (2009) concluded that lack of wood was the main problem facing the woodcarving industry in Mwenge, Tanzania.

#### **4.2 Contribution of woodcarving to the socio-economic welfare of the woodcarvers**

The study required to know the contribution of the woodcarving sector to the socio-economic welfare of the woodcarvers. This was achieved by analysing income generated from woodcarving by the carvers, people employed by the sector, preservation of culture and tradition and promotion of the tourism sector.

Majority of the woodcarvers (93.3%) acknowledged depending on woodcarving as their main occupation (Table 2). This is because the area is prone to prolonged droughts that made crop and livestock farming non-viable. Majority of woodcarvers had turned to woodcarving as their main occupation since it was not dependent on climatic conditions. The remaining Carvers (6.7%) said crop and livestock farming was their main occupation and they did woodcarving as part time activity (Table 2). They said lack of market for the wood carved products made them to turn to farming as their main occupation. None of the woodcarvers was embarking on business and employment as their main occupation (Table 2).

Table 2: Main occupation of the woodcarvers in Wamunyu

Source: Field Data 2016

Main occupation	Frequency	Percentage
Woodcarving	90	93.3
Employed	–	–
Farming	6	6.7
Business	–	–
Others	–	–
<b>Total</b>	<b>96</b>	<b>100</b>

#### 4.2.1 Woodcarving as a source of income

Figure 11 indicates that majority of the woodcarvers (46.4%) earned between 5000 and 9999 per month from the woodcarving industry. About 28.6%, 10.7% and 10.7% earned 10000-14999, 1-4999 and 15000-19999 respectively (Figure 11). About 3.6% of the woodcarvers earned above 19999 per month (Figure 11). The type of wood used, value added to the sculpture, design of the sculpture, creativity of the woodcarver and size of the object brought about the differences in income levels. The buyers preferred objects made from high quality wood, of good design and well finished.

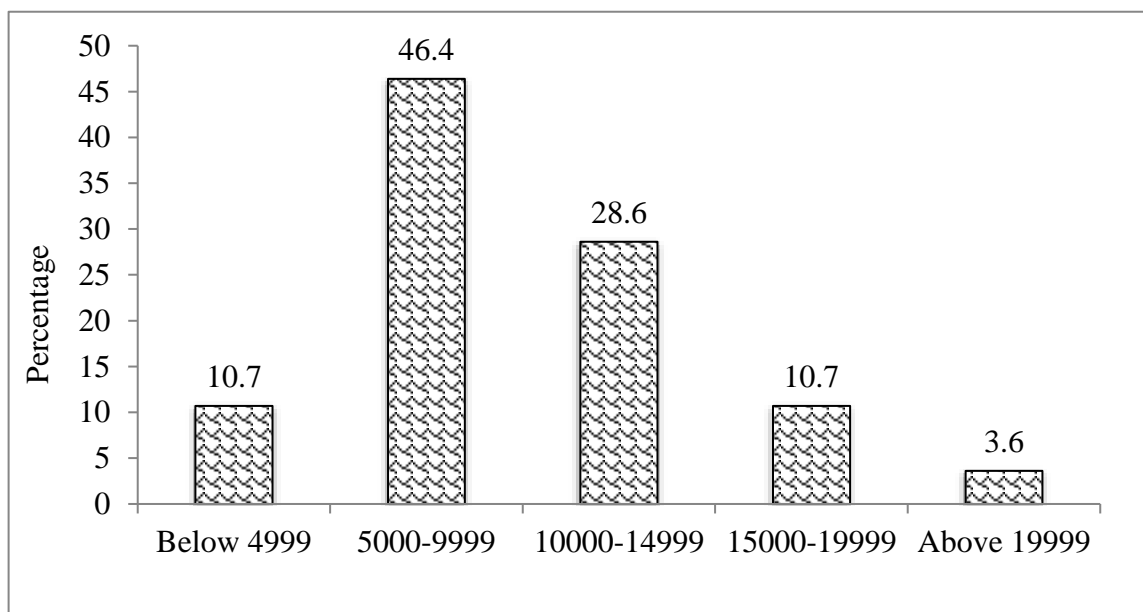


Figure 10: Income from woodcarving as the main source of income in Wamunyu

Source: Field Data 2016

About 80% of the woodcarvers practiced woodcarving as their primary source of income (Figure 12). Woodcarving was an alternative source of income to 13.3% of the sample population while 6.7% of the woodcarvers practiced woodcarving to preserve their culture and tradition (Figure 12). Other sources of livelihood to the woodcarvers included; crop farming and livestock keeping.

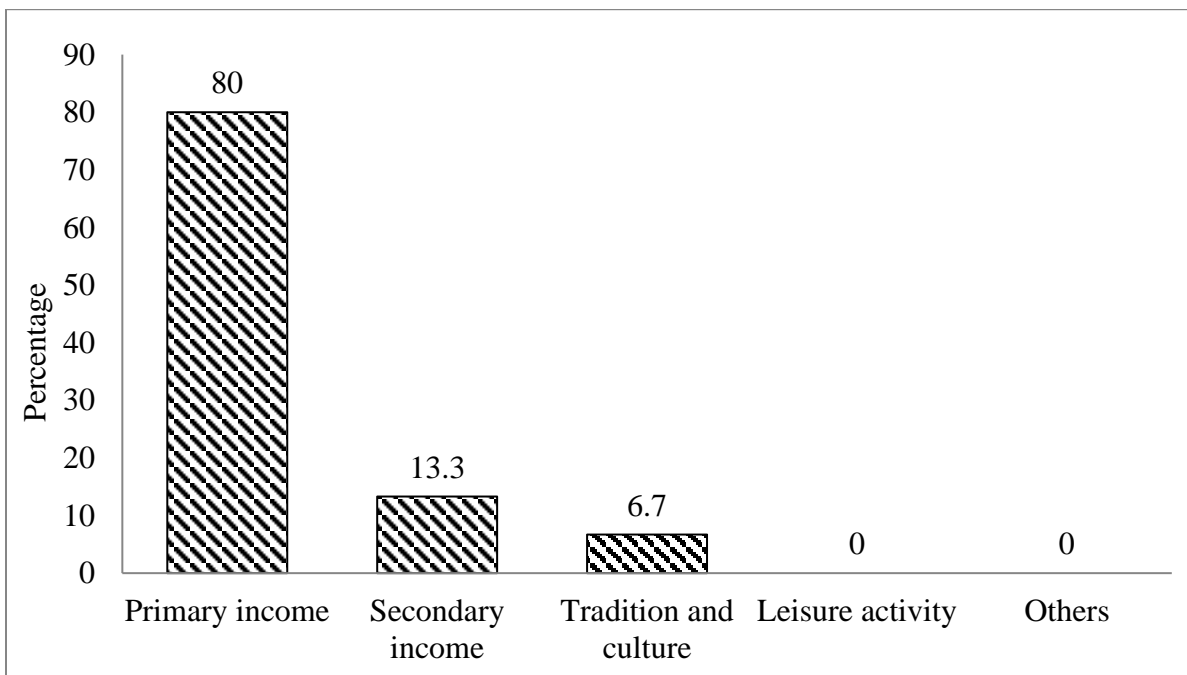


Figure 11: Response as to why woodcarving was being practiced in Wamunyu

Source: Field Data 2016

The most energetic and productive group of people is between 35 to 45 years of age (Wambua, 2014a). Figure 13 shows that woodcarvers who were between the age groups of 46-55 years (34.4%) and those who were above 55 years (43.3%) were more aged in woodcarving than the most energetic and productive group of people, that is, those who were between 35-45 years of age. Only 6.7% of the woodcarvers were between the age group of 18-34 years (Figure 13). This shows that the engagement of the youth in woodcarving as their source of employment was minimal compared to the elderly.

The finding of this study does not concur with the findings of a study which was done by Laurent (2009) in Mwenge, Tanzania. He found out that most of the Makonde woodcarvers were in their most energetic and productive age of 45 years and below.

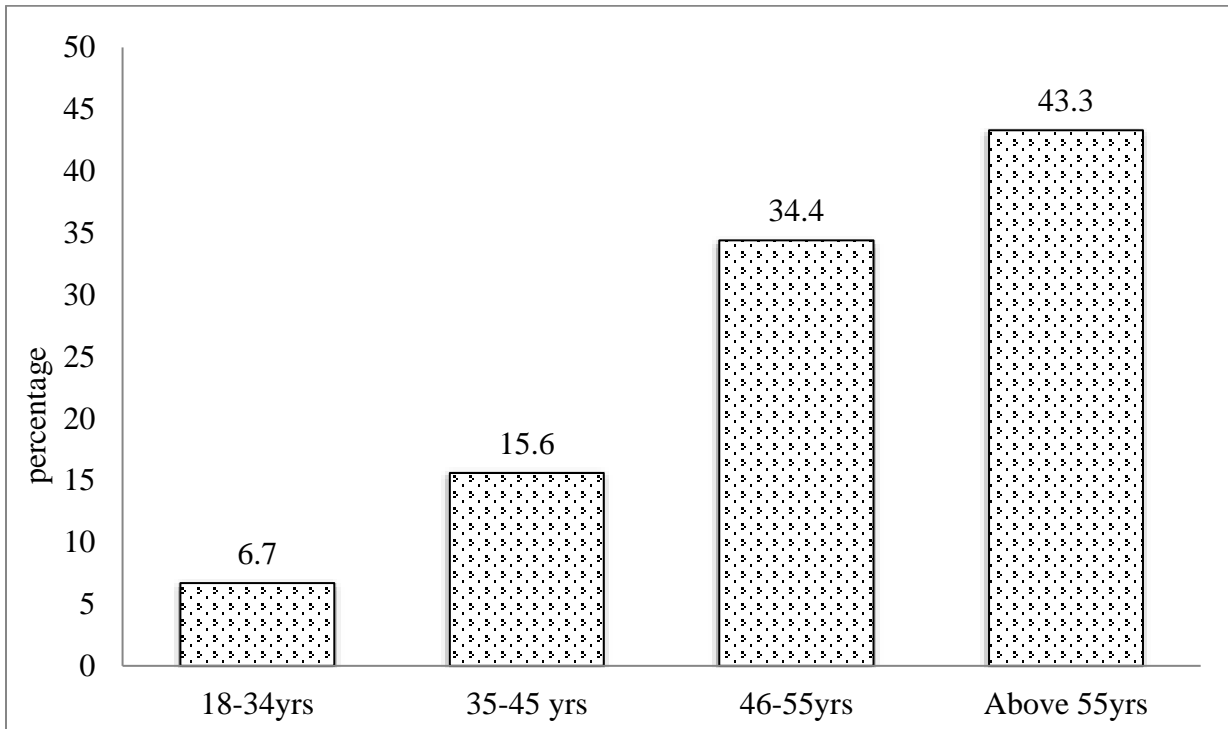


Figure 12: Age group of Wamunyu woodcarvers

Source: Field Data 2016

According to the Wamunyu handcraft cooperative society manager Mr. Joseph Mutuku, the society paid Ksh 17,550 per year to the national government as tax indicating that, wood carving was a source of income to the national government. It was also noted that woodcarving was a source of income to the cooperative society itself since 25% of the total sales made remained in the society to facilitate its operations which involved paying its workers (Figure 14). Since there was no guaranteed number of tourists visiting the society each fiscal year, the number of tourists who are the main buyers of the sculptures varied from one year to another. Consequently, this brought about the difference in the number of sales made each year leading to the difference in the amount of income made by the society. In the fiscal year 2013/2014, the society made the highest income amount of 1,212,500 followed by 2014/2015 with an income

of 1,117,500 (Figure 14). 2012/2013, 2011/2012, 2010/2011 and 2015/2016 the society made income of Ksh 1,075,000, 1,007,500, 1000000 and 850000 respectively (Figure 14).

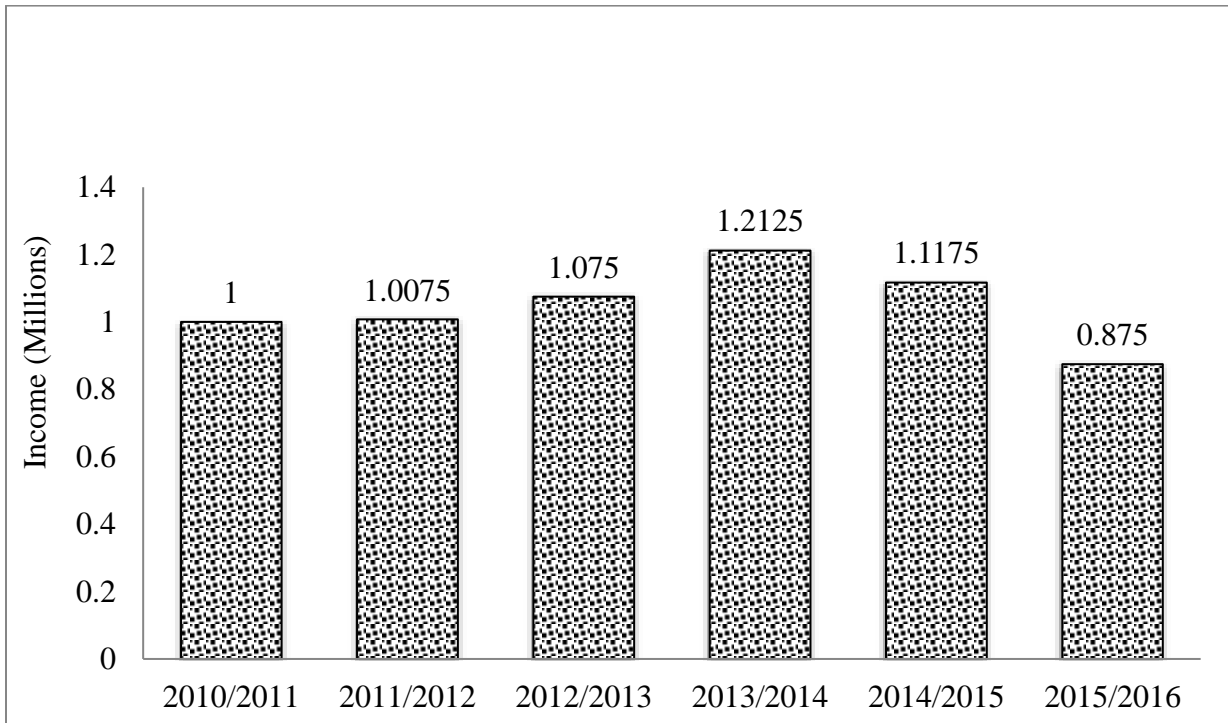


Figure 13: 25% of the total income made by W.H.C.S per fiscal year

Source: Field Data 2016

Woodcarving was also a source of income to variable number of women who took part in the finishing of the sculptures only. They were paid by the male woodcarvers to carry out value addition activities for them. They were paid per day depending on the number of sculptures they successfully finished. There was no constant price for each finished product. The amount paid per finished sculpture dependent on the agreement between the carver and the women and the size of the object.

Plate 7 and 8 show some of the women hired by Wamunyu woodcarvers to assist them in finishing their wood carved products



Plate 7: Women decorating Giraffe sculptures  
Source: Field Data 2016



Plate 8: Woman gluing Giraffe sculptures  
Source: Field Data 2016

Woodcarving was also a source of income to the brokers who bought the unfinished products from the carvers and sold them at higher prices after adding value to them. They sold the finished products to the local and international markets. Plate 9 shows one of the brokers Curio shop at Wamunyu market.



Plate 9: Brokers curio shop at Wamunyu Market

Source: Field Data 2016

The findings of this study are the same as the findings of a study which was done by Koenig *et al.*, (2016) on indigenous livelihoods and art income in Arnhem Land, north Australia. The results of their study indicated that the amount of income made by the woodcarvers was highly variable and it was dependent on the quality of wood used. They further noted that woodcarving was also a significant income earner to the finishers of the wood carved products and the government of Australia. The finding of this study supports the results of a study which was done by Pandey, *et al.*, (2007) on livelihood improvement through woodcarving in India. In their study they concluded that woodcarving provides a variable amount of income to the woodcarvers in Jharkhand and Rajasthan District, the Government of India, brokers and finishers of the carved products.

#### 4.2.2 Woodcarving as an employment opportunity

Table 2 indicates that woodcarving is a main occupation to 93.3% of the study population. According to the Wamunyu handcraft Cooperative Society Manager Mr Joseph Mutuku, woodcarving had provided employment to about 2000 carvers who were registered with the society and majority of whom came from Wamunyu Location.

About 40% of the woodcarvers learned the art of carving sculptures through inheritance from their forefathers (Figure 15). Another 40% trained themselves while 16.7% and 3.3% learned through trainings and introduction by friends respectively (Figure 15).

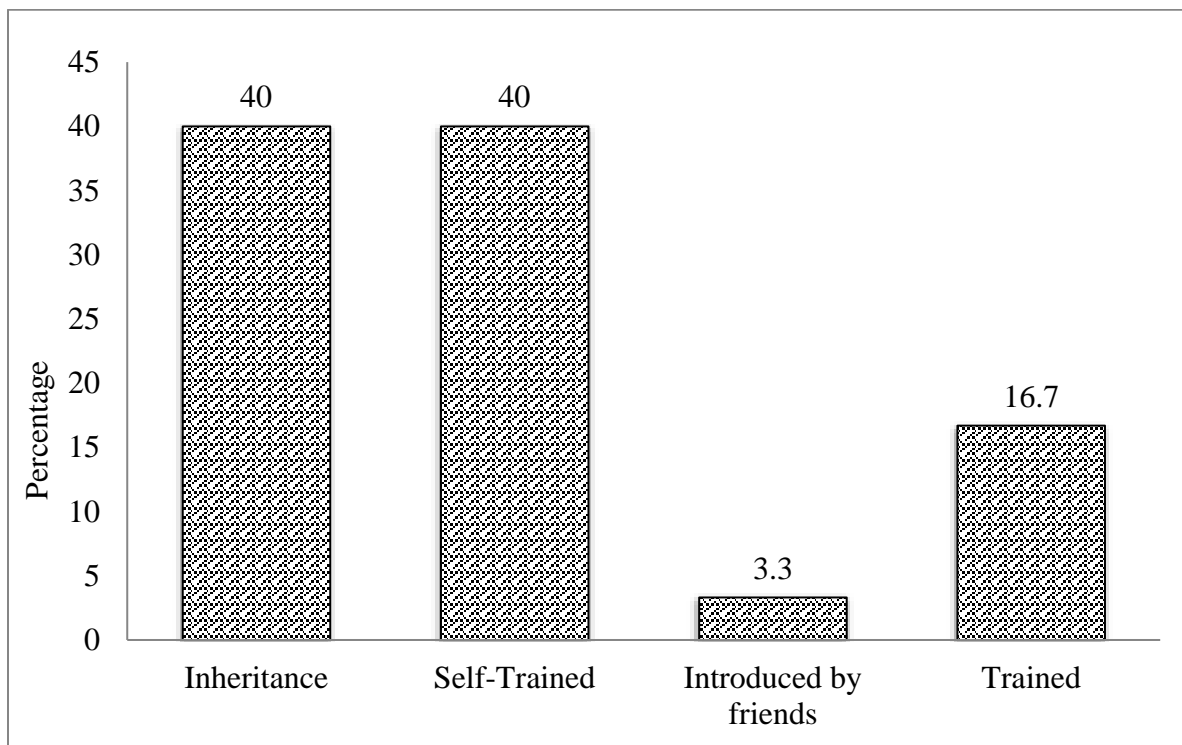


Figure 14: Start of woodcarving by the carvers in Wamunyu

Source: Field Data 2016

About 56.7% of the woodcarvers did all the woodcarving work by themselves (Figure16). They said lack of capital to hire people led them to do all the work by themselves. They also said they could not use their families to assist them since they lacked the skills required to execute different woodcarving activities. About 43.3% hired people to assist them in the woodcarving exercise (Figure 16). They employed people who had woodcarving skills to

finishing their sculptures. The carver and the person doing the finishing agreed on the amount and mode of payment.

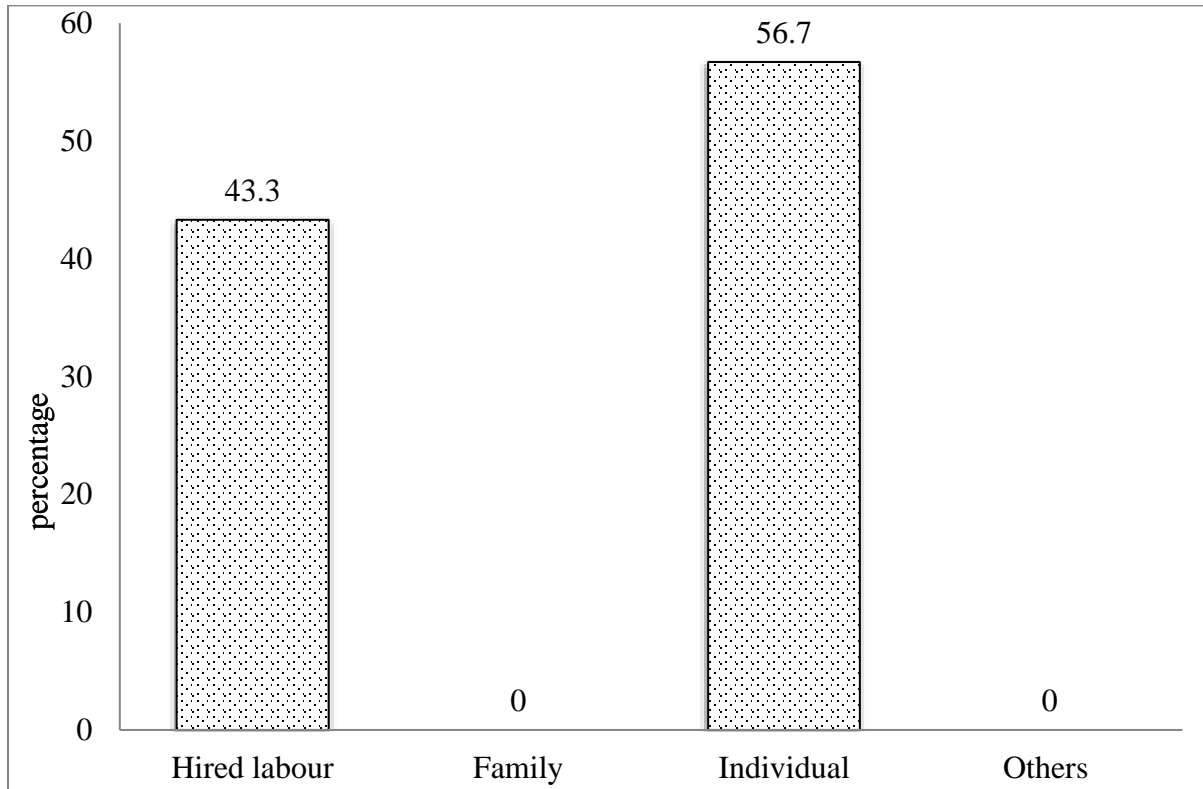


Figure 15: Type of labor used by woodcarvers in Wamunyu

Source: Field Data 2016

The results of this study concur with the findings of another study which was done by Pandey, Garg, Malhotra (2007) on livelihood improvement through woodcarving in India. The results of their study indicated that woodcarving provided employment to approximately 100, 000 people in dodhpur district of India. Another study done by Amoh (2009) indicated that woodcarving was the main occupation for the Asante people of Ghana.

The findings of this study does not support findings of a study which was done by Kutazo, (2008) on challenges that inhibit the development of the small and medium enterprises in Namibia. In the results of his study he concluded that family members were the main source of labor for people operating small and medium enterprises.

### **4.2.3 Wood carving as way of preserving tradition and culture**

Preservation of culture and tradition was the main reason as to why 6.7% of the sample population practiced woodcarving (Figure 12). This was a small proportion compared to other 93.3% who were practicing woodcarving as a means of income (Figure 12).

100% of the woodcarvers who were practicing woodcarving to preserve their culture and tradition had lived in Wamunyu Location for more than 15 years. This clearly shows that they were experienced in the work.

The findings of this study are similar to findings of a study done on small and medium enterprises and sustainable development by Laurent (2009) in Mwenje, Tanzania. In the findings of his study he found out that a small proportion of the Makonde woodcarvers did woodcarving with a primary purpose of preserving their culture and tradition. The findings of this study support findings of a study which was done in Ghana by Dokter (2010). He concluded that not all the Kpando woodcarvers did woodcarving for economic gain. Some of them practiced woodcarving with their primary purpose being preservation of their culture and tradition.

### **4.2.4 Promotion of the tourism industry**

Woodcarving industry is highly interrelated to the tourism industry and it enjoys high levels of consumer preference worldwide (Githiomi, 2014). According to the Wamunyu handcraft cooperative society manager Mr. Joseph Mutuku, both industries mutually benefit from each other greatly. Figure 17 show income made by the society per fiscal year from 2010 to 2016. cooperative society through its chairman made sure that majority of the sculptures bought by previous customers from outside Kenya were safely delivered to them while in their countries' of residence. The other sales were made to local people from within Kenya especially hotel owners and the few tourists who visited the society.

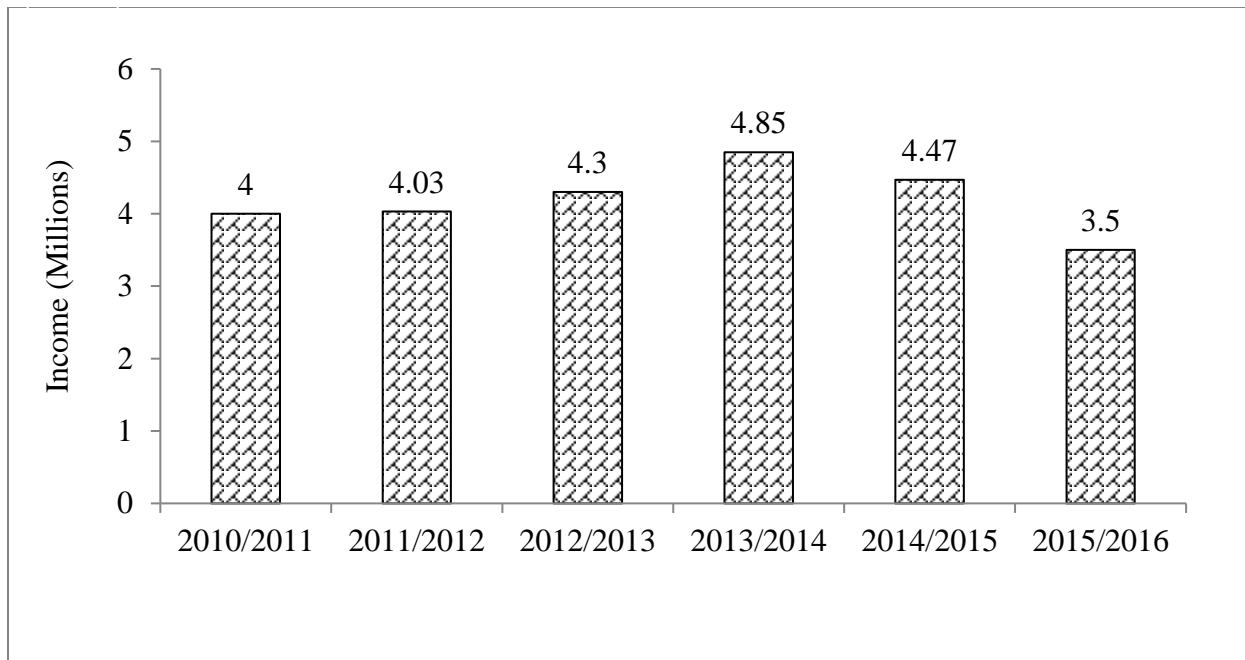


Figure 16: Wamunyu Handcraft Cooperative Society Turn Over per fiscal year

Source: Field Data 2016

A study done by Mbaiwa (2008) on the impacts of tourism on local livelihoods and conservation in Okavango Delta, Botswana concluded that one of the positive impact of tourism to local communities is improvement of their livelihoods. He further noted that the negative impact of tourism to local livelihoods is that, over reliance on tourism may lead decline or abandonment of other sources of livelihoods. This may be dangerous in the event of political, social and economic instability especially in the third world countries

The vibrant woodcarving industry in Rajasthan and Jharkhand districts of India have promoted tourism sector in the country by attracting visitors from different parts of the world who come to see the hand crafted wood products. By so doing they bring foreign currency from their own countries leading to economic growth of India ( Pandey et al., 2007).

## **CHAPTER FIVE**

### **SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATION**

#### **5.0 Introduction**

This chapter consist of three sections, section one contains summary of the study findings as per the objectives of the study. Section two comprises of the conclusion on the study findings while the last section suggests measures that can be put in place to improve the woodcarving sector in Wamunyu location, Machakos County.

#### **5.1 Summary of the Findings**

The main objective of this study was to assess woodcarving practices and their contribution to the socio-economic welfare of the woodcarvers in Wamunyu location, Machakos County.

##### **5.1.1 Woodcarving Practices in Wamunyu location, Machakos County**

Traditional woodcarving was the main method of carving among the Wamunyu Carvers; with none of the woodcarvers using modern woodcarving technologies. Only a small proportion used a combination of both traditional and modern woodcarving methods. Lack of capital to purchase modern woodcarving machines and lack of skills to operate the machines were the main reasons as to why traditional woodcarving remained to be mostly used. Majority of woodcarvers are willing to adopt modern woodcarving technologies. Majority of woodcarvers had basic education and thus capable of adopting modern woodcarving technologies which would in turn lead to the development of the woodcarving subsector.

Majority of woodcarvers added value to their wood carved products, with a third of woodcarvers doing full value addition to the sculptures while the rest did partial value addition. Lack of adequate market, capital, equipment's and tools for value addition and skilled labour for hire were the main reasons which made the woodcarvers to abandon value addition or do partial value addition. Those who did full value addition had connections to the international market. Lack of sufficient market and lack of sufficient wood were the main challenges facing the woodcarving sector in Wamunyu. The wood for carving was acquired locally. Other challenges facing the woodcarving industry included lack of finances, lack of machinery for

woodcarving, poor working environment for the carvers and lack of collaboration with relevant stakeholders

### **5.1.2 Contribution of Woodcarving to the Socio-Economic Welfare of the Woodcarvers**

The study established that 80% of the woodcarvers depended on woodcarving as their primary source of income. Majority of the woodcarvers earned between Ksh 5000 to 9999 per month, with lowest amount of money, Ksh4999 per month being earned by 10.7% of the sample population. The difference in income levels was brought about by type of wood used, value added to the sculptures, design, size and finishing of the sculpture. It was also established that woodcarving was a source of income to variable number of women who did the finishing of the sculptures, Wamunyu Handcraft Cooperative society, brokers who bought the unfinished sculptures added value to them and sold them at higher prices and to the national government through payment of tax.

Woodcarving is the main occupation to majority of the woodcarvers with 6.7% engaged on alternative livelihoods mainly on livestock and crop farming as main occupation. Majority of the woodcarvers did the woodcarving work by themselves. This was associated to lack of capital to hire people and lack of skills by people who could assist to execute the woodcarving work.

A small proportion of the woodcarvers (6.7%) engaged in woodcarving as preservation of their culture and tradition. The study also revealed that woodcarving and tourism industry mutually benefitted from each other.

## **5.2 Conclusion**

Woodcarving industry contributes significantly towards improvement of the woodcarvers wellbeing. Sculptures produced have almost remained the same and tools used have significantly continued to be simple. Modern woodcarving technologies are not embraced in Wamunyu although there are efforts of combining both the traditional and modern woodcarving technologies.

The woodcarving industry in Wamunyu is faced by a number of challenges which hinders its development. These challenges includes lack of sufficient market, lack of capital, lack of machinery, insufficient and quality wood for carving, lack of skills and lack of support by the county and national governments. Due to these challenges the full potential of the woodcarving industry has not been fully tapped in Wamunyu.

Woodcarving industry has brought some benefits to woodcarvers and the people of Wamunyu location. Among the benefits realized include income generation, creation of employment, preservation of culture and tradition and promotion of the tourism industry.

Based on the study, it can be concluded that woodcarving is an important socio-economic activity due to the benefit derived from it, although its full potential has not been fully tapped due to many challenges facing it. There is a need to come up with measures that can be put in place to improve the woodcarving sector in Wamunyu and replicate the same to other woodcarving areas.

### **5.3 Recommendations Based on Findings**

Based on the findings of the study on the contribution of small scale woodcarving enterprises to rural livelihoods, the following recommendations are made to improve the industry, make it a sustainable source of livelihood and address the challenges facing it. The recommendations are divided into two categories, short term and long-term recommendations. Short term comprised of recommendations that the woodcarvers have to put in place immediately while long-term recommendations involved recommendations that were to take a long period of time to be fully implemented.

#### **5.3.1 Short-term Recommendations**

Formal education and trainings should be provided to the carvers on how to add value to their carved products, how to use modern woodcarving technologies and how to solve some of the challenges they face while on their work. This should be done by the County government of Machakos in collaboration with the tourism and cultural sectors.

Carvers should start integrating traditional woodcarving skills with modern technology in order to save on the time and energy spend in carving a single object and produce fully value added products which are of high quality. Consequently, new innovations would be realised in the industry and prices of the wood carved products would go up.

Carvers should establish a tree planting project in order to overcome the problem of wood for carving. This would also lead to sustainable supply of wood for carving in the future. Older and experienced woodcarvers at Wamunyu should encourage the youth to engage in the woodcarving business since the sustainability of the industry depends greatly on the youth.

The cooperative society should develop marketing channels such as wood carvers' website and other platforms where they can be advertising their Sculptures. This could diversify and expand market for their products.

### **5.3.2 Long- term Recommendations**

The County Government of Machakos should establish a fully equipped research centre with modern woodcarving tools and machinery at Wamunyu. This could save on the time and energy woodcarvers use in their work especially on the finishing of the sculptures. This would also lead to production of high quality wood carved products.

The government of Kenya should formalise the woodcarving sector through including them to credit facilities and other kinds of institutional assistance that small enterprises receive. This would enable them to receive loans to hire skilled labour and purchase modern woodcarving tools and machinery either as a group or individually.

The government of Kenya through KFS should make hard wood trees species accessible to the carvers especially where sustainability in use is possible. Quality of the sculptures will be achieved if carvers are not restricted from cutting some of the hardwood tree species for carving.

The County Government should plan and organise more frequent workshops in which they would be exposing woodcarvers to modern woodcarving technologies and how to apply them

in their work. It should also develop market information systems which should embark on creating awareness to the carvers on where they can sell their sculptures and quality of the wood carved products needed.

#### **5.4 Areas for Further Studies**

A thorough study has to be done on the impacts of tourism on woodcarving sector and its implications on hardwood tree species around Wamunyu Location. Woodcarving is a means of livelihood that sustains millions of rural poor and it is highly depended on the tourism industry. Although it creates employment to millions of people living in rural areas, it has some negative impacts to hardwood tree species which are highly priced.

Another comprehensive research should be done to determine how technology is changing the woodcarving sector and its implications on environmental conservation. Its implications on woodcarving tree species, production of sculptures, Value addition and marketing should be the centre of the research.

## REFERENCES

- Amoh, E. (2009). Ahwiaa wood carving industry: new trends and their implication for art education Master of arts in art education.
- Agnes. (2003). Research design and methodology, 51–77.  
<http://doi.org/10.1057/9781137326072.0007>
- Anonymous. (2010). Trade Theory and Natural Resources. *World Trade Report*, 72–111.
- Azeez, O. A. (2011). Indigenous Art of West Africa in Wood. *Global Journal of Human Social Science*, 11(2).
- Bihar, G. (2013). Woodcarving Cluster.
- Brusatte, S. L. (2012). An Introduction to *Dinosaur Paleobiology*, 1–29.  
<http://doi.org/10.1017/CBO9780511623806>
- Canada, S. (2010). *Survey Methods and Practices*. <http://doi.org/12-587-X>
- Castillo, C. (2009). Protective art of indonesia balinese.
- Christian, M. Y., Chirwa, P. W., Ham, C., Christian, M. Y., Chirwa, P. W., & Ham, C. (2016). The influence of tourism on the woodcarving trade around Cape Town and implications for forest resources in southern Africa The influence of tourism on the woodcarving trade around Cape Town and implications for forest resources in southern Africa, 3637(July).  
<http://doi.org/10.1080/03768350802447800>
- Code, C., Title, C., Development, R., Umehau, P. E. E., State, E., Onwe, O. J., ... Coordinator, C. (2008). *No Title*.
- Dary, S. K. (2012). Participation in Rural Non-Farm Economic Activities in Ghana. *American International Journal of Comtemporary Research*, 2(8), 154–161.
- Davis, G. F., & Cobb, J. A. (2009). Resource Dependence Theory : Past and Future. *Research in the Sociology of Organizations*, 1–31. [http://doi.org/10.1108/S0733-558X\(2010\)0000028006](http://doi.org/10.1108/S0733-558X(2010)0000028006)
- De Haan, L. J. (2012). The livelihood approach: A critical exploration. *Erdkunde*, 66(4), 345–357. <http://doi.org/10.3112/erdkunde.2012.04.05>
- DFID. (2008). DFID ' s Sustainable Livelihoods Approach and its Framework. *Development*, 1–5.
- Dokter, A. (2010). Kpando Woodcarvers and Potters a Baseline Study and Value Chain Analysis of Kpando Woodcarvers and Potters Kpando Woodcarvers and Potters a

- Baseline Study and Value Chain Analysis of Kpando Woodcarvers.
- Driscoll, D. (2011). Introduction to Primary Research: Observations, Surveys, and Interviews. *Writing Spaces: Readings on Writing*, 2, 153–174. <http://doi.org/10.1111/j.1540-5885.2010.00744.x>
- Earl, B. (2013). *The practice of social research*, thirteen editions, international edition .Wadsworth Canada.
- Eastern Community Development Programme ( ECDP ) Asp Review for Period 2007-2010  
Date of submission : 29 th April 2010. (2010), (April).
- Eddy, A. A. N., & Gorda, S. (2016). The Integration Model of Small Craft Industry Development Strategy of Wood Carving In Bali Province , Indonesia, *4*(2), 387–393.
- Enya, K. (2004). Soil Variability and Landscape in the Machakos Districts Oil Variability and Landscape in the Machakos District , Kenya ., (September).
- European commison. (2004). This Guidance Paper was originally issued by the European Commission Services , following consultation of the Standing Committee on Construction at the 47th meeting on 1 July Standing Committee on Construction . *This Guidance Paper Was Originally Issued by the European Commission Services*, (December), 11–15.
- Fadiman, M. (2008). “Starvation taught me art”: Tree poaching, gender and cultural shifts in wood curio carving in Zimbabwe. *Ethnobotany Research and Applications*, 6, 335–346.
- FAO. (2012). Forests, Forestry and Forest Products for a Sustainable Future. *Sofo*, 3(1), 24–41.
- GB Oxfam. (2013). The Sustainable Livelihoods Approach: Toolkit for Wales.
- George Jack. (2007). The Artistic Crafts Series of Technical Handbooks Edited by W.R. lethaby wood-carving : design and workmanship, 1–157.
- Githiomi, J. K. (2014). Classification of Kenyan Wood Carving Species Using Macroscopic and Microscopic Properties, *4*(3), 167–178.
- Glasow, P. (2005). Fundamentals of survey research methodology. *Retrieved September*, 1–28.  
Retrieved from <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Fundamentals+of+Survey+Research+Methodology#1>
- Green, G. P., & Haines, A. L. (2003). The Role of Assets in Community-Based Development. *Asset Building & Community Development*, 1–24.
- Haines, A. (2009). Asset based community development. *An Introduction to Community*

- Development*, (October), 2010–2011.
- Hülsemann, N. (2015). Master thesis., 6(2), 100. <http://doi.org/10.1007/BF03192151>
- Jespersen, B. (2010). Geometric Tools for the Magic Woodcarver, 151–158.
- Karuma, A. N., Gachene, C. K. K., Msanya, B. M., Mtakwa, P. W., Amuri, N., & Gicheru, P. T. (2015). Soil Morphology , Physico - Chemical Properties and Classification of Typical Soils of Mwala District , Kenya, 4(2), 156–170. <http://doi.org/10.9734/IJPSS/2015/13467>
- Kavoi, M. M., Hoag, D. L., & Pritchett, J. (2010). Measurement of economic efficiency for smallholder dairy cattle in the marginal zones of Kenya, 2(April), 122–137.
- Keller, K. L. (2009). Building strong brands in a modern marketing communications environment. *Journal of Marketing Communications*, 15(2–3), 139–155. <http://doi.org/10.1080/13527260902757530>
- Kenya National Bureau of Statistics. (2013). *Kenya 1999 Population and Housing Census*. Retrieved 15, 10, 2014, from Kenya National Bureau of Statistics:
- Kies, T. J. (2013). Artisans of Sound: Persisting Competitiveness of the Handcrafting Luthiers of Central Mexico. *Ethnomusicology Forum*, 22(1), 71–88. <http://doi.org/10.1080/17411912.2013.775716>
- Klee, D., Mordey, M., Phuare, S., & Russell, C. (2014). Asset based community development – enriching the lives of older citizens. *Working with Older People*, 18(3), 111–119. <http://doi.org/10.1108/WWOP-06-2014-0017>
- Knutson, P. (2006). The Sustainable Livelihoods Approach. *Aquaculture Economics Management*, 13(1), 90–99. <http://doi.org/10.1080/13657300903156092>
- Koenig, J., Altman, J., Griffiths, A. D., Koenig, J., Altman, J. O. N., & Griffiths, A. D. (2016). Indigenous Livelihoods and Art Income : participation , production and returns from woodcarvings in Arnhem Land , north Australia Indigenous Livelihoods and Art Income : participation , production and returns from woodcarvings in Arnhem Land , north Austr, 9182(July). <http://doi.org/10.1080/00049182.2011.619952>
- Kothari, C.R.(1990), Research Methodology-Methods and Techniques, *New Delhi, Wiley Eastern Limited*.
- Krosnick, J. a. (1999). Survey research. *Annual Review of Psychology*, 50, 537–567. <http://doi.org/10.1146/annurev.psych.50.1.537>
- Kusters, K., & Belcher, B. (2004). *Forest Products , Livelihoods and Conservation*. Office

- (Vol. 1). Retrieved from <http://agris.fao.org/agris-search/search/display.do?f=2008/Q1/Q10701.xml;Q12007000018>
- Kutazo, H. J. (2008). Challenges That Inhibit the Development of the Small and, (April).
- Laurent, M. N. (2009). Master thesis, 1–77.
- Lee, R. C. (2010). *Fine Woodworking Tools September 2010 4 Easy Ways to Shop. Catalogo.*
- Li, K., Liao, Y., & Chang, J. (2013). Development of a, 4227.
- Mayers, J. (2005). Forestry Partnerships in Kenya, (January), 1–54.
- Mayers, J. (2008). Assessment of Potential Impacts in Ghana of a Voluntary Partnership Agreement with the EC on Forest Governance. *Baseline*, (March).
- MBAIWA, J. E. (2008). Tourism Development, Rural Livelihoods, and Conservation in the Okavango Delta, Botswana a. *Development, Rural Livelihoods, and Conservation in the Okavango Delta, Botswana. (August 2008) Joseph Elizeri Mbaiwa, B.A., University of Botswana; Dipl., University of Botswana; M.S., University of Botswana, 1–188(Recreation, Park aTourism).*
- Mbithi, R. N. (2015). Kamba Cultural Artifacts to Impart Identity into Interior Design Products Kamba Cultural Artifacts to Impart Identity into Interior Design Products, (January).
- Melrose, J., Perroy, R., & Careas, S. (2015a). Implications for Art Education and Socioeconomic growth. *Statewide Agricultural Land Use Baseline 2015, 1(3)*, 166–187. <http://doi.org/10.1017/CBO9781107415324.004>
- Melrose, J., Perroy, R., & Careas, S. (2015b). Title. *Statewide Agricultural Land Use Baseline 2015, 1(August)*. <http://doi.org/10.1017/CBO9781107415324.004>
- Mohapatra, S. (2011). Problems Associated with Artisans in Making of Handicrafts in Orissa , India, *6(1)*, 56–81.
- Morse, S., Mcnamara, N., & Acholo, M. (2009). Sustainable Livelihood Approach : A critical analysis of theory and practice. *Geographical Paper*, (189), 68. <http://doi.org/10.1007/978-94-007-6268-8>
- Much, S. O., Than, M., & Getting, J. (2012). Sustainable Livelihoods: *Sustainable Livelihoods: What Contribution Can We ...*, (September).
- Musimba, N., Kimatu, J. N., Mweu, B., Mburu, M. W. K., & Nguluu, S. (2015). Current Research in Agricultural Sciences Germination Effects of Purposive Bruchid Screening of African Ebony ( *dalbergia melanoxylon* ) Seeds in the Arid and Semi-Arid Region of

- South Eastern Kenya, 2(2), 60–66. <http://doi.org/10.18488/journal.68/2015.2.2/68.2.60.66>
- Mutinda, J. (2014). Assessment of the Impact of the Woodcarving Industry on the Environment : A Study of Wamunyu Location , Mwala District , Kenya, 4(6), 48–64.
- Mwangi, E. W., & Mundia, C. N. (2014). Assessing and monitoring agriculture crop production for improved food security in Machakos County, 5(May), 7–10.
- Nassiuma, D. (2000). Survey Sampling: Theory and Methods. Nairobi University Press
- Nyahunzvi, D. K. (2016). Negotiating livelihoods among Chivi curio traders in a depressed Zimbabwe tourism trading environment, 2917(July).  
<http://doi.org/10.1080/13032917.2014.974065>
- Obeng. (2011). Carving Out Idigenous Tree Species to Sustai Rural Livelihood Study Area, 27(2), 85–96.
- Ofukwu, R. a. (2009). O Riginal a Rticles. *Evaluation*, 3(3), 468–472.  
<http://doi.org/10.1067/mmt.2002.123333>
- Ogara, D. A. E. (2014). Impact of cultural industries on urban development: A case of Wamunyu centre, Machakos county, (June).
- Oladimeji, Y. U. (2013). Potentials Of and the Socio-Economic Benefits of Blacksmithing Production in Promoting Agricultural Development and Poverty Alleviation in Kwara State , Nigeria. *International Journal of Modern Engineering Research*, 3(6), 3809–3817.
- Pandey, A. (2016). Wood Craft of Bihar and Uttar Pradesh – a survey, 4, 2–5.
- Pandey, N., Garg, A., Malhotra, R., & Pandey, D. N. (2007). Linking Local Knowledge to Global Markets: Livelihoods Improvement through Woodcarving in India. *World Development*, 1–9. Retrieved from  
<http://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/3868/PandeyWood.pdf?sequence=1>
- Parks, E. (2013). Exploiting local handcrafts , food and traditions to promote local tourism.
- Parts, P.-K., Rennu, M., Jääts, L., Matsin, A., & Metslang, J. (2011). Developing sustainable heritage-based livelihoods: an initial study of artisans and their crafts in Viljandi County, Estonia. *International Journal of Heritage Studies*, 17(5), 401–425.  
<http://doi.org/10.1080/13527258.2011.589199>
- Penh, P. (2010). Working Paper No . APFSOS II / WP / 2010 / 32, 1–24.
- Peters, B., Gonsamo, M., Molla, S., & Mathie, A. (2009). Applying an Asset-Based Community Development ( Abcd ) Approach in Ethiopia Mid-Term Evaluation Report

- Summary October 2009, (October).
- Peters, D. W. (2007). How Technology Could Increase Production Capacity for a Small Artisan Woodworking Shop.
- Petersen, N., & Ostergaard, S. (2003). Organisational photography as a research method: what, how and why. *Academy of Management Conference Proceedings*, Altamira Press.
- Phrasisombath, K. (2009). Sample size and sampling methods, (September).
- Pye, C. (2006). Chris Pye: WoodCarving.
- Riddell, W. C., & Song, X. (2011). The Role of Education in Technology Use and Adoption : Evidence from the Canadian Workplace and Employee Survey. *CLSRN Working Papers*, (83), 1–34.
- Rogerson, C. M. (2005). Rural Handicraft Production in the Developing World: Policy Issues for South Africa. *Agrekon*, 39(2), 193–217.  
<http://doi.org/10.1080/03031853.2000.9524938>
- Ryan, T., & Roche, P. (2016). An Asset based approach or ABCD ( EFFIGY ), (January).
- Samuel Kiumbuku, M. jane. (2014). Gender and Educational Dimensions of Handicraft Industry in Mwala District , Kenya Jane Mutinda PhD School of Environmental Studies Kenyatta University Samuel Kiumbuku Ministry of Agriculture Livestock and Fisheries Kitale , Kenya, 4(11), 252–259.
- Shackleton, C. M., & Shackleton, S. E. (2004). The importance of non-timber forest products in rural livelihood security and as safety nets: a review of evidence from South Africa. *South African Journal of Science*, 100(December), 658–664.
- Shokorova, L. V., & Turlyun, L. N. (2013). The Problem of Synthesis of Traditions and Innovations in the Art of Woodwork, 27(3), 408–412.  
<http://doi.org/10.5829/idosi.wasj.2013.27.03.13646>
- Son, A., & Pearce, P. (2005). Multi-faceted image assessment. *Journal of Travel & Tourism Marketing*, 18(4), 21–35. <http://doi.org/10.1300/J073v18n04>
- Starman, A. B. (2013). Adrijana Biba Starman The case study as a type of qualitative research. *Journal of Contemporary Educational Studies*, 28–43.
- Sunderland, T., & Ndoye, O. (2004). *Forest Products , Livelihoods and Conservation* (Vol. 2).
- Sustainable, I., Practical, U. K., Cobbett, W., Marx, K., Polanyi, K., Sen, A., ... Conway, G. (2015). Book Reviews, 23(Scoones 1998).

- Teddlie, C., & Yu, F. (2007). Mixed Methods Sampling: A Typology With Examples. *Journal of Mixed Methods Research*, 1(1), 77–100. <http://doi.org/10.1177/2345678906292430>
- Tobergte, D. R., & Curtis, S. (2013). No Title No Title. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699. <http://doi.org/10.1017/CBO9781107415324.004>
- Un Habitat. (2009). What Are Asset-Based Approaches to Community Development? *Development*, (November).
- Utaberta, N., Tajuddin, M., & Mohamad, H. (2014). Evaluating the Discontinued Traditions of Malay Wood Carvings in Malaysia : a Failure to Develop the Discourse on Modern and Post, 7(2), 241–254. <http://doi.org/10.3844/ajeassp.2014.241.254>
- Utara, U. S. (2011). Simple Random Sampling, 8–9. [http://doi.org/10.1007/0-387-31075-4\\_2](http://doi.org/10.1007/0-387-31075-4_2)
- Wambua, J. M. (2014). Factors Influencing Dairy Productivity in Machakos County : A Case of Wamunyu Dairy Farmers Co-operative Society by Joshua Mutua Wambua. A Research Project Report Submitted In Partial Fulfillment Of The Requirements For The Award Of The Degree Of Master Of Arts In Project Planning And Management Of The University Of Nairobi.
- Weikop, C. (2008). The Arts and Crafts Education of the Brücke: Expressions of Craft and Creativity. *The Journal of Modern Craft*, 1(1), 77–99. <http://doi.org/10.2752/174967708783389823>
- Willett, J. L. (2015). Experiences of Slow Violence in Poor Kenyan Communities : Micro Disasters , Formalized Aid Responses , and Community Support through Social Networks.
- Williams, D. (2014). India Wood and Wood Products in India 2014.
- Works, G., & York, N. (2014). Genesee valley woodcarvers “.
- Yin, R. K. (2006). Case Study Reserach - Design and Methods. *Clinical Research*, 2, 8–13. <http://doi.org/10.1016/j.jada.2010.09.005>

**Appendix 5.1: Household Questionnaire**

**KENYATTA UNIVERSITY**

**DEPARTMENT OF ENVIRONMENTAL PLANNING & MANAGEMENT**

Name of the interviewer.....

Date of the interview.....

Name of the respondent (optional).....

**Household information**

1. For how long have you lived in Wamunyu Location?

(i) 0-5yrs [ ] (ii) 5-10yrs [ ] (iii) 10-15yrs [ ] (iv) 15yrs and above [ ]

2. What are your household characteristics? (Please fill in the table below)

Age	Gender	Education level	Main Occupation	Income from main occupation	Other sources of livelihood	Comments on the sustainability of other sources of livelihood
Under18[ ] ii 18-35 [ ] iii. 36-55[ ] iv. Above 55[ ]	1=Male, 2=Female	1.primary 2.Secondary 3. College 4. University	1.woodcarving 2.employed 3.farming 4.Business 5. Others			

3. Please tick land ownership as indicated in the table

i. Leasehold	ii. Freehold	iii. Trust land	iv. Private	v. Others (specify)
--------------	--------------	-----------------	-------------	---------------------

4. a) How does land ownership indicated in the table above influence your main occupation and other sources of livelihoods?

.....  
 .....

b) Do you practice woodcarving?

Yes ( ) No ( ) If yes, which type of woodcarving do you practice?

Type of woodcarving practiced	Tick appropriately	Comment on the sustainability of woodcarving practice
Traditional		
Modern		
Both		

5. How did you start practising woodcarving? Please tick appropriately

- i. Inheritance ( )
- ii. Self training ( )
- iii. Introduced by friends ( )
- iv. Trained ( ) (indicate the institution that trained you)
- v. Others

6. Where do you source wood for carvings?

.....  
 .....

7. Comment on the availability of wood for your carvings?

.....

8. In case of scarcity, please indicate alternative sources of wood

.....  
 .....

9. Which type of labor do you use in your carving process?  
 a). Hired labor ( ) b). Family ( ) c.)Individual ( ) Others (Specify) .....

10. Why is woodcarving practiced as a livelihood?  
 a) Primary income [other economic activities] b) Secondary income c)Leisure activity  
 d) Tradition and culture e) Others (specify)

11. What products do you produce?  
 a). People sculptures b). Animal sculptures c) Domestic utensils  
 d) Other (specify).....

12. Who do you sell your products to?  
 1= intermediary/blockers, 2=Supermarkets 3=Individual consumer 5= cooperatives 6= Retail outlets 7= NGOs 8= Private processors 9 =export 10= Tourists 11= Others (specify)

13. Why did you choose the above buyer(s)?  
 1=Good price 2= proximity to the buyer 3= purchases in bulk 4= consistency in purchasing and payment 5=have a contract to supply to the buyer 6= the buyer is the only option 7=Other(specify)

14. Types and uses of wood carved products

Types	Quantity produced per day	use	Comments ( Surplus/ Deficit) In the market

b) In relation to woodcarving, please fill in the information required in the table.

Products	Quantity Per month	Market (Specify)	Unit price (At site)		Total income		Comments
			Before adding value	After value addition	Before adding value	After value addition	

c) Market price of wood carved products

Type of product	Market Price per quantity (Kshs) (unprocessed)	Market Price per quantity (processed) (Kshs)

15. Do you practice value addition for wood carved products at the workshop?

Yes ( ) No ( ) If yes, indicate value addition measure you apply

1. Smoothing
2. Polishing
3. Painting
4. Brading
5. Others.....

16. What reasons drive you to add value to your products?

To prolong the life span of the products	
To generate more income	
To serve a diversified market clientele	
Because I belong to a cooperative that is involved in value addition	
To be able to break into high end markets	
Others (specify)	

17. For those who **DO NOT** add value; what are the reasons why you don't add value?

- a) .....
- b) .....
- c) .....

18. What are the priority areas for value addition in the woodcarving industry?

.....  
.....

19. What are the problems facing the development woodcarving industry in Wamunyu Location?

In terms of:

Production

.....  
.....

Processing

.....  
.....

Marketing

.....  
.....

Value addition

.....  
.....

Environmental conditions

.....  
.....

Others (Specify)

.....  
.....

Please indicate potential areas for investment in the development of woodcarving industry.

.....  
.....

**Appendix 5.2: Institutional Questionnaire**

**KENYATTA UNIVERSITY**

**DEPARTMENT OF ENVIRONMENTAL PLANNING & MANAGEMENT**

Name of interviewer.....Date.....

Name of the institution	
Name of the officer	
Designation	
Duration of stay in the institution	

1. What is the mandate and role of your institution in relation to the development of carving industry in Wamunyu?  
.....  
.....
2. What are the main sources of livelihoods among the people of Wamunyu Location in Machakos County? Please prioritize them in terms of their preference among the community.  
.....  
.....
3. Please identify and comment on how traditional and modern woodcarving practices have influenced the development of woodcarving industry in Wamunyu location.  
Traditional.....  
.....  
Modern practices.....  
.....
4. How has the woodcarving subsector contributed to community livelihoods in Wamunyu location in Machakos County?  
.....  
.....

5. What measures of value addition have been taken for the wood carved products under each value chain platform?

Value chain platform	Woodcarved products	Measure for value additon	Challenges/comments

6. Please identify areas for investment under the various value chain platforms in order to improve the performance of the wood carving industry.

.....  
 .....

7. What are the possible investment opportunities available in developing woodcarving subsector in Wamunyu?

.....  
 .....

8. What are the problems facing the development of woodcarving industry in Wamunyu?  
 Please indicate measure for improvement on each area.

In terms of:

Inputs and Production.

.....  
 .....

Value addition

.....  
.....

marketing

.....  
.....

Environmental conditions

.....  
.....

Wood supply

.....  
.....

Others (Specify)

.....  
.....  
.....

### **Appendix 5.3: Interview Schedule for Wamunyu Handcraft Cooperative Society**

1. What is the mandate and role of your institution in relation to the development of carving industry in Wamunyu?
2. What are the major sources of raw materials (wood) for wood carving in Wamunyu location?
3. What is the socio-economic importance's of woodcarving in Wamunyu?
4. What are the main sources of livelihoods among the people of Wamunyu Location in Machakos County? Prioritize them in terms of their preference among the community.
5. How many woodcarvers do we have in Wamunyu Location?
6. Please identify and comment on how traditional and modern practices have influenced the development of woodcarving industry in Wamunyu location.
7. How has the woodcarving subsector contributed to community livelihoods in Wamunyu location in Machakos County
8. What value addition measures can be taken to boost the wood carving industry in Wamunyu?
9. Please identify areas for investment under the various value chain platforms in order to improve the performance of the wood carving industry in Wamunyu.
10. What are the possible investment opportunities available in developing woodcarving subsector in Wamunyu?
11. What are the problems facing the development of woodcarving industry in Wamunyu? Please indicate measure for improvement on each area.

#### **Appendix 5.4: Observation Sheet for Wamunyu Woodcarvers**

1. Type of tools (traditional or modern) used for woodcarving
2. Types of wood used to carve products
3. Preferences of wood to use
4. The process of wood treatment
5. Type of structures in which woodcarvers do their work
6. Storage of the wood carved products.
7. Interaction of woodcarvers while on their work
8. The process of carving various products
9. Any Value addition practice being carried out at the site
10. The condition of the workshop at the site
11. The process of adding value to wood carved products