

**ADOPTION OF ENTREPRENEURIAL STRATEGIES IN AQUACULTURE
DEVELOPMENT TOWARDS JOB CREATION IN UASIN GISHU COUNTY,
KENYA**

**BY
AKHWABA PETER STEPHEN**

**ATHESIS SUBMITTED TO THE SCHOOL OF HUMAN RESOURCE
DEVELOPMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE
IN ENTREPRENEURSHIP, MOI UNIVERSITY**

2017

DECLARATION AND APPROVAL

Declaration by the Candidate

This Thesis is my own original work and has not been presented for a degree or any other scholarly work in any institution of higher learning. No part of this Research Report therefore may be reproduced without the prior permission of the author or Moi University, Kenya.

AKHWABA PETER S.

DATE

SHRD/PGE/02/11

Approval by Supervisors

This work has been submitted for examination with our approval as the university supervisors.

DR. RUTH TUBEY

DATE

Department of Quantitative and Entrepreneurship Studies

Moi University, Eldoret, Kenya

PROF. PETER ISABOKE OMBOTO

DATE

Department of Quantitative and Entrepreneurship Studies

Moi University, Eldoret, Kenya

DEDICATION

This work is dedicated to my mother Aleso Akhwaba, and sister Phoebe Ayuma, for the keen interest they had in my education and their financial and moral support. To my wife Joyce Oside, our children Christine, Fred, Ayuma, Hillary and Blessing whose presence encouraged me to pursue my studies.

ABSTRACT

The fish industry is crucial to the world economy. The livelihoods of millions of people worldwide are dependent on fish farming. Fish provides a rich source of food nutrient for human consumption. Globally however, evidence indicates that in many areas aquaculture development which could be a source of employment, its management is failing. Though it has been geared towards full employment, food security and social peace, the management of the fishery industry has not achieved this goal. In order to realize the full potential of aquaculture to the world economy, there is an urgent need to develop appropriate strategies to promote aquaculture technologies that will spur production for job creation. The purpose of this study was to investigate the adoption of entrepreneurial strategies in aquaculture development towards job creation in Uasin Gishu County, Kenya. The objectives of the study were; to examine the relationship between adoption of high growth strategies in aquaculture development and job creation, determine the relationship between adoption of innovativeness in aquaculture development and job creation and evaluate the relationship between risk taking propensity in aquaculture development and job creation. Survey design was employed for the study. The target populations were 1034 fish farmers. Purposive and Multistage simple random sampling techniques were used in selecting a sample of 310 respondents. Instruments used for data collection were questionnaires, interviews, observation and document analysis. Quantitative data were analyzed using descriptive (frequency tables and percentages) and inferential statistics (chi-square). Qualitative data were analyzed using content and thematic categorization. The results showed that product quality (77.5%) was the most adopted strategy for high growth. The study further indicated that (65.7%) of the respondents had adopted new innovation. The study also found out that high growth ($\chi^2 = 0.000$, $P=0.05$), innovativeness ($\chi^2 = 0.006$, $P=0.05$) and risk taking ($\chi^2 = 0.000$, $P=0.05$) had significant relationship with job creation. The study concluded that aquaculture is a source of employment and profitable venture. In addition, despite the support from the government, fish farmers still faced several management problems which included fingerlings, affordable fish feed, finance, flooding and predations among others. The study recommends that there is need for the fish farmers to be accessed to appropriate technologies, support services and resources. This will enable them move from a purely subsistence venture to a more commercial one.

ACKNOWLEDGEMENT

First and foremost, I am thankful to the Almighty God for the gift of life and for having brought me safely this far. I wish to thank Moi University for the financial support and other assistance without which this research report would not have been possible. I wish to express my sincere appreciation to my supervisors Prof.P. Omboto and Dr. R. Tubey who guided me in writing this research report. Without their tireless efforts, this work would have been incomplete.

I would like to express my gratitude to members of the School of Human Resources Development namely Mr. Ogada, the late Mr. Achar, Dr Nassiuma and Mr.Kefa who taught me and also acted as my mentors. I am also grateful to my classmates Mr. H. Kipon'gok, Mr. A. Wasike, Mr. J. Kiprop and Miss L. Maritim who were my source of encouragement and inspiration throughout my study.

A debt of gratitude also goes to the Director of Eldoret Fisheries Department and all his staff for their strongly support during field work by facilitating data collection from among the informants. My gratitude goes to the respondents who were patient enough to respond to all the items posed in the study questionnaire. Their contribution greatly influenced the quality of the research output for this research. To all others who contributed to this study, I say thank you and may God bless you all.

TABLE OF CONTENT

DECLARATION AND APPROVAL	ii
DEDICATION	iii
ACKNOWLEDGEMENT	v
TABLE OF CONTENT	vi
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS AND ACRNOMYS	x
OPERATIONAL DEFINITION OF TERMS	xi
CHAPTER ONE	1
INTRODUCTION	1
1.0 Overview	1
1.1 Background of the Study	1
1.2 Statement of the Problem	3
1.3 Research Objectives	4
1.3.1 General Objective of the Study.....	4
1.3.2 The specific Objectives of the Study.....	4
1.4 Research Hypotheses.....	5
1.5 Scope of the Study.....	5
1.6 Limitation to the Study.....	5
1.7 The Significance of the Study	6
1.8 Assumptions of Study	6
1.9 Conceptual Framework	7
CHAPTER TWO	9
LITERATURE REVIEW	9
2.0 Introduction	9
2.1 Global Overview of Aquaculture	9
2.2 Employment Evidence in Aquaculture Development.....	11
2.3 High Growth in Aquaculture Development and Job Creation	13
2.4 Innovativeness in Aquaculture Development and Job Creation	18
2.5 Risk Taking in Aquaculture Development and Job Creation.....	21
2.6 Chapter Summary of Literature Review	24
CHAPTER THREE	25
RESEARCH METHODOLOGY	25
3.0 Introduction	25
3.1 Study Area.....	25
3.2 Research Design	26
3.3 Target Population	27
3.4 Sampling Techniques	27
3.5 Sample Size	28
3.6 Methods of Data Collection	30
3.7 Data collection Instruments /Research Tools	30
3.7.1 Questionnaire.....	30
3.7.2 Interview Schedule.....	30
3.7.3 Observation Guide.....	31
3.7.4 Document Analysis.....	31
3.8 Pilot Study	31
3.9 Validity Testing	32

3.10 Reliability Testing	33
3.11 Data Collection Procedure.....	33
3.12 Data Analysis Methods	34
3.13 Ethical Consideration/Issues	35
CHAPTER FOUR	36
DATA PRESENTATION, ANALYSIS AND INTERPRETATION	36
4.1 Introduction	36
4.2 Data Analysis and Interpretation.....	36
4.3 Demographic Characteristics of the Respondents.....	37
4.3.1 Characteristics of Aquaculture Enterprise.....	42
4.4 Entrepreneurial Strategies in Fish Production.....	43
4.5 The Adoption of Innovative Strategies	46
4.5.2 Cost of Accessing Innovation.....	49
4.5.3 Sources of Adoption.....	49
4.5.4 If adopted any Technology.....	50
4.5.5 Technology Adopted.....	50
4.5.6 Accessibility to New Technology.....	51
4.6 Risk Taking Propensity in Aquaculture Development and Job Creation.....	52
4.6.1 Risk Taking Propensity.....	52
4.6.2 Sources of Risks.....	53
4.6.3 How to Counter Risks.....	54
4.7 Job Creation in Fish production in the Study Area	54
4.7.1 Source of Labour.....	56
4.7.2 Nature of Jobs Done by Male.....	57
4.7.3 Nature of Jobs Done by Female.....	60
4.8 Other Information in Fish Farming	62
4.9 Hypotheses Testing	65
CHAPTER FIVE	67
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND	
RECOMMENDATIONS	67
5.0 Introduction	67
5.1 Summary of Findings	67
5.2 Discussions of the Study Findings	68
5.3 Conclusions	72
5.4 Recommendations	73
5.4.1 Recommendations for Further Research	73
REFERENCES	74
APPENDICES	79
Appendix 1: Letter of Transmittal.....	79
Appendix 2: Farmers Questionnaire.....	80
Appendix 3: Interview Schedule for Fishery Officials.....	88
Appendix 4: Observation Guide.....	89
Appendix 5: Map of a Study Area.....	90
Appendix 6: Research Permit.....	91
Appendix 7: Research Authorization	92
Appendix 8: Letter from Ministry of Agriculture, Livestock and Fisheries	93
Appendix 9: Letter from Department of Fisheries Eldoret	94

LIST OF TABLES

Table 3.1: Area of the county by sub - county.....	26
Table 3.2 Sampling frame.....	28
Table 3.3: Sample size based on30% of the target population.	29
Table 3.4: Sample size based on Strattek’s formula.....	29
Table 4.1: Response rate in percentage.....	36
Table 4.2: Characteristics of respondents	37
Table 4.3: Characteristics of aquaculture enterprise.....	42
Table 4.4: Distribution of respondents based on high growth strategies	44
Table 4.5: Distribution of respondents based on innovation	47
Table 4.6: Distribution of respondents based on risks taking prosperity.....	52
Table 4.7: Distribution of respondents based on source of employees and the nature of Jobs practiced.....	55
Table 4.8: Distribution of respondents based on other information	63
Table 4.9: Summary of Chi-Square Performed.	65

LIST OF FIGURES

Figure 1.0: Conceptual Framework	8
Figure 4.1: Distribution of Questionnaires	37
Figure 4.2: Respondents Level of Education.....	37
Figure 4.3: Professionalism in Fish Farming.....	39
Figure 4.4: Capital to start Fish Farming	40
Figure 4.5: Future of Fish Farming.....	41
Figure 4.6: Government / Local Authorities Support	42
Figure 4.7: Innovation in Fish Harvesting	49
Figure 4.8: Technology in Pond Construction.....	51
Figure 4.9: Work done by Men in Aquaculture	58
Figure 4.10: Managerial Jobs.....	59
Figure 4.11: Managerial Jobs.....	61

LIST OF ABBREVIATIONS AND ACRNOMYS

CPR	-	County Progress Report
DAR	-	District Annual Report
ESP	-	Economic Stimulus Program
EU	-	European Union
FAO	-	Food and Agriculture Organization
FI	-	Fishery Industry
GDP	-	Gross Domestic Product
ICT	-	Information Communication Technology
KNBS	-	Kenya National Bureau of Statistics
LIFDs	-	Low-Income Food- Deficit Countries
MOFD	-	Ministry of Fisheries Development
NES	-	National Economic Survey
NGO	-	Non –Governmental –Organization
OECD	-	Organization for Economic Cooperation and Development.
ROK	-	Republic of Kenya
SSFF	-	Small Scale Fish Farming
UGC	-	Uasin Gishu County
UGC DP	-	Uasin Gishu County Development Profile

OPERATIONAL DEFINITION OF TERMS

Adoption of entrepreneurial strategies- In the context of this study, this phrase referred to the agreeing of related activities by the entrepreneur that enhance aquaculture development

Aquaculture development- In the context of this study the term referred to the Engineering of farming of aquatic aquaculture related activities which include rearing fingerlings, culturing large fish, agriculture-integrated activities involving aquatic plants and animals.

Aquapreneurship – In the context of this study the concept refers to the business opportunities that arise through fish farming and other aquatic activities in water.

Employment – In this study the term refers to the situation in which a labourer is hired to offer services in fish production in order to earn income.

Entrepreneurial strategies - The phrase in this study refers to the knowledge and skills that a fish farmer puts in place in order to improve aquaculture production.

Fingerling- This refers to young fish, older than fry but usually not more than one year old, and having the size of a finger .

Market development- This phrase in this study refers to introduction of new market for existing product to increase the market share.

Product development- Refers to the process in which a fish farmer introduces a new product (fish) in the existing market

Product penetration- This refers to the ways in which entrepreneur increases his product (fish) share in the market.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the background to the research problem, the statement of the problem, the research objectives, and research hypotheses. It also addresses the scope of study and conceptual framework.

1.1 Background of the Study

Aquaculture remains one of the most valuable management techniques in fisheries today (Stroud, 1986). It has its origin in two separate geographical areas; in North Africa and in China (Parker, 2011). The oldest aquaculture system in the world may be the Egyptians blackish water pond system with a history of two to three millennia. Prehistoric Egyptians were farming the Nile tilapia as back as around 3200BC. Culture of seaweeds began about 400 years ago in Japan. Mullusc culture began about 600 years ago in France and 300 years in Japan.

Most other coastal aquaculture is relatively recent, evolving from a few decades to less than a decade back (FAO, 1997). Aquaculture may have a risen in relation to declining per capita availability of wild fish through overfishing and environmental degradation as population densities increased in the mid 1980s. It is currently one of the fastest growing food producing sectors in the world.

Although Africa has high production potential for aquaculture development, aquaculture production in Africa is still insignificant at the global level and accounts for about 0.9% (404571t) of the total global aquaculture production in 2000 (FAO, 2003). Poor infrastructure, severe political instabilities in many African countries, credits and markets, rising cost of production inputs and lack of entrepreneurial skills

among others are some of the reasons why the full potential has not yet been exploited. It is estimated that 95% of African aquaculture production comes from small-scale fish farming. Predominantly farmed species includes tilapia and catfish. Freshwater aquaculture in small ponds remains the most common aquaculture system in Africa. In North Africa, Egypt is the second largest producer of Tilapia worldwide after China.

In Kenya the natural resource potential for aquaculture development is considered favourable. The country is a coastal state with a surface area of 582,650km,²of that, 13,400km² is covered by inland water surface in the form of lakes and rivers while territorial ocean waters cover 14,300km² (Munguti et al., 2014).These resources are all suitable for different types of aquaculture development. Otieno (2011) further stated that, the country has 1.4million hectares of land suitable which can support aquaculture development however only 0.014 percent is currently used for fish farming. Munialo (2011) supports the view that these potential for growth and expansion is high given by the many favourable physical endowments of the region. These include; adequate rainfall, a well distributed network of rivers, streams, dams, satellite lakes and wetlands as well as suitable climate characterize the region. Despite these enormous potential which can be tapped to increase fish production for job creation, the industry has been characterized by low levels of production that have stagnated for decades. This low level of production is as a result of high cost and poor quality of fingerlings and feed, inadequate funds, poor technical know-how and inadequate extension services.

Uasin Gishu County possesses most of the fundamental attributes for rapid expansion of aquaculture development for job creation. However, according to the data available in the County youth office indicate that the percentage of unemployed youth stand at 61%. This is an indication that people from other counties immigrate in Uasin Gishu County to look for employment. Therefore to tackle this problem of unemployment in the region, appropriate strategies have to be identified and adopted to increase aquaculture production. This study is therefore undertaken to investigate the adoption of entrepreneurial strategies in aquaculture development for job creation in Uasin Gishu County, Kenya.

1.2 Statement of the Problem

Countries which have nurtured innovative aquaculture by adopting aquaculture practices in fish farming have generated many employment opportunities. Yet on a global perspective unemployment remains a challenge. This has resulted into high level of poverty in most countries, Kenya included. Uasin Gishu County has huge potential (markets, manpower, adequate rainfall, rivers, dams and stream) which can support aquaculture development for job creation. However, most of the fish that are consumed in the county are sourced from other counties. In addition, most of the ponds which had been in operation since the introduction of Economic Stimulus Program (ESP) 2009/2010 are not doing well and even some have been closed down.

Given that the aquaculture can supplement to generate a wide range of benefits to the locals in terms of employment and food security, the entrepreneurial orientation among the entrepreneurs in the sector has not been properly integrated. There is therefore need to investigate the potential for aquapreneurship in the county to boost job creation and food security to the residents through adoption of appropriate entrepreneurial strategies hence the need for this study.

1.3 Research Objectives

1.3.1 General Objective of the Study

The general purpose of the study was to investigate the adoption of entrepreneurial strategies in aquaculture development towards job creation in Uasin Gishu County, Kenya.

1.3.2 The specific Objectives of the Study

The specific objectives of the study were:

- I. To examine the relationship between adoption of high growth strategies in aquaculture development and job creation.
- II. To determine the relationship between adoption of innovativeness in aquaculture development and job creation.
- III. To evaluate the relationship between risk taking propensity in aquaculture development and job creation.

1.4 Research Hypotheses

The study tested the following hypotheses:

Ho₁ There is no significant link between high growth strategies and number of jobs created.

Ho₂ There is no significant link between innovativeness and enterprise sustainability.

Ho₃ There is no significant link between risks taking propensity and new enterprise created.

1.5 Scope of the Study

This study was carried out in Uasin Gishu County particularly in Eldoret South, Eldoret East and Eldoret West sub-counties. The study focused specifically on those fish farmers who had been involved in fish production for more than one year. The time frame for the study was within one and a half year because the programme takes two years to graduation. A sample of (310) fish farmers was studied.

1.6 Limitation to the Study

During the study, the researcher encountered limitation of language barrier. Some of the respondents could not be able to speak Kiswahili nor English. The researcher had to employ the research assistant in helping to translate the questionnaire in their mother tongue.

Some of the respondents were hesitant to respond to the questions. The researcher had to assure them that this was not a police investigation. The introductory letter from the university, the permit from the national council for science and technology and the research assistants who were also the agents in their areas of jurisdiction helped in clearing their doubts.

There was also a limitation of time constraints. The researcher could take too long time to some respondents to collect data. These were the potential farmers who were very much eager in research that was been undertaken and would like to know more about the value the research in relation to their ventures. The researcher had to convince them that another special visit would be made for them. This enabled the researcher to budget his time and attend to other respondents.

1.7 The Significance of the Study

The results of this research would benefit the county government of Uasin Gishu, other governments and donors by providing knowledge on appropriate strategies that are necessary for promoting aquaculture entrepreneurship and enable the policy makers prioritize project implementation in various parts of the country.

The result would also help the farmers to appreciate the role of cooperative organization especially those farmers who source capital from personal saving as this could help in alleviating their financial problems and marketing of their products. In addition, it would point out the main key challenges and threats these farmers are facing and bring out the necessary actions of overcoming them. To scholars, researchers and students of entrepreneurship development would use this finding as basis for further research in the related field of research. This would be through by providing empirical literature on the adoption of entrepreneurial strategies in aquaculture development and job creation.

1.8 Assumptions of Study

During the study the following assumptions were considered; that the sample chosen was adequate enough to assist in drawing valid conclusions and that the respondents

would be honest in giving the reliable information and views. The responses articulated by the participants were true reflection of their opinions. The data collection instruments had validity and would measure the desired outcome for the study. The variables in the study would not alter in the course of the research period.

1. 9 Conceptual Framework

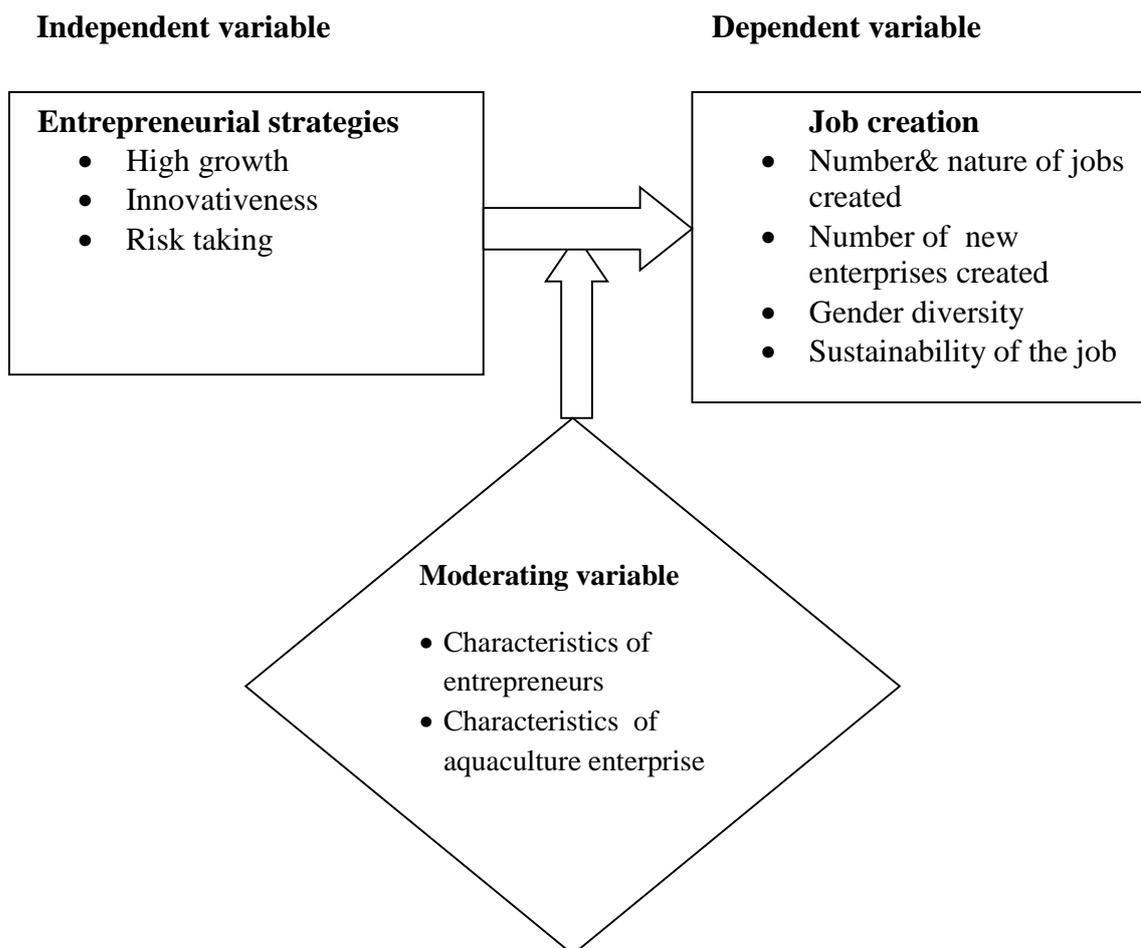
This study was guided by the conceptual framework as illustrated in Fig 1.0

The framework was developed to provide clear link between the dependent and independent variables in this research. The independent variable indicates the various aspects of entrepreneurial strategies which include; high growth strategies, innovativeness and risk taking propensity.

The dependent variable is job creation. In this study job creation was conceptualized as an outcome of interrelated factors such as high growth strategies, innovativeness and risk taking propensity in aquaculture development. However, while it is expected that relationship between the dependent and independent variable is direct as described above, that is not the case in all situation. There are usually other factors that come in between the two variables known as the moderating variables.

These variables can be studied independently if need arises. In this study these factors are not related to adoption of entrepreneurial strategies in aquaculture but can also influence high production for job creation indirectly. These factors are characteristics of entrepreneurs and aquaculture enterprise.

Some of the characteristics of entrepreneur are (age, gender, level of education, experience and household size) and those of aquaculture enterprise include (number of ponds owned, species reared and the size, method of fish farming and pond size) among others. The links of these variables are depicted in the conceptual framework in Figure 1.0



Source: Author 2015

Figure 1.0: Conceptual Framework

The next chapter focuses on the review of the related literature. The literature is concerned with aquaculture development and past findings on its contribution towards job creation.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of literature on aquaculture development in five sections. Global overview, employment, high growth, innovativeness and risk taking in aquaculture development.

2.1 Global Overview of Aquaculture

World aquaculture production has continued to grow since 1970. Global fish production has grown steadily in the last five decades with world food fish supply increasing at an average annual rate of 3.2%. It is believed that in the next decade, total production from both capture and aquaculture will exceed that of beef, pork and poultry, (FAO, 2012). China has been responsible for most of this growth in fish availability owing to the dramatic expansion of its fish production particularly from aquaculture (2014).

In 2010 it accounted for more than 70% of the total freshwater culture output (Dong, 2012). These indicate that most of China investment is in aquaculture industry and the practices has been taken as a culture where the farmers have been given the priority. According to the latest available statistics collected by FAO, global capture fishery production in 2012 was 86.6 million tonnes (live weight equivalent) while world aquaculture production attained a high of 90.4 million tonnes worth US\$ 144.4 billion (FAO, 2014). This included 66.6 million tonnes of food fish worth US\$ 137.7 billion and 23.8 million tonnes of algae (mainly seaweeds).

Asia dominated the aquaculture production by volume accounting for 88.4%, followed by the American at 4.8%, Europe 4.3%, Africa 2.2% and Oceania 0.3%.FAO statistics(FAO, 2014)further reveal that many millions of people around the world found a source of income and livelihood in fisheries and aquaculture in 2012.The estimates indicate that 58.3 million people were engaged in the primary sector of capture fisheries and aquaculture with 84% of them being in Asia followed by more than 10% in Africa. About 18.9 million of the people were engaged in fish farming concentrated primarily in Asia (more than 96%) followed by Africa (1.6%).

In Africa for instance most of aquaculturists use culture technology imported from Asia, Europe and North America as part of the rural development projects. Majority of these are based on earthen ponds. King (1993) noted that over 90 of cultured fish in Sub-Saharan Africa come from earthen pond of 200 to 500m² feet with locally available, low cost agricultural by products.

Brummett and Noble (1995) observed that these ponds were for multipurpose facilities for the farming households rather than just for fish production. The authors found that many crops can be planted around the pond for the family use round the year. Field studies contacted have showed that a good percentage of fish grown in such systems are bartered or consumed directly by the farm households and never enter the cash economy, (Brummett and Chikafumbwa, 1995).

Almost all these fish are disposed off on the pond-bank within minutes of harvest, a finding that might mean that actual fish production in Sub-Saharan Africa is much more than that reported in official statistics. Aquaculture production in Africa has remained low despite the huge potential that exists on the continent. These potentials can be exploited to help in tackling the problem of unemployment and food

insecurity. In order for aquaculture to register further growth and meet its potential of bridging the gap between high production and job creation, the direction of aquaculture development in Africa including Kenya will have to be refocused on modern technologies. This current research investigates the entrepreneurial strategies in aquaculture development towards job creation in Uasin Gishu County, Kenya.

2.2 Employment Evidence in Aquaculture Development

A report conducted by the Food and Agriculture Organization (FAO) on the state of world fisheries and aquaculture (2011), state that the fish sector is a source of income and livelihood for millions of people around the world (FAO, 2011). Employment in fisheries and aquaculture has grown substantially in the last thirty years with an average rate of increase of 3.6 % per year since 1980. It is estimated that in 2008, 44.9 million people were directly engaged, full time or more frequently part time, in capture fisheries or in aquaculture production and at least 12 % of these were women (Foe ken. Dick and Owuor, 2008). On average, each job holder provide for three dependants or family members. Therefore, the primary and secondary sector support the livelihoods of a total of about 540 million people, or 8.0 % of the world population, (FAO, 2011).

According to Fisheries Bulletin(2013) indicate that in 2013, the sector supported about 1.1 million people directly and indirectly working as fishers, fish farmers, traders, processors, suppliers, merchants of fishing accessories, employees and their dependants. In 2008, it was observed that 85.5% of fishers and fish farmers were people from Asia, followed by Africa (9.3 percent), Latin America and Caribbean (2.9%), Europe (1.4%), North America (0.7%) and Oceania (0.1%).China was found

to be the country with the highest number of fishers and fish farmers representing nearly one third of the world total, (FAO, 2011).

According to Hedland (2008) observed that the economic viability of fish farming was becoming widely recognized as observed in countries like Israel where more than half the fish eaten in the country was produced from fish farms. Similarly 25% of fish in China and in India, 11% in USA and 10% in Japan were aquaculture products. The author further opined that fish farms in developing countries not only improved a nation's sustainability diet but also brought income to small farmers and created employment particularly in rural areas. This study therefore suggests that the benefits of aquaculture in rural development relate to reduction in high level of poverty in terms of employment, income, health and nutrition and farm sustainability.

Bailey (2008) in his study found that aquaculture development stimulates the development of the rural communities in which they are allocated by direct employment of the residents and also generate greater economic activity with the establishment of support services. Aquaculture development brings with it an infusion of cash to areas, which may not merit consideration for other type of industry. Similar study carried by Ceiling and Hishamunda (2009), found that aquaculture contributes to Millennium Development Goals by providing protein and increasing the availability of food. The authors further noted that the sector generate employment income (often female employment in fish processing and marketing).The authors concluded by saying that through multiplier, the sector increases economic growth, tax revenue and foreign exchange earnings.

Edwards and Muir (1999) in their study in Philippines found that aquaculture development has potential of generating employment on the farm, either on full-time basis for example a 'caretaker' who is responsible for the day to day farm operations, or on an occasional basis for seasonal tasks such as harvest. Bwathodi (2001) in his contribution indicated that fishing industry provide employment for between 0.5 million Ugandans, more than 0.5 million Tanzanians and over 0.8-1.5 million Kenyans. According to the GOK (2010) report indicate that aquaculture is one of the strategies to overcome raising poverty levels in Kenya.

In a paper published for the Overseas Development Institute, Edwards (2000) supports the view that aquaculture contributes to the livelihood of the poor through improved food supply, employment and income. Aquaculture creates 'own enterprise' employment, including for women and children, and provides income through sale of the fish. Income through employment opportunities is possible on larger farms, in seed supply networks, market chains and manufacturer industry.

In coastal areas the farming of mud crabs, oysters, mussels, shrimps, fish and seaweeds provides employment for the rural poor mainly related to labour inputs as well as seed and feed collection (Halwart et al., 2002).

Based on the above information, there is enough evidence that there is a bright future for increasing fish production from the business in the county which will serve as business venture for employment, income generation and food security to the residents in the study area.

2.3 High Growth in Aquaculture Development and Job Creation

According to (FAO, 2002), total aquaculture in 1996 was 26.7 million tons, and in 2001 increased to 37.5 million tons. Caddy and Griffiths (1995) indicated that this

rapid growth was as a result of combined effects of an increasing world population and decreasing catches from traditional fisheries. In addition, the growth was further influenced by consumer preferences in developing countries, (Lem and Shadadeh1997; Tacon 1997).

According to FAO (2014) report indicate that the global demand for fish will continue to grow over the next decade due to population growth, urbanization and wealth. This suggests that there must be appropriate strategies to achieve this goal. Aquaculture in small farming systems provide high quality animal protein and essential fatty acids, vitamins and minerals, especially for vulnerable groups such as pregnant and lactating women, infants and pre-school children, generally at prices affordable to the poorer segments of the community.

FAO (2011) report of 2007, further indicate that fish accounted for 15.7% of the global population's intake of animal protein, and 6.1% of all protein was consumed. The outcome of this is to increase ability to work and/or go to school and generate employment opportunities and income. Globally, fish provides more than 1.5 billion people with almost 20% of their average per capital intake of animal protein and 3billion with 1% of such protein.

FAO (2010) report also reveal that as the population continue to grow, there is a need to secure more and more of the food from aquatic environments (Marine and freshwater).This will help in bridging the gap of this nutritional deficiency in the world. The report continue to state that capture fisheries will not be able to fill the widening gap between demand and supply as their yield's have remained unstable or, in some cases, experienced decline. Aquaculture which is already supplying around

50% of the aquatic food fish production as an enterprise possesses the capacity to contribute significantly to agricultural sector, (Osagie, 2012).

He further noted that the contribution of the fisheries sub-sector to the national economy is significant ranging from employment creation to provision of raw materials for the animal feed industry. The statement was also supported by Abu and Opera (2009) who indicated that aquaculture as a business venture is capable of bringing significant development in the rural and urban areas by improving income, providing employment opportunities and reducing problem of food supply and security. The authors of the study however, did not elaborate clearly which strategies should be adopted or put in place to increase aquaculture production as a venture in achieving the mentioned benefits.

Turpie et al., (1999) were of the opinion that small scale fisheries improve local livelihoods by generating income and wealth. Fishers and to a lesser extent, fish farmers can access cash year round by selling their fish. This contrasts with agriculture where farmers have to wait for harvest time to get cash. The authors therefore concluded that fisheries are the bank in the water for remote rural population who lack access to formal financial systems.

In some regions of Africa especially West Africa and the Great Lakes, the most dynamic part of the sector has managed to link to the global economy. Countries such as Senegal, Ghana, Kenya, Tanzania and Uganda have benefited from this trend. These fisheries generate hundred of thousand jobs and contribute substantially to the national economy. In Senegal for instance more than 17% of the total labour force of the country works in the sector, (FAO, 2004 b).

Estimate in Uganda suggest that some 700,000 Ugandans take part in fisheries related work (Allison, 2004). According to Kenya National Economic Survey report (2006) reveal that the growth of Kenya's Fisheries Sub-Sector has the potential to contribute significantly to the National economy through employment creation, foreign exchange earnings, poverty reduction and food security support. In the year 2006 alone the fishery department contributed 0.5% of the Kenyan GDP while in the year 2005 registered 4.1% sub sector growth (Mwangi, 2008).Lwenya (2006) was of opinion about the role of gender in the artisanal fisheries by stressing that both men and women need to participate in fisheries management to enhance growth. However, the author did not specify the role each gender play in the venture.

Medard et al., (2000) however indicated that African Women play a prominent role in artisanal fishing which includes fish processing, marketing and retail. The conservative estimate suggests up to 50% of the continent workforces in the fisheries sector are Women -5million in all. In Kenya, Tanzania and Uganda women comprise 70-80 % of fish trade workers. In West Africa, women are most prominent in post harvest work such as small-scale fish retailing, processing, and distribution and marketing. In contrasts men predominate in off shore fish capture (Overa, 1998 Konan, 1999 William, 2000).This suggest that there is strong potential for future business growth and entrepreneurship by women with improved support and training.

However many studies show that women have less access to credit to buy equipments and modernize their business (Medard et al., 2000; William, 2000; Maman Na-any and Maiga ,2004).FAO (2006) report stress the idea of competitiveness in the sector, that the competitiveness of aquaculture is being amplified by product development and marketing made by a more predictable supply. That combined effect of productivity

and market growth has made aquaculture the world fastest growing animal based food sector during the last decade. Aquaculture generate employment for the poor, economic activity from the sale of a low as well as high value species in national, some cases international markets, of the poor in the supply, processing and distribution chain can be substantial and significantly greater than those directly associated with small scale fishing.

Kotler and Keller (2009) were of the opinion that when a firm develop a new product and introduces its regular product into a new market distribution channel or geographical area and when it enters bid on new contract for the first time, it must set a price. Several studies have been done on pricing strategies each giving it different approach, use different methodology and hence resulting to varied findings. According to (Dean, 1976) noted that skimming strategy involves charging a high introduction price, which subsequently is lowered. The rationale of this strategy is to skim the surplus from the customers early in the product life cycle in order to exploit a monopolistic position.

Penetration strategy involves charging a low price to rapidly penetrate the market (Dean, 1976Nagle and Hogan, 2006). Tellis (1986) supported the views by indicating that penetration pricing aims at exploiting economies of scale or experience. These pricing strategies in the context of this study reveal that fish farmers need to apply skimming pricing strategy at the time of harvest when the fish (product quality is high) for example when fish has just been harvested and is still fresh. However as the time overlap penetration strategy is applied to challenge the competitor and penetrate the market in order to increase the market share.

Dean (1969) was of the opinion about product quality and argued that higher quality entrance will engage in skimming strategy, while entrant that offer only marginal improvement will adopt market penetration strategy, charging lower initial prices. The author of this current study therefore concludes that the above studies were aimed at increasing the sales volume of the enterprises for their expansion, growth in sales and their sustainability of which this study attempt to address.

2.4 Innovativeness in Aquaculture Development and Job Creation

According to Fallow (2004), innovation is about the introduction of a new or significantly improved product or service to the market or introduction of a new or significantly improved process to a business. Morgan et al., (2003) in their research found that innovation in its simplest form is generating and exploiting creativity, whether it relates to products, process or organizational features and includes the creation, adaption and adoption of new technologies. According to Len and Chen (2007), innovation is a dominant factor for firm's competitiveness within the environment. It fuel organizational growth, drives future success and is the engine that allows business to sustain their viability in global economy. The authors observed that Innovation creates jobs in the developments, manufacturing, marketing and distribution of new better products and services.

Oata (2012) found that despite the increase of fish production in Nigeria production level is still very low and this has been attributed to high cost of input, lack of credit to fish farmers at low interest rate, lack of skill manpower and inefficient aquaculture extension service system. Adewumi and Olaleye, (2011) in their study on cat fish established that a number of problems confront its production. Prominent among these were management skills, inadequate supply of quality seed, lack of capital, high cost

of feed and marketing of the products. Nwiro, (2012) also reported the same but stressed on inadequate supply of fingerlings as a constraint of the fishery sub sector amongst other factors such as inadequate information and feed supply.

The authors felt if the associated problems of production especially the twin issue of feed production and fingerling supply are tackled; Nigeria will soon become a world exporter of fish especially the cat fish. Although the studies carried out identified the problems that affected the sustainability of the sector, the authors of the studies did not shed light on which innovation or technology should be adopted in order to combat the noted problems. In East Africa for instance, the crucial areas of where action is needed in aquaculture development in terms of innovations and modern technologies include suitable production systems, the availability of affordable feeds, quality seed, equipments, capital, outreach, research, education and training and marketing of products. Mwangi (2008) in his study observed that lack of certified quality seeds (fingerlings) and commercially produced feeds are among the major problems that faces the fish farming sector. He noted that majority of the farmers had not yet embraced the entrepreneurial skills that could address these problems.

The author further observed that the produced feeds are hard to come by and when available they are expensive for farmers to afford. In that respect, appropriate production systems are essential for the successful aquaculture of which option remain to the fish farmer. In that light production at a low cost in relation to this study calls for fish farmers in adopting innovative skills and new technologies in their business that can minimize costs and maximize returns on investments.

Morikawa (1999) discovered in his study that Japan developed a new type of technology driven innovation in feeding using substitute protein such as soybean cake, corn gluten instead of fishmeal and achieved a feeding efficiency approximately 10-15% less than the original feed. The author further noted that the appearance of the finfish color, taste and quantity fresh meat was better than the fish reared on fresh fish feed. In this regards, increasing the productivity through modern technology in utilization of factors in aquaculture production are attractive option to this study.

They have the ability of generating output growth that can result in sustainability of enterprises together with generating employment opportunities. Therefore, there is need to priorities the development technologies that enhances productivity in the study area. Edward (2000) in his study observed that to increase high growth of fish or fisheries products requires a different set of technical and managerial skills rather than agricultural activities.

The author further noted that for one to become aquaculturist could successfully grow aquatic organisms, needs specialized training in water management, aquatic weed control, parasite and disease control, nutrition and feeds, cultural techniques, marketing and processing skills.

In that regard the massive body of evidence points to the fact that innovation not only creates prosperity (wealth) in aquaculture development, but also creates jobs in development, manufacturing, marketing and distribution of new and better production and services. It also helps to lower the cost of production, thus enhancing profitability and sustainability of the enterprise.

2.5 Risk Taking in Aquaculture Development and Job Creation

Modern aquaculture ranks among the most risky business to enter. The risk begins with production process as farm face several substantial biophysical uncertainties related to disease, water, environmental and climatic conditions (Tveteras, 1999; 200; Kumbhakar, 2002). Anderson (2003) noted that market prices for most aquaculture species exhibit significant volatility, market access is restricted by changing trade regulations and new competitors continuously enter the markets.

Anderson(2003) further noted that there were so many causes of market risks of which the obvious sources were shifts in total supply from the farmers and consumer demand that is not fully anticipated when production decisions are made. The author further observed that when aquaculture products are marketed in the international arena, which is the case for aquaculture species, producers face risks related to exchange rate, antidumping, sanitary and veterinary regulatory changes and other trade barriers. The author went on to say that aquaculture products are increasingly marketed through large retail chains where there are risks related to retailers' bargaining power and extensive requirements to suppliers in terms of deliveries, documentation and certification. He therefore concluded that despite high economic risks, the global aquaculture industry continues to attract new production capacity, new entrepreneurs and new investors. This viability of the venture can thus result for economic development both in rural and urban areas.

Johnson (2000) discussed the hazards and risks in aquaculture and defined hazard as the presence of a material or condition that has the potential for causing loss or harm. Risk on the other hand is a combination of the severity of consequences and likelihood of occurrence of undesired outcomes (Johnson, 2000). The author noted that risk is the likelihood that harm or injury from a hazard that will occur to specific individuals or groups exposed to a hazard. He therefore concluded that for every system or process, there are associated risks and hazards no matter how well managed the system is. Karanja et al., (2003) in their studies observed that, although this sector contributes significantly to the national economy in terms of income, employment, food security and foreign exchange, its semi-organized and unregulated status create a situation where workers are exposed to innumerable hazards.

The authors noted that these injuries and occupational diseases, which are preventable, and food safety issues abound in such systems resulting in unnecessary loss of man hours and skilled workforce. Burbidge et al., (2001) found that aquaculture as an enterprise may allow for greater integration of other household economic enterprises. The authors noted that water from the ponds can be used for limited irrigation needs while crop residues and animal wastes can be used to fertilize ponds for production of carps, tilapias or other appropriate species.

They realized that this diversification can minimize risks while maximizing income opportunities and employment. They therefore called for the introduction of aquaculture systems that may fit into an adaptive strategy that is central to the resilience of rural economies. Fagbenro et al., (2004) carried out the study in Nigeria and identified the main risks facing the aquaculture activity in two fold; pure risks and Business risks.

The authors noted that pure risks occur due to uncontrollable physical forces of nature. The prime risks included; flooding, drought and deposition of silt. The authors found that the consequences of flooding are not only physical damage to the farm structures and consequential loss of fish; but also causes great changes in the quality of water on the farm. Floodwater may also introduce predators like crabs, snakes and tortoises into such farms or new pathogens.

It provides an opportunity for cultured fish to escape confinement. Water provides the fishes with dissolved oxygen for life and the volume of water passing through the farm regulates the carrying capacity. The other pure risks the author noted were common social risks such as theft, malicious damage and fraud. Above all, poaching was identified to be a major risk to farmers. In regards business risk, these are those directly related to tilapia production and associated business of the enterprise.

Fapohunda (2005) carried the same study in Nigeria and found that large farms in Nigeria have failed to attain profitability in one or more years simply because of major disruption in the production process. The author established that this was as a result in late delivery of supplies of fingerlings and other related services. Lack of adequate technology or related technical information and expertise as regards hatchery propagation remains a bane of the venture.

Meir (2002) further noted that there are other factors that cause unpredictability of seed supply in aquaculture enterprises which include; flooding and other natural or manmade disasters for example oil spills, disease outbreaks and limited availability of feed for brood stock and larvae. However, given that various studies have been done in identifying the risks that affect aquaculture development, most studies have not provided adequate information on modern technologies on how these risks can be encountered to enhance pond productivities for employment opportunities. This study anchors on this and assumes that the above identified risk in aquaculture development applies to all emerging nations where aquaculture is practiced.

2.6 Chapter Summary of Literature Review

The literature reviewed has shown that those countries which have nurtured innovative aquaculture practices by adopting fish farming have generated many employment opportunities. Equally aquaculture practices in most countries have not been enhanced in view of existing aquaculture technologies resulting in low productivity. Areas for further research are also identified e.g. factors affecting the growth and development of aquaculture in Kenya as identified by Mwangi (2008).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This section outlines the procedures that were used in conducting the study and the techniques used to obtain data. The chapter include the study area, research design, target population, sampling techniques, sample size, methods of data collection, data collection instruments, pilot study, validity and reliability of research instrument, data collection procedures, data analysis techniques/presentation and ethical consideration.

3.1 Study Area

The study was carried out in Uasin Gishu County which is part of the rift valley region, Kenya. It lies in the western part of Kenya in latitude between 0 degrees 03'South and 0 degrees 55' North and longitude 34 degrees 50' East and 35 degrees 37' West. It covers a total area of 3345.2 km². It borders Nandi to the West, Kericho to the South, Baringo to the North East, Elgeyo Marakwet to the East, Trans Nzoia to the North and Kakamega County to the North West (Appendix 4).

The county is a highland plateau. Altitude gently from 2,700 above sea level at Timboroa in the East to about 1,500m above sea level at Kipkaren in West (Uasin Gishu County Development Profile May, 2013). Administratively, the county is divided into three sub-counties namely Eldoret East, Eldoret West and Wareng. This is further comprised of six divisions namely Turbo, Soy, Ainabkoi, Moiben, Kessess and Kapsaret which are further subdivided into fifty-one locations as indicated in Table 3.1.

Table 3.1: Area of the county by sub - county

Sub-County	Area km²	No. of Division	No. of Location	No. of sub- location
Eldoret East	1,257	2	20	45
Eldoret West	1,090.8	2	17	29
Warreng	997.4	2	14	23
Total	3,345.4	6	51	97

Source: (KNBS, 2013)

The study area was chosen because Uasin Gishu County is a rich agricultural region which can be integrated with fish farming activities to increase pond productivities for more job opportunities, income generation and food security among others in the area. The county also has conducive environmental and climatic factors which can support aquaculture development in the region.

3.2 Research Design

This study adopted survey design this design was employed for this study because it helped to investigate relationship between variables. Survey studies make primary use of questionnaire and interview which this study opted to collect the data. Mugenda, O.M and Mugenda, A.G (2003) recommended design where the current status of a population was to be determined. Therefore the description of this research design matches with the objectives of this study as the study sought to investigate the relationship between adoptions of entrepreneurial strategies in aquaculture development for job creation in Uasin Gishu county Kenya.

3.3 Target Population

The target population for this study was made up of fish farmers in Uasin Gishu County, Kenya. According to the data available at the Department of Fisheries County Head Office Eldoret reveal that there are 1034 fish farmers spread across the county. Eldoret South sub-county had 360, Eldoret West sub-county 339 and Eldoret East sub-county 335 farmers who are active in their area of business for more than one year. (CPR, 2012).

3.4 Sampling Techniques

This study employed multi-stage simple random sampling and purposive techniques in selecting the respondents to be used in the study. In the first sampling stage the researcher clustered Uasin Gishu County into three blocks which represented the three sub-counties; Eldoret East, West and South. In the second stage of sampling the researcher again clustered the three sub-counties into blocks which represented wards. In the third stage of sampling, after the researcher realizing through data available at the Department of Fisheries Headquarters the total number of fish farmers in each sub-county of Eldoret East, Eldoret West and Eldoret South respectively, the study opted to adopt simple random sampling.

This sampling technique was used to ensure that the selected sample is the representative of the population. The purposive sampling was used to select the key informants (Fishery Directors, officials and other aquaculture experts).

Table 3.2 Sampling frame

Name of the Sub- county	Number of fish farmers
Eldoret East	335
Eldoret West	339
Eldoret South	360
<i>TOTAL</i>	<i>1034</i>

Source: County Progress Report (2012)

3.5 Sample Size

A sample is part of the target population that has been procedurally selected to represent it (Oso and Onen, 2009). According to Kothari (1985), Mugenda & Mugenda (1999) and Peter (1996) in a descriptive survey, a sample enables a researcher to gain information about the population. Cochran (1977) noted that a sample of 30% of the population is sufficient for the study. It is large enough to give adequate information and easy to analyze within a short period of time.

According to Mugenda and Mugenda (2003) a good population sample is between 10% to 30% of the entire population. Therefore the author of this study based on the information given by Cochran(1977); Mugenda and Mugenda (2003) and the formula given by Strattek 2012 to choose 30% of the target population of 1034 respondents whom the researcher thought to be sufficient enough to give required information and also easy to manage in respect to the available resources at hand. The sample size was therefore 310 respondents.

Table 3.3: Sample size based on 30% of the target population.

Category/Strata	Population(frequency)	Percentage (%)	Sample size
Eldoret East	335	30%	100
Eldoret West	339	30%	102
Eldoret South(Wareng)	360	30%	108
Total	1034	30%	310

Stattrek formula 2012

$$n_h = (N_h/N) * n$$

Where

n_h -Sample Size for stratum h

N_h - population size for stratum h

N - Total population size

n - Total sample size

Hence Sample size for Eldoret East sub-county was $(335/1034)*310=100.4$

Applying the formula to other Strata, the sample Size was as shown in Table 3.4

Table 3.4: Sample size based on Strattrek's formula

Category/Strata	Number	$n_h=(N_h/N)*n$	Sample size
Eldoret East	335	100.4	100
Eldoret West	339	101.6	102
Eldoret South (Wareng)	360	107.9	108
Total	1034	309.9	310

The sample was therefore consisted of 310 respondents selected from the target population of 1034 fish farmers.

3.6 Methods of Data Collection

The data collection in this study comprised of both primary and secondary data. Primary data consisted of originating data from the field for specific purpose of the study at hand. Secondary sources were employed through the use of previous documents or materials to supplement the data received from the questionnaires and information from interviews.

3.7 Data collection Instruments /Research Tools

Instruments used for data collection were questionnaire, interviews, personal observations and document analysis.

3.7.1 Questionnaire

The primary data was collected using questionnaires which were administered to the respondents at their homestead on face to face by the author and aquacultural extension agents who were in frequent contact with farmers and thus were knowledgeable about farming practices. These questionnaires contained both structured and unstructured questions. Structured questions were accompanied by possibly other alternatives from which respondent could pick an answer that describes the situation. Unstructured questions gave the respondent complete freedom of response and own words. The questions were based on the objectives of the study. The instrument was used because of its credit for flexibility in asking probing questions not beyond the focus of the study.

3.7.2 Interview Schedule

The interview schedule was administered to the Fishery Department officials, extension officers and other aquatic aquaculture experts to collect additional

information. The interview schedule makes it possible to obtain data required to meet specific of objective of the study, (Mugenda& Mugenda, 1999).

3.7.3 Observation Guide

In addition, the investigator gathered data through his own direct observation of relevant people, actions and situations under study and took notes of the observed phenomena without asking from the respondents. Some of the observed aspects included how farmers work as group and their partners, organize their workflow, delegate tasks, and respond to problems, pond management, treatment of customers and record keeping. The advantage of using this instrument was that it enabled the researcher to study behavior as they occur which respondents are normally unwilling or unable to provide. Observation assisted in validating and strengthening quality of the primary data collected.

3.7.4 Document Analysis

The researcher went through necessary documents within the study topics to obtain the secondary data. Documents analysis was done at the Department of Fisheries Eldoret Town, Moi University library, National library Eldoret, University of Eldoret and from internet. The secondary data sources were employed to supplement the data received from questionnaires.

3.8 Pilot Study

Before collecting the data required for the study, the researcher carried out a pilot study to establish the reliability and consistency of the main research tool, the questionnaire. The questionnaires were piloted to fish farmers in Lugari Sub - County of Kakamega County.

The area was chosen because it neighbour the Uasin Gishu County to the North West and researcher hoped that the farmers in that area had similar characteristics with the target population. Piloting was conducted to check the questionnaire content, structure, sequence, meaning and ambiguity of questions. This also ensured that the questionnaire was able to provide the same result as questions that needed clarification were dealt with appropriately.

The questionnaire was pretested by administering it to a sub-sample of 30 respondents which was 10% of the sample population. According to Mugenda and Mugenda (2003), content validity is determined by a professional or expert. The researcher therefore amended the questions in consultation with the supervisors to ensure that they accurately addressed all possible area of the study.

3.9 Validity Testing

This study relied on content validity test procedure to ensure the instruments measured what they are supposed to measure. To check on validity of research instrument, it was presented to experts in the Department of Fisheries within the sub-counties for further perusal, the consultation with the supervisors, the researcher peers and colleagues as well as the piloting that was made and their recommendations were incorporated in the producing the final data collection instruments.

The purpose of this was to rid the instrument of unclear direction, vocabulary and sentence structures that might have been poorly constructed, improperly arranged, ambiguous or inappropriate for the outcomes being measured, (Gupta, 2007).

3.10 Reliability Testing

This refers to the extent to which findings can be replicated by another researcher (Silverman, 2005). Reliability is very important in any research because it enable the researcher to identify the ambiguities and inadequate items in the research instrument. Reliability in this study was measured through test retest technique where the same test was given to a group of 30 respondents in similar characteristics as the actual sample.

The tests were repeated after one week interval and score obtained were correlated to get the coefficient of reliability. Cronbach alpha was used for computation and reliability coefficient of 0.87 was obtained which implied that the instrument was 87% reliable. Coefficient of above 0.8 implies that there is a high degree of reliability of the instruments as is supported by Mugenda and Mugenda (2003) and also by Kline (1999). Therefore the instrument was reliable and consistent to answer the research questions of the study. Ambiguous words and irrelevant items were edited to enhance reliability of the instrument.

3.11 Data Collection Procedure

The researcher obtained introduction letter from Moi University, School of Human Resource Development (SHRD) showing that he was abonafide student then proceeded with this letter to the National Council of Science and Technology for research permit and authority that the study may be carried out. After this, the researcher again obtained an introduction letter from County Director of Education and Ministry of Fishery Department Head Office, Eldoret to operate in the area.

The researcher booked appointment with fisheries extension officials through their fishery director to help in identifying the respondents (fish farmers) in their various sub- counties. The researcher together with extension officials visited each sub-county and personally sampled and administered the questionnaires with their assistance. Further to that, to ensure that all participants were provided with the information, the researcher developed a script (cover page), which was printed on the front page of the questionnaire set, which the respondents were requested to read carefully, before responding to the questionnaire (Appendix 1). Those who were in doubt were guided accordingly on how to respond and assured of confidentiality after which they will be given the questionnaires to fill. This process also eliminated any doubts regarding the intentions or purpose of the questionnaire.

3.12 Data Analysis Methods

The data collected were analyzed using qualitative and quantitative techniques. Qualitative data were analyzed using content and thematic categorization. Quantitative data were analyzed using both descriptive (frequency tables and percentages) and inferential statistical techniques (Chi- Square) test. The Chi-Square test was used to test the hypotheses at $P=0.05$ level of significance.

Data was analyzed with the aid of Statistical Package for Social Science (SPSS) software and results presented descriptively in form of tables and graphs. This is the simplest way to present data, (Orodho, 2005). This gave a clear and more understandable presentation of the data obtained.

3.13 Ethical Consideration/Issues

Before the study, consent was sought from the respondents before embarking on the interviews. Respondents were told what is expected out of them including what they ought to do. The researcher assured the respondents that all the information provided on their identity, organization and age should be kept confidential from other respondents. The researcher also informed the respondents that caution would be taken against coercing respondent into participating into the study.

The researcher assured that all the risks and the benefits of the study must be shared with the respondent. Care must be taken if there are elderly or sick people involved. The dignity of the respondents must be taken preference and they should not be exploited in any way or simply used for the purpose of the conducting the survey. The researcher also assured that all communication was clear and there was no ambiguity. Respondents must receive copies of informed consent form and must be informed of the outcome of the study.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the research findings to investigate adoption of entrepreneurial strategies in aquaculture development towards job creation in Kenya with reference to Uasin Gishu County. Descriptive statistics (frequency tables and percentages) and inferential statistical (Chi-square) techniques were used to analyze the data.

The research involved face to face interviews with the respondents in their homesteads. Most of the respondents were identified by the researcher with the assistance of fishery officials in their various sub- counties.

4.2 Data Analysis and Interpretation

This section presents the analysis and interpretation of data. Table 4.1 shows the response rate of respondents.

Table 4.1: Response rate in percentage.

Sub County	Distributed questionnaires	Non Returns	Usable questionnaire	Percentages
	No	No	No	%
Eldoret East	100	6	94	94%
Eldoret West	102	12	90	89%
Eldoret South	108	12	96	89%
Total	310	30	280	90.3

As shown in Table 4.1 the responses rate from respondents in each sub counties was commendable as only (9.7%) failed to respond to the questions. The high response rate was achieved as there was good coordination between the researcher and the fishery officials in administering the questionnaires to the respondents (Figure 4.1).

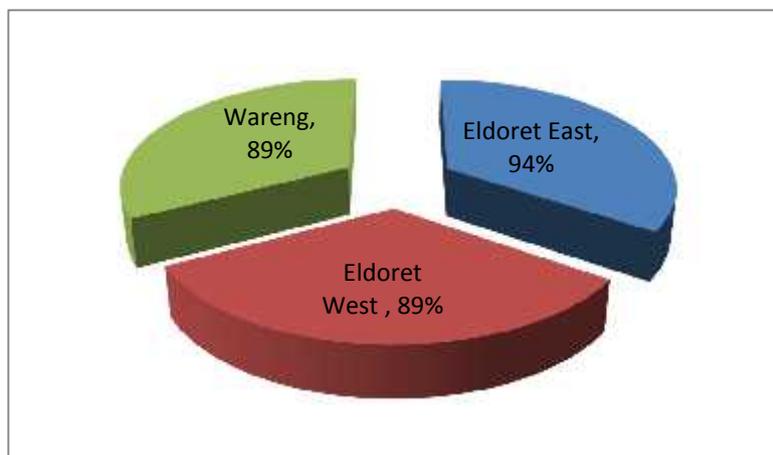


Figure 4.1: Distribution of Questionnaires

4.3 Demographic Characteristics of the Respondents

Table 4.2 presents data on characteristics of respondents.

Table 4.2: Characteristics of respondents

Category	Frequency	Percent
Gender		
Male	187	66.8
Female	93	33.2
Total	280	100
Level of Education		
No formal Education	43	15.4
Primary	72	25.7
Secondary	121	43.2
Tertiary institution	25	8.9
University	19	6.8
Total	280	100
Marital Status		
Single	82	29.3
Married	171	61.1
Divorced	10	3.6
Total	280	100
Professional Level in Fishing		
No professional level	247	88.2
Certificate level	17	6.1
Advanced certificate	10	3.6
Diploma	6	2.1
Total	280	100
Capital to start Fishing		
Personal Saving	169	60.4
Friends	17	6.1
Relatives	10	3.6
Cooperatives	13	4.6
Bank loans	12	4.3

Government support	59	21.1
Total	280	100
Future of Fish farming		
Will decline	13	4.6
Is sustainable	118	42.1
Will grow	149	53.2
Total	280	100
Government/ local Authorities Support		
Training programmes	159	56.8
Credit	10	3.6
Technical advice (extension service)	109	38.9
Market to sell	2	0.7
Total	280	100

As is indicated in Table 4.2 the majorities (66.8%) of respondents interviewed were male but this does not mean that there were no female involved in fishing farming. As most respondents were married and due to cultural factors, it was the men who took it upon themselves to respond to questions about any ventures that were undertaken by their households.

Education is an important factor in changing attitude and motivation of an individual. Respondents level of education (Figure 4.2). Approximately three quarters of the respondent had received acceptable level of formal education ((can at least read and write and solve simple arithmetic problems. Many 15% of fish farmers are still illiterate, yet have become entrepreneurs in aquaculture. Some well- educated (middle level and above) individuals have also adopted fishing profession.

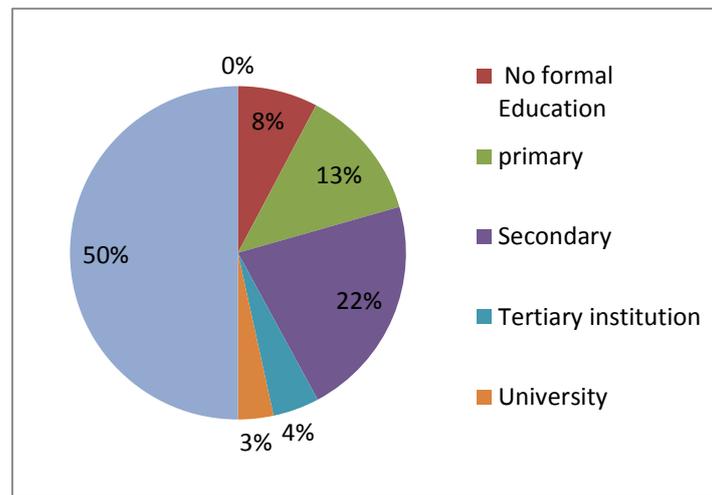


Figure 4.2: Respondents Level of Education

Majority (88.2%) of the respondents in the study area had no professional skills, 6% had certificate, 4% had advanced certificate and 2% had diploma (Figure 4.3). Professional skill plays a key role in enhancing high productivity and lower the production cost of the firm. There was therefore a need for the government to hire more qualified extension officers or retrain those in place to be able to assist the farmers in attaining the knowledge. This will make them more competencies in their business enterprises.

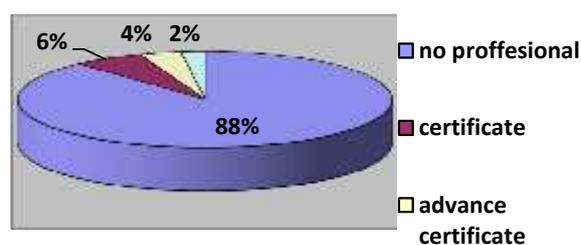


Figure 4.3: Professionalism in Fish Farming

Majority (60.4%) of the respondents used their own funds to start their own fish farming business, while 21.1% obtained startup capital from Economic Stimulus Program (ESP). The rest 6.1% raised money from the friends, 4.6% raised money from cooperatives, 4.3% from the bank and 3.6% from the relatives (Figure 4.4). The high rate of respondents using their own funds as startup capital indicates that farmers mobilize their earning for re-investment in the venture. The low rates of respondents getting capital from the bank indicate that the banks charge high rate of interest on loans. This study suggests that banks should be advised to lower interest rates in order to encourage the farmers get credit to buy inputs for their business activities

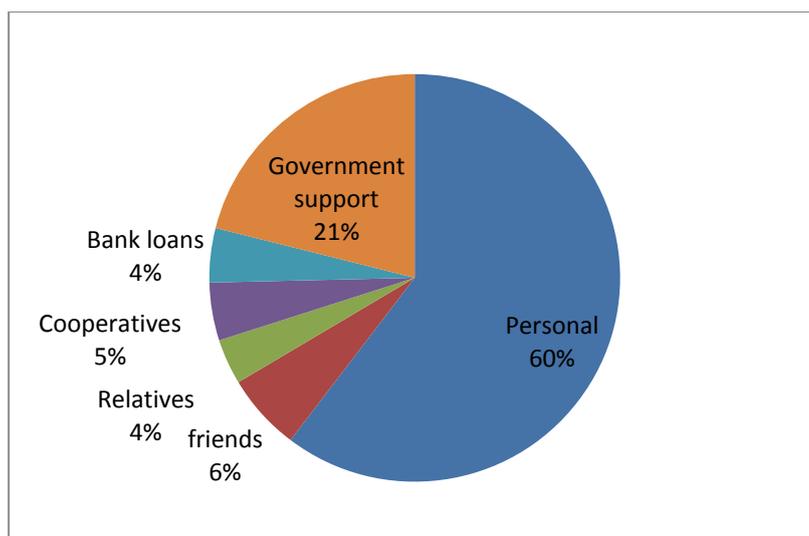


Figure 4.4: Capital to start Fish Farming

It was established that most (53.3%) of the respondents were optimistic that fish farming as a venture will grow from small scale to commercial one, 42.1% revealed that it was sustainable because harvesting of the fish pond was throughout the year while 4.6% indicated that future of fish farming will decline (Figure 4.5). The respondents further cited like provision of information by the government and the fingerlings as an indicators for growth and sustainability of the fish farming venture in the study area.

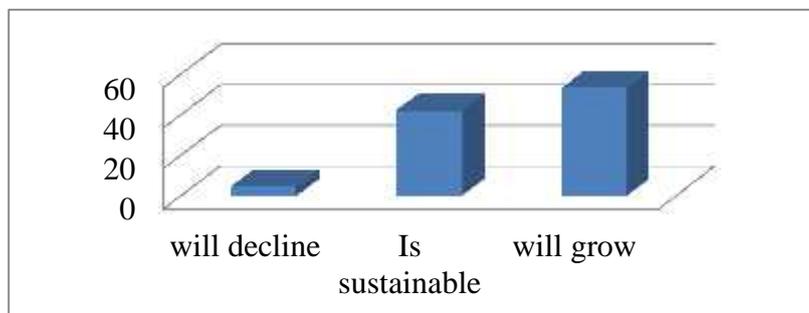


Figure 4.5: Future of Fish Farming

Most (56.8%) of the respondents were being supported by the government in training programme, 38.9% supported in technical advice (extension service), 3.6% supported with credit and 0.7% were supported in marketing to sell the fish (Figure 4.6). It was also observed from the study that farmers were more knowledgeable about pond management for example dispose of waste from their fish farms. However farmers faced with problems in marketing of their products which requires government intervention.

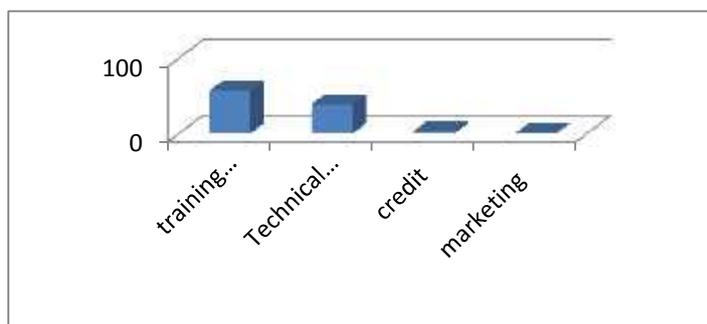


Figure 4.6: Government / Local Authorities Support

4.3.1 Characteristics of Aquaculture Enterprise

Table 4.3 presents data on characteristics of aquaculture enterprise.

Table 4.3: Characteristics of aquaculture enterprise

Category	Frequency	Percent
Methods of Fish Farming		
Cages	13	4.6
Ponds	267	95.4
Total	280	100
Land Used		
Owned land	222	79.3
Leased	58	20.7
Total	280	100
Fingerling Availability		
Yes	98	35
No	182	65
Total	280	100

Data presented on Table 4.3 shows that the majority (95.4%) of the respondents used pond culture as a way of rearing fish in their homesteads and only minority 4.6% practice cage culture. 79.3% used their own land to rear fish. During the study it was further observed that almost all the fish ponds measured about the same size i.e. 300m² feet and a depth of 4 feet slope to 6feet. All farmers who benefitted from Economic Stimulus Program (ESP) of the government of Kenya received 1000 fingerlings.

Majority (83.3%) of respondents grow tilapia, with minority 16.7% growing mud fish. This differ with FAO report (1997) which indicate that in Nigeria, the African cat fish have overtaken tilapia as a preferred cultured species and common cap production in Egypt is in decline in preference to indigenous Nile tilapia. Asked why they prefer tilapia to mudfish majority most indicated that tilapia is more delicious than mud fish and it can survive in any condition. However, some of them said that the shape of the mouth of the mudfish is like that of a cat thus not attracting to many.

It was also noted from the study that majority (65%) of the respondents expressed that fingerlings was a problem in their area of operation. This implied that the Economic Stimulus Program (ESP) introduced by the government of Kenya to support the farmers with quality seeds to stock their ponds had declined and yet the farmers were not well informed with the technology of breeding and hatchery in the study area. This could adversely have an impact on fish sustainability in the region. Those accepted availability included one farmer in Moi's bridge who had six fish ponds including his own breeding hatchery.

4.4 Entrepreneurial Strategies in Fish Production

The first objective of the study sought to examine the relationship between adoption of high growth strategies in aquaculture development and job creation. The findings were summarized in Table 4.4

Table 4.4: Distribution of respondents based on high growth strategies

Category	Frequency	Percent
HIGH GROWTH STRATEGY		
Product Penetration		
Pricing	141	50.1
Promotion	118	42.1
Distribution	21	7.5
Total	280	100
Market Development		
Research	120	42.9
Promotion	95	33.9
Competition	60	21.4
I don't know	5	1.8
Total	280	100
Product Development		
Quality	217	77.5
Customer Value	46	16.4
Performance	16	5.7
Any other	1	4
Total	280	100

From Table 4.4 it is noted that the sale indicators for high growth in aquaculture development in the study area included product penetration, market development and product development. The product penetration in the study area was dictated by the market forces. It was found from the study that in the product penetration, majority(50.4%) of the respondents expressed that they use pricing, 42.1% used promotion and only 7.5% used distribution as a way of increasing their sales. This implied that product penetration in the study area was dictated by the demand.

It was further established that when the demand for the product was high, for example during the dry season, the farmer employed skimming pricing strategy to charge price for their products. In this strategy, the farmer charged high price because the demand for the product was very high. The high price was employed to maximize the returns of initial funds and gradually decreases it when the competitor starts appearing in the market. This helped in clearing off the remaining stock to increase the market share.

This concurs with Tellis (1986) that penetration pricing strategy aims at exploiting economies of scale or experience, while Dean (1976) state that skimming is the best strategy which involves charging a high introduction price which is subsequently lowered. However the low rate in distribution strategy indicates that farmers need to be sensitized in distributing their product in the right place and at the right time. This will help in accelerating the sales for more profit for enterprise growth and expansion. Hence more job opportunities for the residents in the study area.

Under market development most (42.9%) of farmers used research as a strategy for Sales, 33.9% adopted promotion, 21.4% employed competition and only 5% did not know any indicator to use. This showed that a good proportion of the fish farmers found new markets for their products through research. The research might be through research centre, fieldwork, attending shows and doing marketing among others. It was also through market development strategy that fish farmers increased their market share of their products hence more profit. This profit can result to creation of new enterprises, their sustainability thus creating more job opportunities. In addition, to accelerate more sales several promotional activities need to be conducted for example communicating the product advantage and influencing customer to buy the product.

In the product development majority (77.5%) of the respondents indicated product quality as a strategy, 16.4% showed customer value and 16% used performance as a strategy. Product quality had been thought to affect entry pricing. This finding is in line with Bagwell and Riordan (1991) who argued that the most efficient way for the firm to signal high quality of new products is to charge high introductory prices. However as consumers become more informed about the product's quality, the price distortion lessens.

In the light of this study it implies that the quality of the products motivate the customers to make more purchase of fish product and at the same time quality of the product act as a catalyst in convincing customers to buy the product at high price. This increases the sales volume hence more profit for business expansion and more jobs created in the study area.

4. 5 The Adoption of Innovative Strategies

The second objectives of this study sought to determine the relationship between the adoption of innovative strategies in aquaculture development and job creation.

The results are presented in Table 4.5.

Table 4.5: Distribution of respondents based on innovation

Category	Frequency	Percent
If adopted New Innovation		
Yes	184	65.7
No	96	34.3
Total	280	100
Cost of Adoption		
High	101	36.1
Medium	106	37.9
Low	73	26.1
Total	280	100
Source of Adoption		
Research Centre	77	27.5
NGOs	7	2.5
Extension staff	152	54.3
Knowledge based	44	15.7
Total	280	100
If any Technology Adopted		
No	40	14.3
Yes	240	85.7
Total	280	100
Technology Adopted		
Pond construction	82	29.3
Pond maintenance	58	20.7
Stocking of pond	44	15.7
Harvesting of fish	30	10.7
Transport of fingerlings	22	7.9
Fish preservation/ processing	44	15.7
Total	280	100
Accessibility to New Technology		
Creativity	101	36.1
Extensional officer	122	43.1
NGOs	12	4.3
Training	45	16.1
Total	280	100

4.5.1 Adopting New Innovation

In a changing and competitive environment, innovation is a key factor for any business survival. It focuses on increasing productivity and developing technology by reducing costs and also acting as challenger to the competitors. It is observed from

Table 4.5 that majority (65.7%) of the respondents had accessed (adopted) new innovation. Only 34.3% had not adopted. This high rate of adoption was as result of high cost of fish feed and lack of readily available quality and affordable commercial fish feeds. The (33.4%) included those who were able to afford commercial feeds and those who did not know more about innovation and have closed down their ponds.

During the field survey, it was also observed that various innovation activities had been adopted in the sector. However the most common innovation adopted was feed formulation as compared to other innovations such as fish harvesting, opening of new markets, packaging finding of source of supply and pond management among others. The feed formulation in the study area included chickens waste, compost manure, cow dung, pig manure, mixture of maize and millet then grinded, dried ants, brewery waste and green leaves among others.

During the interaction with the respondents, majority expressed that the commercial fertilizer that was available was too expensive to afford and had little effect on the growth rate of their fish in the ponds and called for the government intervention. The innovation in fish harvesting involve the use of nets that cater for every size of fish in the pond during harvesting and also when the fingerlings are required by the farmer (Figure 4.7)



Figure 4.7: Innovation in Fish Harvesting

4.5.2 Cost of Accessing Innovation

As indicated in Table 4.5 most (37.9%) of the respondents indicated that the cost of adopting new innovation is medium, 36.1% high and 26.1% low. This implies that the adopted innovation was appropriate and cost-effective in that most of the material that were used did not involve more transport cost. The ingredient of the feed meals was obtained within the farm. This resulted to the sustainability of the enterprises in the study area.

4.5.3 Sources of Adoption

Majority (54.3%) of the farmers indicated that they adopted the new innovation through extension staff, 27.5% through research centre's 15.7% acquired through knowledge based and only 2.5% attained through NGOS. This high rate of adoption was as a result of extension staff visiting the farmers on a frequent basis and giving them technical advice on fish farming in the county. This was also observed during the field study the extension officers moving round to fish farmers in their homesteads

and giving them some technical advice about pond management in stocking and maintenance. However, the study revealed through department of fishery office that the county needs to hire more qualified staff in the sector to meet the growing number of fish farmers in the region.

4.5.4 If adopted any Technology

The data in Table 4.5 shows that majority (85.7%) of respondents indicated that they have adopted new technology, 14.3 % indicating that they have not adopted the technology. This high rate of adoption is a result of educational level of the respondents. As it was observed earlier, majority of the respondents had minimum academic qualifications that stimulate the uptake of new technology. The findings further borrow heavily on a study done by Meena et al 2002, that an educated farmer is more likely to adopt technology than uneducated one.

4.5.5 Technology Adopted

Most (29.3%) of the farmers had adopted technology in pond construction (Figure 4.8) where off cuts and polythene paper are used to raise the pond instead of digging. In this technology big space is not necessary at the same time it is not important that the farm should be located in swampy areas. 15.7% in fish preservation, 10.7% in harvesting and 7.9% in transport of fingerling. The results indicate that although the rate of adopting technology is low, but at least there was technology adopted which still require some more improvement.

Other technologies adopted included pond maintenance, stocking of the pond and feeding. The study suggests that technology adopted should be profitable to farmers. This would enhance growth in the sector and result in employment opportunities for residents in the study area.



Figure 4.8: Technology in Pond Construction

4.5.6 Accessibility to New Technology

As shown in Table 4.5 most (43.1%) adopted new technology through extension officers, 36.1% through creativity, 16.1% through training and only 4.3% by NGOS. These results show that for the fish farmers to increase production they require the capacity building in training programmes and demonstrations, followed by group discussions and field visits. These will improve their skills in accessing new technology that will spur production.

4.6 Risk Taking Propensity in Aquaculture Development and Job Creation

The third objectives of this study sought to evaluate the relationship between risk taking propensity in aquaculture development and job creation.

The findings are presented in Table 4.6

Table 4.6: Distribution of respondents based on risks taking prosperity

Category	Frequency	Percent
Rating of Risk Taking		
High	52	18.6
Medium	155	55.4
Low	73	26.1
Total	280.0	100.0
Sources of Risk		
Disease	140	50.0
Accidents	39	13.9
Poaching	53	18.9
Overproduction	48	17.1
Total	280	100.0
How to Counter Risk		
Quality fingerlings	122	43.6
Disease control	131	46.8
Fishing gear	15	5.4
Research	12	4.3
Total	280	100

4.6.1 Risk Taking Propensity

The data in Table 4.6 reveals that majority (55.4%) of the respondents expressed that the rate of risk taking in the venture was medium, a good proportion of respondents 26.1% expressed low and only 18.6% expressing high. The medium risks in the venture were predation, accidents, diseases and oil spill. These risks could be controlled by the farmers by putting in place the necessary measures for example through fencing, medication and monitoring of the fish in the ponds during daytime to protect them from predation.

The study found that although these risks occur, their occurrence had little effect on the business profitability. The low risks also implied that the farmers were risk takers and at least had some knowledge in risk management for example site selection of the fish pond, stocking of the pond and culturing of the best species. The high risk was attributed to extreme climatic and meteorological conditions like floods, drought, and earth quake and pond siltation. When these risks occur they have strong force on the enterprise for example damage of the pond structure and allow the fish to escape confinement, changes quality of water on the farm and introduce predators into the farm or new pathogens.

4.6.2 Sources of Risks

With regard to sources of risks, majority (50%) of respondents indicated that the sources of risks in their venture were from diseases 13.9 % accidents, 18.9% poaching and only 17.1% indicated production. These results revealed that farmers need to be informed to adhere to laws and regulations regarding the movement, handling and marketing of diseased stocks so as to reduce the risk of spreading the disease. Other sources of risks identified during the study included oil spill and theft.

Through observation one farmer was cited saying:

“She woke up in the morning and found chemicals poured on the water body thereby killing the fish and rendering the water body lifeless in the pond”.

Farmers also expressed that they faced market and consumer related risks such as loss of product quality, lack of market information, loss of consumers appeal. These risks affected both consumers and the marketing middlemen hence a negative influence on the profitability of the enterprise which could enable them obtain more profit for business expansion and to save in the bank.

4.6.3 How to Counter Risks

Most (46.8%) of the farmers indicated that they counter the risk through disease control, 43.6 % through quality fingerlings, 5.4 % through fishing gear and only 4.3% through research. This implied that the farmers had some technical management skill in managing their fish pond. Asked to name some of the diseases majority indicated that the parasite and the pathogen in water affected the fish body causing them to die.

4.7 Job Creation in Fish production in the Study Area

With regard to job creation in the study area the researcher investigated the source of employees and nature of jobs practiced by both male and female. The summary of the findings are as shown in Table 4.7

Table 4.7: Distribution of respondents based on source of employees and the nature of Jobs practiced.

Category	Frequency	Percent
Have you Employed any Employee in your Enterprise		
Yes	80	28.6
No	200	71.4
Total	280	100
Sources of Employees		
Hire	136	48.6
Family labourer	144	51.4
Total	280	100.0
Nature of Jobs Male Do		
Manual Jobs		
Feeding	152	54.3
Weed control	46	16.4
Pond construction	64	22.9
Harvesting	17	6.1
Any other	1	0.4
Total	280	100
Managerial Jobs		
Organizing	112	40
Planning	82	29.3
Control	86	30.7
Total	280	100.0
Nature of Jobs Female Do		
Manual Jobs		
Making feed mix	225	80.4
Cleaning ponds	38	13.6
Any other specify	17	6.0
Total	280	100
Professional Jobs		
Marketing	143	
ICT	21	
Pricing	7.5	
Record keeping	9.5	
Total	33.9	
	100	

Managerial		
Organizing	112	40
Planning	82	29.3
Control	86	30.7
Total	280	100.0

If Jobs Sustainable		
Yes	186	66.4
No	94	33.6
Total	280	100.0

If Fish Farming main source of Income		
Yes		
No	59	21.1
Total	221	78.9
	280	100.

If Fish Farming is profitable Business		
Yes		
	164	56.8
No	116	41.4
Total	280	100

Created any New Enterprise		
Yes		68.9
No	193	31.1
	87	
Total	280	100

4.7.1 Source of Labour

Most of the fish farmers approximately 51% run their own fish farms, while others get their spouses and children to assist in running the fish farms. Through observation the study noted there was a delegation of duties among the family members. Children were specifically assigned the mixing the compost, the woman was assigned feeding

while the man was there for any physical work and also attend to problem that a rise in the farm.

The most (28%) of the respondents employ other people to assist them because they still hold day jobs, most of them as public servants for example teachers in the study area. The hired labour are on casual basis and assist in cutting of grasses around the pond, pulling of weeds along the bank of the pond, applying feed and manure, harvesting, pond construction and watching pond from the predators.

4.7.2 Nature of Jobs Done by Male

Manual jobs

As shown in Table 4.7 majority (54.3%) of men do feeding of fish, 22.9% do pond construction (Figure 4.9) under the supervision of aquaculture experts, 16.4% do weed control and 6.1% do harvesting. The results show that feeding in fish farming is a determining factor in production cycle since it influences the size, maturity and the quality of the fish. During the field study it was found that in most ponds feeding was done twice in a day.



Figure 4.9: Work done by Men in Aquaculture

The majority (51.4%) of the respondents indicated that men do planning, 30.7% do control and only 17.9% do organizing (Figure 4.9.1). These findings reveal that men in their farms takes the responsibilities of decision making, do procurement of inputs and to some extent prepare business plan which was noted to be very rare in business.

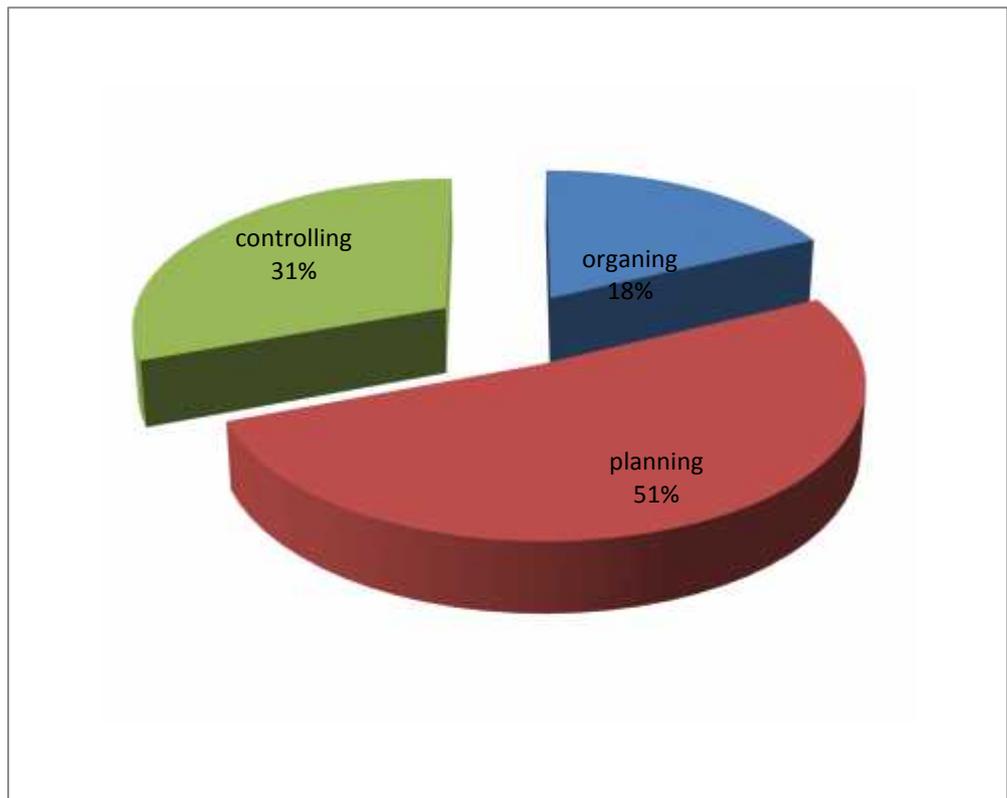


Figure 4.10: Managerial Jobs

Professional jobs

The respondents were asked to indicate the professional jobs done by the men. Majority (51.1%) indicated that men do marketing, 33.9% do pricing, 7.5% do both ICT and record keeping. These findings show that men are the ones who look for markets for their products. However, minority (7.5%) in both ICT and record keeping indicate that majority of the fish farmers do not keep the records for their enterprise and most of them have not embraced ICT. This was confirmed through observation that no record could be seen nor computer for enterprise data base by the farmers. Record keeping and ICT in businesses can help business owners in traceability of business activities that result to sustainability of the business enterprise. Thus there was need for the fish farmers to be accessed to this technology

4.7.3 Nature of Jobs Done by Female

Manual jobs

As indicated in Table 4.8 majority (80.4%) of the respondents indicated female do the work of making feed mix, 13.6% do cleaning of the ponds. This was evidenced by the field study which through observation noted women mixing fish feed for example chicken waste and cow dung manure. Other role observed through observation that women do on their fish farm included guarding of ponds from poaching during day time for example from poaching which included kingfishers and other birds.

Professional jobs

Most (51.1%) of the female fish farmers do marketing, 33.9% pricing, 7.5% do both ICT and record keeping. The low rate of respondent in ICT and record keeping was also observed under men. It is evident that there is a real need for the government to provide capacity building in this area. This would help the farmers move from analogue to digital. The farmers would also be better able to obtain information on fish farming from wider social network thus enhancing business sustainability.

Managerial jobs

The most(40%) of the fish farmers indicated that women do the work of organizing, 30.7% of planning and only 29.3% do control (Figure 4.9.2). This is an indication that women organize the feed for their fish in the ponds. During the survey it was noted that three quarters of the women time is in their homestead and most of the ponds are situated within the homestead. This concurs with FAO (1985) report that homestead fish farming is the most suitable option for women to be involved in, since it does not require them to be a way from their homes for long periods which might force them to neglect their household or domestic responsibilities.

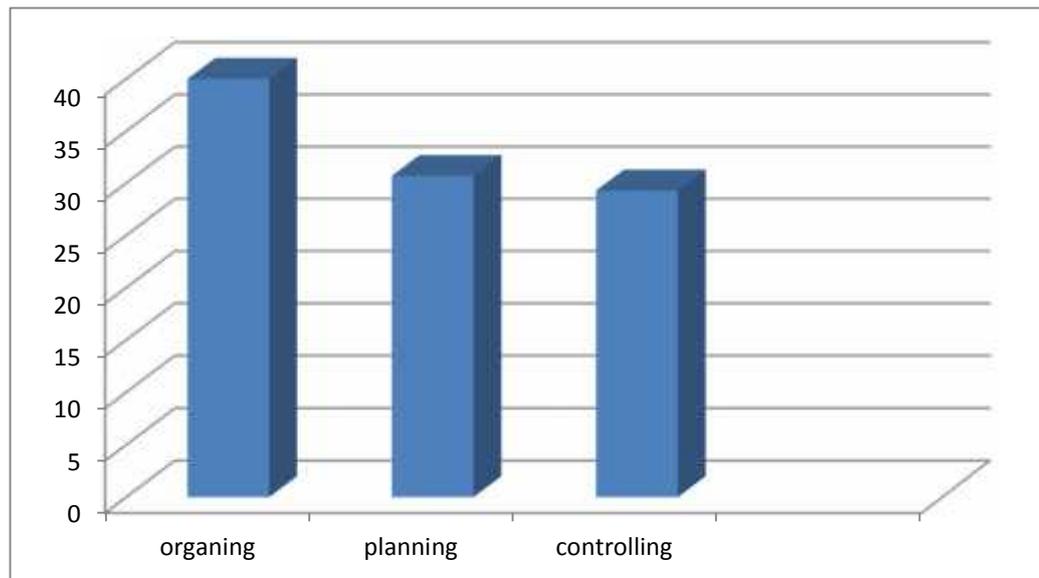


Figure 4.11: Managerial Jobs

With regard to sustainability of the jobs, majority (66.4%) showed that the jobs are sustainable, only 33.6% indicated that jobs are not sustainable. This implied that the jobs in the industry could last for a long period of time. This is as result of fish farming activities being done all year round as compared to agriculture which is done only once in a year. In addition, the integrated aquaculture system practiced by the farmers together with the technical advice from extension services further enhances farms sustainability.

Asking the respondents to state whether fish farming is the only source of income, majority (78.9%) of the farmers showed that fish farming is not the only source income, 21% indicating that the venture is the only source of income. Asked to name some of the other sources of income, the respondents indicated small scale dairy and poultry keeping, cultivation of land for crop production around the pond and bee-keeping. The farmers revealed that it was cheaper for them to get information about poultry and dairy farming than obtaining information about fish farming.

About the profitability of the venture, majority (58.6%) of the respondents indicated that fish farming is profitable venture while on the contrary 41.4% indicated that they have not yet profited from their ventures and have closed down their ponds. They cite lack of support from government in terms of fingerlings, affordable fish meals, credits and predators among other reasons for closing down their fish ponds. This was also evidenced during survey one farmer complaining that he stocked his pond with fingerlings but to his surprise he came to realize that nothing was in the pond instead the pond was full of the frogs which were believed to have eaten the fingerlings.

From the field study one farmer was quoted saying:

“The income generated from the enterprise is allocated to household goods, create new enterprises and others spent for school children and nothing is saved in the bank although the business is rewarding and viable”.

However the study did not observe any records on how the books of accounts about the business enterprise were kept.

4.8 Other Information in Fish Farming

The researcher also attempted to gather data that is related to fish farming in the study area. The summary of the findings are shown in Table 4.8

Table 4.8: Distribution of respondents based on other information

Category	Frequency	Percent
How you Dispose off Water from your Pond		
Through the Municipal waste system	37	13.2
Drain it into a nearby river/ lake	136	48.6
Recycling solids and used as a fertilizer on land	107	38.2
Total	280	100
Technical Information to take care Fishing		
Farming		
Yes	210	75
No	70	25
Total	280	100
If aware of the Laws Governing Fish Farming		
Yes	122	43.6
No	158	56.4
Total	280	100.0

Data presented on Table 4.8 shows that the most (48.6%) of the respondents drained water into nearby river, 38.2% recycled solids and used it as a fertilizer on land and only 13.2% disposed it through the municipal waste system. The implication was that some of the fish farmers had not known the technologies of recycling solids and using it as a fertilizer in their fish ponds. If this innovation could be adopted then there would be high productivity on agricultural crops because fish leave some productive nutrients in these solids during production time. This can create more activities at the farm level hence more employment creation.

With regard to technical information on fish farming, the majority of the respondents 75% expressed that they felt well informed on the technical aspect of fish farming, 25% felt that they did not have adequate information on fish farming.

Among the reasons given was lack of support from government and majority were in interior so accessibility to resources like newspapers, journals, and internet which could update them with current information about aquaculture practices was a problem. This is due to lack of knowledge hence low productivity. The other challenges that were noted during the interaction with fishery officials that faced the sector were; poor roads, lack of enough staff, inadequate transport system for example vehicles and motorcycles. They called for the government to help them in these areas.

In terms of laws governing fish farming, majority (56.4%) of fish farmers indicated that they are aware of laws governing fish farming in the study area. Approximately 43.6% indicated that they were not aware of these laws and they would like to be made aware of these laws. This concurs with Balarin (1985) who opined that in African countries where aquaculture was not protected by law, legislation governing other activities which impact one way or the other on aquaculture tend to hinder its development.

4.9 Hypotheses Testing

To test the research hypotheses, chi-square test was used. The statistical test was chosen to judge the significance at $P=0.05$ of the entrepreneurial strategies as contributes to job creation in the study area. The chi- square is a statistical test used for analyzing non-metric data which this study collected. The summary of which are presented in Table 4.9

Table 4.9: Summary of Chi-Square Performed.

	High growth	Innovativeness	Risk Taking
	Number of jobs	Sustainability	New enterprise
Chi-Square	51.429b	10.400a	63.479a
Df	1	2	1
Sig	.000	.006	.000

Hypothesis 1 Testing

The first null hypothesis (H_{01}) stated that high growth strategies have got no significant link on number of jobs created. Alternative hypothesis was that high growth strategies had a significant link on number of jobs created; Table 4.9 show the results of the chi-square test. From findings in the Table 4.9 above the p-value for the chi-square test is ($\chi^2 = 0.000$) which is less than 0.05 indicating that at 5% level of significance, we reject the null hypothesis and conclude that high growth strategies had significant link with the number of jobs created. This confirm that when the fish enterprises expand in terms of sales, there is growth in the market shares that result in economies of scale thus more employment opportunities in the study area.

Hypothesis II Testing

The second null hypothesis stated that innovativeness had got no significant link on enterprise sustainability. Table 4.9 reveals the result of the chi-square testing the link that exists between innovativeness and enterprise sustainability. From the findings the

p- value of the chi-square test is ($\chi^2 = 0.006$). Since the p- value is less than 0.05, it can be concluded that at 5% level of significance, innovativeness had significant link on enterprise sustainability. The null hypothesis was therefore rejected and accepts that there exist significant link between innovation and sustainability. This support the data findings that majority (65.7%) had adopted new innovation in the study area. The high rate of adoption was as result of high cost in production that was likely to affect enterprise sustainability. This finding concur with that of Len and Chen (2007) who state that innovation is a dominant factor for firms competitiveness, fuel organizational growth, drives future success and is the engine that allow business to sustain their viability in global economy.

Hypothesis III Testing

The third null hypothesis stated that risk taking propensity has got no significant link on creation of new enterprises. Therefore we reject the null hypothesis and accept that risk taking propensity and new enterprises had very significant link at 0.05 level of significance ($\chi^2 = 0.000$). This is strong evidence that risks identified in the study area were minimal and had very little impact on the profitability of the enterprise. This is also supported by the findings that (55.4%) of the respondents indicated that risk taking in their venture was medium thus do not disrupt the production process. An increase in profitability is necessary for sustainable future for fish farming. This can result into creation of new enterprises hence more employment opportunities in the study area.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This study aimed at investigating the adoption of entrepreneurial strategies in aquaculture development towards job creation in Uasin Gishu County, Kenya. The chapter therefore highlights the research outcomes under various headings that includes summary of findings, discussions, conclusions and recommendations derived from the study. The findings and conclusions are drawn in line with the specific objectives of the study. Finally are recommendations for further research.

5.1 Summary of Findings

The results of the study indicated that there were three indicators used for high growth in the aquaculture development for job creation in the study area. These were product penetration, market development and product development. The study found that pricing, research and product quality were the most employed strategies to accelerate sales volume in their business enterprise.

The study found that various innovative practices had been practiced in the study area. The study revealed that the cost of accessing these innovations was medium thus cost effective. The source of adoption was through extension officers. The study further established that majority of the farmers had adopted new technology in pond construction. This was a result of having acquired minimum qualification that stimulated technologies uptake.

The results of the study revealed that the risks taking in the venture was moderate and their occurrence had little effect on the business profitability. The sources of the risks were from diseases, accidents, poaching and production. The study found out that the risks were encountered through disease control, fingerling and research.

5.2 Discussions of the Study Findings

The study sought examined adoption of high growth strategies in aquaculture development for job creation. The results of the study revealed that in the high growth strategies, three indicators were used in accelerating enterprise sales. These were product penetration, market development and product development. In the product penetration, pricing strategies (50.4%) was the most strategy applied by the farmers. These included price skimming and price penetration.

Price skimming strategy was employed to charge high price when product was still fresh. Dean (1976) concurs with this findings that skimming pricing strategies involve charging high price which subsequently is lowered. The author stated that the rationale of this strategy is to skim the surplus from the customers early in the product lifecycle to exploit monopolistic position. Immediately the competitors start entering the market, penetration strategy was employed to charge low price to rapidly penetrate the market, (Dean, 1976, Nagle and Hogan, 2006).

This helped to stimulate the sale volume of the enterprises hence more number of jobs created. However, the study found that distribution and promotion strategies were the least strategy adopted in the venture. The study therefore suggested that there is need for the farmers to be sensitized about the importance of this strategy in their business.

As concern market development, most (42.9%) of the farmers used research in enhancing their market share. The research skill was developed through visiting research centre, fieldtrip, own farm demonstrations, attending shows and doing some marketing. These helped the farmers to acquire knowledge and skills for farm management and also for benchmarking their enterprises with their counterparts.

The study further revealed that product quality was the most (77.5%) strategy used by the farmers in increasing their sales volume. The product quality can determine higher price of the product without complains from the customers. This finding is also supported by Dean (1968) who argued that higher quality entrance will engage in skimming strategy while the entrants that offer only marginal improvement will adopt market penetration. Fish product is perishable and if is not handled by great care the product can loss its quality hence keeping customers and middlemen way from purchasing the product. This can adversely affect the enterprise growth and number of job created in the study area.

However, through hypothesis testing the study revealed that there was a significant strong influence between high growth and number of jobs created. The study therefore concluded the three sales indicators used for high growth were viable for enterprise growth hence more employment opportunities.

In the second objective, the study sought to determine whether adoption of innovativeness in aquaculture development had relationship with job creation. The results of the study revealed that majority 65.75% of the respondents had adopted new innovation in their ventures. This finding borrows heavily from Len and Chem (2007) who indicated that innovation is a dominant factor for a firm's competitiveness within

the environment. It fuel organizational growth, drives future success and is the engine that allows business to sustain their viability in a global economy.

However, the study observed that although various innovations had been adopted and practiced in the study area, feed formulation was the most common innovation mentioned by majority of respondents. Asked why, majority gave the same reason of high cost of commercial feeds and even the available feeds were of low quality in the study area. This also remained a challenge to fish farmers. Lia and Chao (1997) concurs with this findings by observing that aquaculture face many challenges namely combating diseases, development of appropriate feeds and feeding mechanism, hatchery and growth out technology as well as quality management.

During the interaction with the respondents, the study established that the commercial fertilizer had little effect on the growth rate of their fish in the ponds and called for the government intervention. The study further found that the cost of accessing innovation was medium. This indicated that the innovation was appropriate and cost effective in enhancing the sustainability. The study confirmed that most of the materials that were used in the preparing the fish meal were obtained within the farm thus cost effective in terms of transport cost.

These materials included chicken droppings, compost manure, cow dung, pig manure, mixture of maize and millet then grinded, green leaves and dried ants among others. It was also established through the study that the sources of the adopted innovations were through extension staff, research centre, knowledge based and NGOs. Through hypothesis testing it was evidenced that these innovations in the study area had strong

link with enterprise sustainability. However, during the survey the respondents expressed with great concern the inadequate of extension officers in the study area.

The study revealed that majority (85.7%) of the respondents had adopted new technology. Minority had not adopted. This high rate of adoption was as a result of majority of respondents having acceptable level of education which had created awareness, sensitization and positive attitude towards fish farming. The adopted technologies were pond construction, maintenance, stocking of the pond and feeding. The study suggested that the adopted technology should be rewarding and profitable to farmers. This will stimulate the rate of uptake in the study area.

In the Last objective the study sought to evaluate how risks taking propensity in aquaculture development relate with job creation, the study results revealed that the risk encountered by the respondents in the study area had minimal impact on the profitability of their business. This was evidenced through hypothesis testing at a significance level. The study noted that the high risk were due to uncontrollable physical forces of nature. It arises occasionally due to extreme climatic and meteorological conditions.

The prime risks are flooding, drought and deposition of silts. The low risk low risks indicated those farmers who had acquired entrepreneurial skill in the fish farming and were to some extent risk takers in their ventures. The study found that the sources of these risks in the venture majority (50%) were from diseases, 13.9% accidents, 18.9% predators, 17% production. The study observed through interaction that although most risks were encountered by the respondents, the respondents indicated that quality fingerlings, finance, flooding, pond siltation and predation were among major problem in the area.

Fapohunda (2005) concurs with this finding that large firms in Nigeria failed to attain profitability in one or more years due to major disruption in production process. He established that this was as a result in late delivery of supplies of fingerlings and other related services. Lack of adequate technology or related technical information and expertise as regards hatchery propagation remain a bane of the venture.

5.3 Conclusions

Based on the findings of the study, it is observed that majority of the aquaculture entrepreneurs have adopted entrepreneurial strategies in aquaculture development and related business activities that improved their livelihood and the study therefore concluded that aquaculture is a source of employment and profitable venture in the study area. However more sensitization was needed in the adoption of distribution and promotion strategies to stimulate high growth in the study area.

Secondly, majority of the fish farmers expressed that beside high rate of adopting innovation in fish formulation, the commercial fish meal was still unaffordable by most fish farmers and even the available feed was of low quality. The fish farmers further indicated that the unreliable visits of the extension officers in their fish farms and poor roads in the rural areas was another major problem that they were facing in their businesses and called for the government intervention.

Thirdly the study established that the encountered risk in the venture was minimal to business profitability. However, the fish farmers felt that quality fingerlings, finance, flooding and predations remained a challenge in the study area.

5.4 Recommendations

On the basis of this study, the following recommendations are made based on the conclusions;

Dissemination of fish farming knowledge is vital to adoption process. Effort should be made therefore to disseminate fish farming knowledge through various channels to potential farmers. Further more emphasis should be put on the distribution and promotion strategies of the products to enhance more sales.

There is need for the government to employ more qualified extension staffs, retrain the existing ones, and improve the infrastructure in the rural area. Apart from the government, commercial banks could also be encouraged to assist fish famers with credits for input such as feed, fertilizer, nets and wire chain at reasonable interest rate.

Farmers should strive to improve the profitability of fish farming through investigating the possibility of reducing the risk of losing fish, shortening culture cycle to target market size fish, use of low cost inputs and/or through integrating fish farming within the existing farming system. Fish farmers should also be trained to acquire more skills on feed formulation and fish breeding to maintain a constant supply, quality and save on costs for both feeds and fingerlings.

5.4.1 Recommendations for Further Research

Based on the results of the study this research recommends further research on the following areas;

1. Challenges in establishing fish farming projects in Kenya
2. Factors affecting the growth and development of aquaculture in Kenya.

REFERENCES

- Adewami, A.A.Olaleyem, V. F. (2011). Catfish Culture in Nigeria: progress prospects and problems. *African journal of Agricultural research*, 6(96); 1281-1285
- Akinrotimi, O.A; Abu, O.M.G.Ibere, IF &Opera C.A (2009). Economic Viability and Marketing strategies of Periwinkle *TympanotonousFuscatus* in River state Ngeria. *International journal of Tropical Agriculture & Food systems*, 3(3), 238-244.
- Anderson, J, L. (2003).*The international seafood Trade*. Cambridge: Wood head Publishing.
- Bagwell, K., and M.H Riordan, (1991).High and Declining Signal Product Quality, *American Economic Review* 81(1991), 24-239.
- Bene, C., &Merten, S (2008). Women and Fish- for- sex: Transactional sex, HIV/AIDS and Gender in African fisheries. *World Development*, (36)5, 875-899.
- Brummett, R.E and M.J. Williams. (2000). *The evolution of aquaculture in Africa rural and economic development* .Ecological Economics.
- Bwathondi, P. Ogutu- Ohwayo R. and Ogari J. (2001). (Ed. I.G. Cowx and K Crean) *Lake Victoria Fisheries Management Plan*; The Lake Victoria Fisheries Organisation.
- Caddy J.F and Griffiths R.C.(1995). Living marine resources and their sustainable development. *FAO Fisheries Technical Paper* 353.p.167.
- Dean, J., (1969). Pricing pioneering Products; *The Journal of Industrial Economics*.
- Dean, J. (1976). Pricing Policies for New Products. *Harvard Business Review*, 54(11-12), 141-153.
- District Development Plan, Uasin Gishu (2002-2008). *Office of the Vice President and Ministry of Planning and National Development*. Nairobi: Government Printers.
- Dong, Y.Y. (2012).*China Aquaculture Industry Report 2011-2012*.Beinjing: China Press.
- Edward P, Demaine H. (1997). *Rural Aquaculture: Overview and Framework for Country Reviews*. RAP Publication 1997/36
- Edwards, P,(2000). *Aquaculture, poverty impacts and Livelihoods, Natural Resource Perspectives, Number 56*. London: ODI.

- Fagbenro, O.A, Akinbulumo, M.O &Ojo, S O (2004).Aquaculture in Nigeria-Past experience, present situation and future outlook (History, and prospects).*World Aquaculture* 35(2): 23-26.
- FakoyaK.A; Owodeinde, F.GO Jimoh, A. and Akintolip, S.L.(2001). *An overview of challenges and prospects in developing an aquaculture industry.* Nigeria: Lagos state
- FAO (2002). The state of world fisheries and aquaculture.[http://www.fao.org/World Fisheries-Aquaculture- 20 02.pdf](http://www.fao.org/WorldFisheries-Aquaculture-2002.pdf).
- FAO (2009). Fisheries and aquaculture technical paper 521, Prospective aquaculture *Analysis of Development ,Delphi Method, FAO, Rome, Italy pg 104.*
- FAO (1997). *Rural Aquaculture: Overview and Framework for Country reviews.* Rome: RAP Publications.
- FAO (2003). *Fishery Statistics.* [http://www. Fao.org](http://www.Fao.org)
- FAO (2014). The State of World Fisheries and Aquaculture 2014, Rome, 223p.
- Fapohunda, O.O (2005). Analysis of bio- technical socio-economic factors affecting agricultural production in Ondo State, Nigeria, (PhD.Thesis), Federal University of Technology, Akure, Nigeria.
- Foeken. Dick W.J Owuor, S.O. (2008). *Farming As A Livelihood Source For The Urban Poor of Nakuru,* Kenya Geoforum, 13
- Food and Agriculture Organization, (2007).Food and Agriculture organization of the United Nations. The State of World Fisheries and Agriculture 2006. *FAO Fisheries Department, Rome: 209.*
- GOK (2011). *Kenya Fisheries Resources Ministry of Fisheries Development Developed by the University of Nairobi.* Nairobi : UON ICT centre.
- Hambrey, J, Edwards. &Beldon, B. (2008). An ecosystem approach to freshwater aquaculture: a global review. *FAO Fisheries and aquaculture proceedings. No 14 Rome, FAO PP 117-221*
- Harrism, S. (1995). Aquaculture in Africa: Socio-economic dimension. In J. Muir and Roberts (eds). *Recent Advance in Aquaculture, Starling, UK.*
- Hecht. (2000). *Consideration on African aquaculture.* World Aquaculture 31(1): 12-19.
- Hetland (2008). The challenges of sustainable fish farming
- Huisman, E.A. (1990). Aquaculture research as a tool in international assistance. *Ambio* 19(8); 400-403.

- Jobling, M. (2010). *Farmed fish and their characteristics. In: Finfish Aquaculture Diversification*. CABI: Oxfordshire, pp 88-99.
- Johnson. R.W. (2000). Risk management by risk magnitude-Unwin Company Integrated Risk Management pp. 1-2
- Konan.A. (1999). Co-management in Aby lagoon (Cote d'Ivoire): preliminary results. Fisheries co- management project ICLARM-IFM- NARS <http://www.Worldfishcenter.com>.
- Kumbhakar, S.C. (2002). Risk Preferences and Technology: A Joint Analysis *Marine Resources Economic* 17 (2): 91-102.
- Lin, C.Y &Chen, M.Y (2007). Does Innovation Lead to Performance? An Empirical study of SMEs, in Taiwan, *Management Research News* (2), pp 115-132.
- Lwenya, C.L., (2006). *Gender Participation in Fisheries Management of Lake Victoria Kenya*. Nairobi: Kenya Marine and Fisheries Research Institute.
- Mair, G. (2002). Supply of good quality fish seed for sustainability aquaculture. *Aquaculture in Asia*, 7(2), 25.
- Maman Na-Any.I.And Maiga.Y. (2004). *Contribution of Gama to the workshop on Gender in fisheries*. European Commission.
- Mbugua, H. (2002). *Aquaculture extension service, Department of Fisheries Nairobi*. Nairobi: Macmillan publishers.
- Medard.M Sobo. F; Ngatunga, T and Chirwa, S. (2000). Women and gender participation in the fisheries sector in Lake Victoria.
- Meena SB, Kirway TN, Lema nm, NalolelaAJ(2002) (Eds) *Farming System Approach to Technology Development and Dissemination*. Color print limited Ministry of Agriculture and Food Security, Dares Salaam p.228.
- Morikawa T. (1999). Sustainability Marine aquaculture and stock enhancement in Japan. NOAA Aquaculture Workshop Report 11-13 August.<http://www.lib.noaa.gov/docacqua/finalAquacultureWorkshopRpt.pdf>.
- Mugenda, O.M and Mugenda, A.G. (2003). *Research Methods; Quantitative and freshwater fish culture farms in latin America and Caribbean. Qualitative Approaches*. African Center for Technology Studies.
- Munguti, J.M., Kim, J-D and Ogelo, E.O.(2014). An overview of Kenyan aquaculture: current status, challenges, and opportunities for future development. *Fish.Aquat.Scie.* 17(1): 1-11.

- Munialo M. (2011). *Fish Pond Management, Fisheries Workshop presentation*. Kenya: Kisumu.
- Mwangi .H. M. (2008). *Aquaculture in Kenya; Status, challenges and opportunities, Directorate of Aquaculture*. Nairobi: Acts Press
- Mwiro, E. (2012). *Fish Farming a lucrative Business*. Accessed online 20th October 2012
- Oata, L. (2012). *Is Nigeria Committed to Fish producers* accessed online 20th October 2012.
- OCED (2010). *Barriers to fish farming Development as pathway to poverty Alleviation and Food Security*. Paris: OECD Workshop.
- Osiagie, C. (2012). *Aquaculture as path to Thriving Agriculture*. Accessed online 5th October 2012.
- Otieno, M.J. (2011). *Fishery Value Chain Analysis: Background Report-Kenya*. Rome, IT, PP 2-110
- Overa .R. (1998). *Partners and Competitors; Gendered Entrepreneurship in Ghanaian Canoe Fisheries*, (PhD thesis), University of Bergen. Ghana: University of Bergen.
- Parker, R.O. (2011). *Aquaculture Science.3rd Edition*. New York: Cengage Learning
- Savantakos, S (1993). *Social Research*. New York: Palgrave Macmillan.
- Sheldon, W.L and Rotherbard, S(2006). Exotic Species in global. Aquaculture- A review. *The Israel Journal of Aquaculture – Bamidgeh* 58, 2-9.
- Stroud R.H., Editor,(1986). *Fish Culture Section in Fisheries Management, American Fisheries Society, Fish Culture Section and Fisheries Management section, Bethesda, Maryland*.
- Tellis, Gerald J, (1986). Beyond the many Faces of Price. An Integration of PRICING strategies. *Journal of Marketing*, 50(11), 146-160.

- Williams, S.B. (2000). Economic Potential of women in small-scale fisheries in West Africa. *International Institute for Fisheries Economics and Trade, Corvallis, USA, 6PP.*
- Turpie, J., Smith. B., Emerton,L and Barnes, B.(1999). Economic Value of the Zambezi Basin Westlands, IUCN Regional office in Southern Africa, Cape Town.
- World Bank (2008). Kenya poverty and inequality Assessment volume1: synthesis report. *Poverty reduction and economic management unit. Africa region.*

APPENDICES

Appendix 1: Letter of Transmittal

Dear Farmers,

The following questionnaire has been designed to find out personal views on fish farming. It is aimed at helping a researcher find out the real status of fish production in Uasin Gishu County, Kenya. Your honest view will be of great assistance in creating awareness about this important aspect of this exercise.

Remember that (**it is not a test**). So do not write your name anywhere on the paper. The results are purely for research purposes and will not be used to grade you in any way. Ask for clarification in case of any difficulty. Please ensure that the answers reflect your true feelings. Thank you for participating.

Appendix 2: Farmers Questionnaire

The questionnaire is divided into five sections “A”, “B,” “ C,” “D”AND“E”

SECTION “A” Characteristics of Entrepreneur

In which year were you born?

Gender

Male []

Female []

Level of education

No formal education []

Primary level []

Secondary []

Tertiary institution []

University []

What is your marital status?

Single []

Married []

Divorced []

Separated []

Widowed []

What is your professional level in fish farming ?

No professional level []

Certificate level []

Advanced certificate []

Diploma level []

What is your experience in years in aquaculture (Fish farming)?
..... Years

What is your household size? person/s

How did you raise money to start your fish farm?

Personal saving []

Friends []

Relatives []

Cooperatives []

Bank loans []

Government support []

Is fish farming a seasonal or all year round activity?
.....

How do you consider the future of fish farming ?

Will decline []

Is sustainable []

Will grow []

What are the major challenges [problems] are you facing as a fish farmer?
.....

How can the authorities help you in overcoming these challenges?
.....
.....

Does the government/local authorities provide any support to fish farmers in the area?

If so, what kind of support do they provide?

- Training programmes []
- Credit []
- Technical advice (extension services) []
- Market to sell fish []

SECTION “B” Characteristics of Aquaculture Enterprise

How many fish pond do you own?

Which species do you deal with on your farm

.....

.....

Which method of fish farming do you use?

Cage []

Ponds []

If you use the pond method is the land on which you do your farming

Own Land []

Leased []

Are fingerlings/Seed readily available?

Yes []

No []

What is the size of your pond?

.....

.....

SECTION “C” Entrepreneurial Strategies

What strategies do you adopt in High growth in Acquaculture

Product Penetration (Please tick only one)

Pricing []

Promotion

Distribution

Market Development (Please tick only one)

Research

Promotion

Competition

I don't Know

Product Development (Please tick one)

Quality

Customer Value

Performance

Any other

Have you adopted new innovation since you started fish farming?

Yes No

Which innovation, If yes?

.....

How do you rate the cost of adopting new innovation

High

Medium

Low

What is the source of adopted innovation

Research Centres

NGOs

Extension Staff

Knowledge based

Have you adopted any technology?

Yes

No

If yes, which one have you adopted (Tick only one)

Pond Construction

Pond Maintenance

Stocking of Pond

Harvesting of Fish []

Transport of Fingerlings []

Fish Preservation/Processing []

How did you access to the new technology

Creativity []

Extensional officers []

NGOs []

Training []

How do you rate the risk taking propensity in fish farming

High []

Medium []

Low []

What is the source of the risk ?

Disease []

Accidents []

Predators []

Over Production []

Any other []

How do you counter the risk

Quality fingerlings []

Control []

Fishing gear []

Research []

SECTION “D” Job Creation

Have you employed any employee in your enterprise? Yes No

If yes how many employees ?

Where do you source your employees

Hire Family Labourer

If hired state the number of

Male

Female

What nature of Job male do in Acquaculture

Manual: (Tick only One)

Feeding

Weed Control

Pond Construction

Harvesting

Any other specify

Managerial: (Tick only One)

Planning

Organizing

Control

Any other specify

Professional: (Tick only One)

Record Keeping

Information Communication Technology (ICT)

Marketing

Pricing

What nature of Job Female do in Acquiculture

Manual: (Tick only One)

Making Feed Mix []

Cleaning Ponds []

Any other Specify []

Professional: (Tick only One)

Record Keeping []

Information Communication Technology(ICT) []

Marketing []

Pricing []

Managerial: (Tick only One)

Planning []

Organizing []

Control []

Any other specify []

Are these Jobs Sustainable?

Yes [] No []

Is Fish farming your main source of income?

Yes [] No []

If not, kindly state if you have other source of income.....

Do you own any new enterprise.? Yes[] No []

Do you consider fish farming to be a profitable business i.e is the income generated enough to meet you and your familys monthly monetary requirement?

Yes [] No []

SECTION "E" Any Other

How do you dispose off water from your ponds?

Through the municipal waste system []

Drain it into a nearby river/lake []

Recycling solids and used as a fertilizer on land. []

Do you have technical information to sussessfully take care of your fish farm?

Yes [] No []

Are you aware of the laws governing fish farming in your area?

Yes [] No []

If not, would you like to be made aware of these laws.....

Appendix 3: Interview Schedule for Fishery Officials

How many farmers do you have?.....

How many farmers do you serve in a month?.....

How do you access /reach your farmers?.....

How do you rate your service

Very high []

High []

Average []

Below average []

Other specify []

What challenges do you encounter mainly in your area of operation?.....

How do you rate your farmers?

Very active []

Active []

Average []

Below average []

What plan do you have for your farmers in increasing production?.....

How often do you train farmers?.....

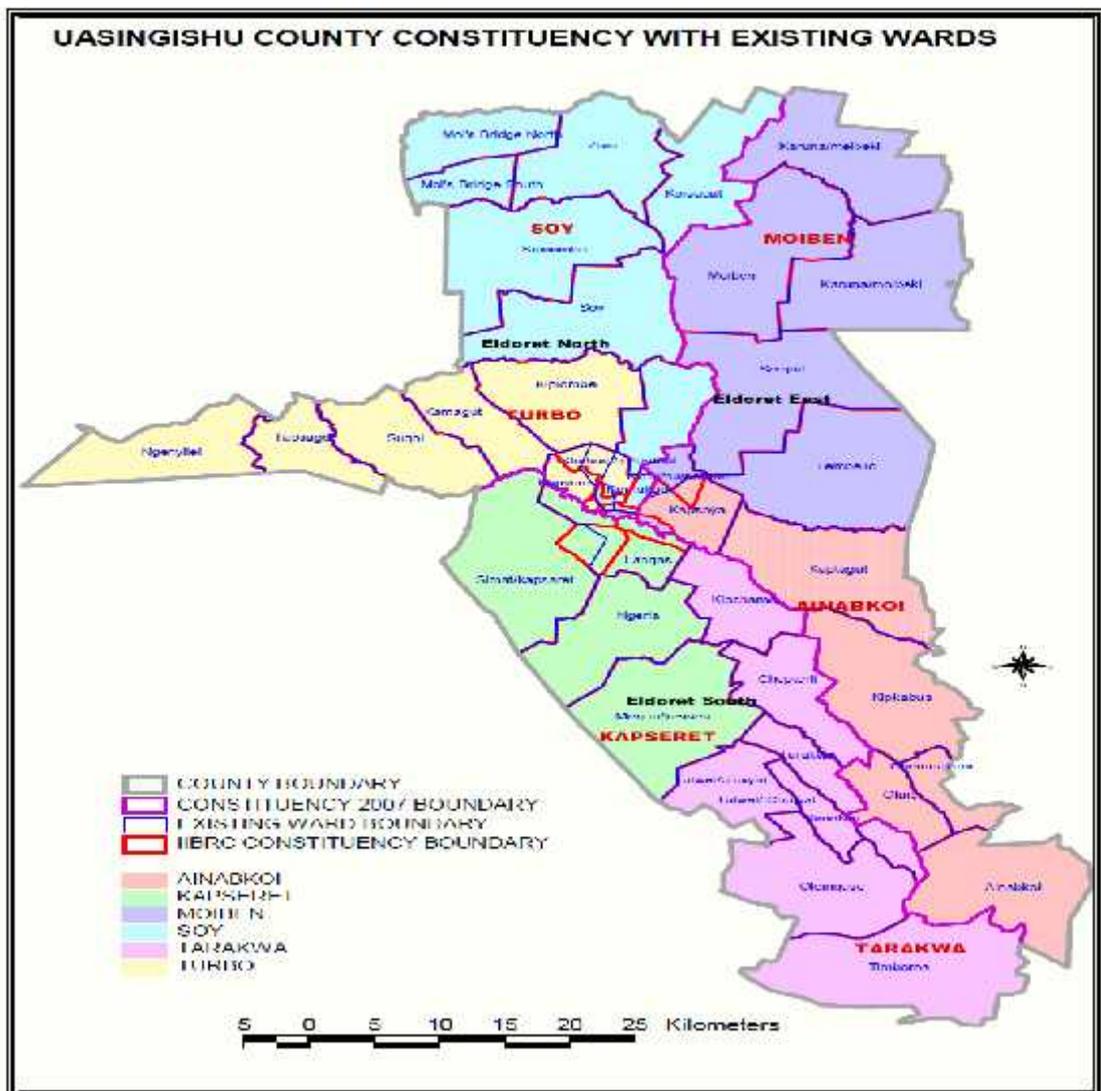
Do you require any support from the government? If yes which one in particular?.....

How do you classify your farmers in terms of small farmers, medium and large?.....

APPENDIX 4: Observation Guide

1. How farmers work as a group and their partners
2. Organize their work flow
3. Delegate tasks
4. Respond to problems
5. Workers supervision
6. Record keeping
7. Time management
8. Pond management
9. Treatment of the customers
10. Participation of owners

Appendix 5: Map of a Study Area



Appendix 6: Research Permit

PAGE 2		PAGE 3	
THIS IS TO CERTIFY THAT:		Research Permit No. NACOSTI/MCD/T4013/Y768	
Prof./Dr./Mr./Mrs./Miss/Institution		Date of issue 21 st November, 2013	
Peter Stephan Akhwaaba		Fee received KSHS. 7000	
of (Address) Moi University			
P.O.Box 3900-30100, Eldoret			
has been permitted to conduct research in			
	Location		
	District		
Uasin Gishu	County		
On the topic: The role of entrepreneurial Strategies on agriculture and job creation in Uasin Gishu County, Kenya.			
for a period ending: 31 st August, 2014.		Applicant's Signature 	
		For Secretary National Commission for Science Technology & Innovation	

Appendix 7: Research Authorization



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254 20 2201471,
2201480, 2201477, 2201482
Fax: +254 20 248245, 248248
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote:

P.O. Box 30010
Uasin Highway
P.O. Box 30010-0100
NAIROBI-KENYA

Date:

Ref No: **NACOSTI/RCD/14/013/1768** **21st November, 2013**

Peter Stephen Akwaba
Moi University
P.O. Box 3900-30100
ELDORET.

RE: RESEARCH AUTHORIZATION

Following your application dated *11th November 2013* for authority to carry out research on *"The role of entrepreneurial strategies on aquaculture and job creation in Uasin Gishu County, Kenya."* I am pleased to inform you that you have been authorized to undertake research in Uasin Gishu County for a period ending *31st August, 2014.*

You are advised to report to the County Commissioner, County Director of Education and County Agricultural Coordinator, Uasin Gishu County before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


DR. M. K. RUGWET, PhD, HSC
 DEPUTY COMMISSION SECRETARY
 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Copy to:

The County Commissioner
The County Director of Education
The County Agricultural Coordinator
Uasin Gishu County.



National Commission for Science, Technology and Innovation is ISO 26000:2006 Certified

Appendix 8: Letter from Ministry of Agriculture, Livestock and Fisheries

REPUBLIC OF KENYA



MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
STATE DEPARTMENT OF EDUCATION

Telegrams: "EDUCATION", Eldoret.
Telephone: 053-2063342 or 2031421/2
Mobile : 0719 12 72 12/0732 240 280
Email : education@uasincounty@yahoo.com
: education@uasincounty@gmail.com

Office of The County Director of Education,
Uasin Gishu County,
P.O. Box 371-30100,
ELDORET.

When replying please quote:

Ref No. MOEST/UGC/TRN/9/58

Date: 4th December, 2013

Mr. Peter Stephen Akhwaha
Moi University
P.O. Box 3900-30100
ELDORET

RE: RESEARCH AUTHORIZATION

This office has received your request for authority to carry out research on **"the Role of Entrepreneurial Strategies on Aquaculture and Job Creation in Uasin Gishu County."**

We wish to inform you that your request has been granted in Uasin Gishu County for a period ending 31st August, 2014. The authorities concerned are therefore requested to give you maximum support.

We take this opportunity to wish you all the best during this research.


WAMUKOYA MAGDALENE
for: COUNTY DIRECTOR OF EDUCATION
UASIN GISHU COUNTY

Copy: National Commission for Science, Technology and Innovation
P.O. Box 30623
NAIROBI

Appendix 9: Letter from Department of Fisheries Eldoret

