MAKERERE UNIVERSITY

COLLEGE OF BUSINESS AND MANAGEMENT SCIENCES

SCHOOL OF STATISTICS AND PLANNING

THE CONTRIBUTION OF FISHERIES TO UGANDA'S GROSS DOMESTIC PRODUCT

BY

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A RESEARCH REPORT SUBMITTED TO THE INSTITUTE OF STATISTICS AND APPLIED ECONOMICS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN QUANTITATIVE ECONOMICS OF MAKERERE UNIVERSITY.

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DECLARATION

I, ACHENG HOPE, declare that, to the best of my knowledge, this dissertation is my original work and has neither been submitted to nor published by this university or any other institution of higher learning for the award of a degree or any other academic award.

..... Date 24/10/2017

ACHENG HOPE

APPROVAL

This research report has been submitted with my approval as university supervisor.

..... Date..24th/10/2017.....

Ms. KOMUHENDO MIRIAM,

SCHOOL OF STATISTICS AND APPLIED ECONOMICS

DEDICATION.

This work is dedicated to all those dear to me.

ACKNOWLEDGEMENT

I would like to take this opportunity to thank all the people, in varying capacities, who have dedicated time, energy, ideas, experience and perspectives to this project.

First and foremost, I thank my supervisor, Ms Komuhendo Miriam, for all the guidance and time she offered to me that has enabled me to complete this research.

I would also like to thank my parents Mr and Mrs Richard and Josephine Abura for all the guidance offered. Not forgetting Beatrice, Patra, Kevin, Daniel, you guys have been an inspiration in your various capacities during the research. But above all, to God the almighty, glory and praise is unto Him for the far I have come.

ABSTRACT

This study's aim was to determine the contribution of fisheries to Uganda's GDP and analysis was done using data obtained from UBOS, URA and the World Bank for the period from 2010 to 2015. Our dependent variable was GDP and the independent variables were value of the share of fisheries to GDP, tax revenue and total exports.

Data analysis was done using STATA. Line graphs were used to show the trend of each variable, bivariate analysis carried to determine whether a relationship existed between the dependent variable and each of the independent variables. Finally, a multiple linear regression was used for the multivariate analysis.

The results showed a positive relationship between GDP and the value of the contribution of fisheries to total exports and an inverse relationship between GDP and the share of fisheries in tax revenue and GDP. This was backed by evidence from other related studies.

Based on these findings, the researcher recommended that more emphasis be put on aquaculture, policies be put in place to attract both local and foreign investors and an improvement in policy formulation and implementation. The researcher also cited the need for further research to provide concrete evidence on the contribution of fish production, consumption and trade to economic development.

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ASSP:	Agricultural Sector Strategic Plan
FAO:	Food and Agricultural Organisation
GDP:	Gross Domestic Product
LDC:	Low Developed Country
MAAIF:	Ministry of Agriculture, Animal Industry and Fisheries
MoFPED:	Ministry of Finance, Planning and Economic Development
SEATINI:	Southern and Eastern African Trade Information and Negotiations Institute
UBOS:	Uganda Bureau of Statistics
URA:	Uganda Revenue Authority
USD:	United States Dollar

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter contains the background of our study, problem statement, purpose for which the study is being carried out, research objectives, hypotheses, the scope of our study and finally its significance. It lays emphasis on Uganda's fisheries sector and its contribution to GDP.

1.1 Background to the study

Fisheries refers to people involved, species or type of fish, area of water or sea bed, method of fishing, class of boats, purpose of the activities or a combination of the foregoing features(FAO: Fisheries Glossary). A fishery may involve capture of wild fish or aquaculture.

Aquaculture is the science, art and business of farming or cultivating fish under controlled conditions. FAO defines aquaculture as "the farming of aquatic organisms, including fish, crustaceans, molluscs and aquatic plants in (Mathias Halwart, 2001).

GDP is the final value of the goods and services produced within the geographic boundaries of a country during a specified period of time, normally a year. (economictimes.com)

1.1.1 The state of fisheries sector in Uganda

Uganda is blessed to be among the top fish and fish products producing and exporting countries from an artisanal fishery. Whereas many countries have highly commercial fishing industry, with huge licensed fishing vessels, Uganda's case is so unique with an open access where fishing is considered for socio-economic activity yet well linked to the complete export value chain.

In this way, it is thus a dependable source of livelihood and employs about 1.3 million Ugandans predominantly youth without formal education but well skilled in fishing related work. Women who engage in small scale artisanal fish processing and other support activities form a considerable force at the artisanal processing level. About 570,000 people are involved as fisher folks, 450,000 are employed in small scale artisanal fish processing with the fish processing factories employing over 5,600 permanent workers and of which 36% are women. The remaining 280,000 out of the 1.3 million are engaged in support services including fish

marketing and trade, boat building and repair and fishing gear making.(ASSP 2015/16-2019/20: MAAIF).

It is important to note that all these individuals have families who depend on them for a livelihood. While fisheries still remains selected as one of the high value commodities that would contribute economic growth in Uganda and is already contributing 3% to National GDP and 12% to agricultural GDP (MoFPED), the stocks of the commercial large fish species (Nile perch and Tilapia) to which this sector depends are on the decline hence performance of the sector below its potential.. If managed well fisheries can help Uganda attain middle income status by the projected year of 2020.

There are two major sources of fish in Uganda; one is from aquaculture, the other from fishing in rivers and lakes. The latter has made up the largest and most significant share of all fishing. Open water covers 15.3 percent of Uganda's surface and comprises five major lakes (Lake Victoria, Lake Albert (Africa), Lake Kyoga, Lake Edward and Lake George (Uganda) which are the main sources of fish in the country. Lake Victoria continues to be the most important water body in Uganda both in size and contribution to the total fish catch, followed by Lake Albert and Lake Kyoga. (Statistics, 2013)

Uganda's main sources of fish supply for both the domestic and export markets are the districts on Lake Victoria, particularly Mukono, Mpigi, Kalangala, Masaka and Luwero. Lake Kyoga, Albert, George and Edward districts are other major sources of fish. The major urban centres within the Lake Victoria belt, namely Kampala, Masaka, Jinja and Entebbe constitute the main domestic market centres for fresh fish. Although considerable fish supplies reach these market nuclei and most of the other district headquarters markets, inadequate supplies reach most of the rural markets. (Towards an Appropriate Management Regime for the Fisheries Resources of Uganda)

Primary production of fish is generally done on a relatively small-scale, as most of the fishing is carried out using small, wooden (plank-built) boats about six to eight meters in length propelled by oars or, in an increasing number of cases, a petrol engine fastened to the back of the boat. These simple boats are sufficient to carry fishermen to and from the fishing grounds with full loads of fish. (The political economy of the fisheries sector in Uganda: ruling elites, implementation costs and industry interests)

1.1.2 The trend of Uganda's GDP

The Gross Domestic Product (GDP) in Uganda was worth 25.53 billion US dollars in 2016. The GDP value of Uganda represents 0.04 percent of the world economy. GDP in Uganda averaged 6.70 USD Billion from 1960 until 2016, reaching an all-time high of 27.93 USD Billion in 2014 and a record low of 0.42 USD Billion in 1960. (tradingeconomics.com, World Bank)

Table 1. 1: Uganda's GDP (2007-2016)

YEAR	GDP(BILLION USD)
2007	12.29
2008	14.24
2009	21.2
2010	20.18
2011	20.51
2012	23.52
2013	24.88
2014	27.93
2015	27.86
2016	25.53

Source: World Bank

1.2 Statement of the problem

Uganda, like other developing countries, mainly depends on agriculture for food and foreign exchange. In an effort to diversify her export base, the GoU (Government of Uganda) in September 2001, issued a report "Government intervention to promote production, processing and marketing of selected strategic exports." (MoFPED, 2001). Attention was directed to a range of government's interventions of which fishing was identified in addition to six other agriculture related sub-sectors.

In 2014, Uganda's agricultural sector contributed to 23% of GDP of which the fisheries sector contributed 1.2%. Also, agricultural exports were worth $1.29 billion of which fish and fish

products contributed $134.8 million. (UBOS, 2015). Although the trend in demand for Uganda's fish has been increasing, overexploitation and contamination of fisheries resources limits the export potential and expansion. Fisheries potential in Uganda has not been fully tapped due the present lack of experience and research which provides justification for my study.

Moreover, a number of people are directly and indirectly employed through the upstream and downstream activities of the fisheries industry. Uganda's fisheries industry employs about 3,000,000 people with 1.2 million people directly dependent on the industry as their main source of income. (Matsamura, 2004). Therefore, developments in the industry significantly affect employment and income levels in the country.

This study will mainly focus on Uganda's fisheries sector from 2010 to 2015 and establish the relationship between the sector and the country's GDP taking into consideration its contribution to overall GDP, tax revenue and exports. It will therefore add to the existing body of literature in order inform policy.

1.3 Objectives

1.3.1 Main objective

To determine the contribution of fisheries to Uganda's GDP.

1.3.2 Specific Objectives

1. To determine the relationship between the contribution of fisheries to GDP and the overall GDP.
2. To determine the relationship between GDP and the contribution of fisheries to total exports.
3. To establish the relationship between GDP and the contribution of fisheries to tax revenue.

1.4 HYPOTHESES

The study will assess fisheries' socio-economic performance in Uganda based on the following hypotheses;

1. H_0: There is no relationship between overall GDP and the contribution of fisheries to GDP.
2. H_0: There is no relationship between GDP and the contribution of fisheries to total exports.
3. H_0: There is no relationship between GDP and the contribution of fisheries to tax revenue.

1.5 SIGNIFICANCE OF THE STUDY

The study will give insight into the contribution of fisheries to GDP with respect to the quantity of fish and fish products exported, the sector's contribution to taxes and its share in overall GDP.

The study will also help policy makers to make informed decisions that will positively impact on the sector.

1.6 SCOPE OF THE STUDY

The research will cover mainly the contribution of fisheries to Uganda's GDP taking into consideration its share of GDP, total exports, and its contribution to tax revenues.

The study will take into consideration data from 2010 to 2015 and it will be obtained from trusted sources like UBOS, FAOSTAT, URA and MAAIF.

CHAPTER TWO

LITERATURE REVIEW

2.1 Global production and employment

In 2011, the total world production of fish was 154 million tons, with 131 million tons intended for human or animal consumption. The global fish food supply has steadily grown at an average annual rate of 3.2 percent for the last five decades but capture production has plateaued at around 90 million tons since the mid-1990s. The growth in fish production has been sustained by the rapid expansion of aquaculture: over the last three decades aquaculture production has tripled, growing at an average rate of 8.8 percent. Aquaculture now constitutes 40% of world fish production compared to 21 percent in 1995. (FAO, The State of World Fisheries and Aquaculture, 2012b)

The growing importance of aquaculture is also reflected in employment trends; employment in fish farming has increased5.5 percent annually over 2008-2012 in contrast to a 0.8 percent in capture fisheries (both marine and inland) for the same period. Still, aquaculture only accounts for about 30% of total fishing employment and 40 percent of production. Capture fisheries are on average more labour intensive than aquaculture mainly due to low -productivity 'artisanal' or small scale fisheries (FAO, Fishery and Aquaculture Statistics Yearbook, 2012a)

Fish production supports employment across a variety of sectors. Harvesting, packaging, processing and distribution activities constitute the supply chain for delivery of the commodities while the production of equipment and technology for vessels, handling, processing and shipping constitute support services. The primary sector alone generated employment for 54 million people in 2011, and when all related services and dependents of the employed are taken into account fisheries support the livelihood of about 10-12 percent of the world's population.

Large-scale industrial fishing and small-scale artisanal fishing both contribute importantly to GDP but in very different ways. Small-scale fisheries are far more labour intensive and employ the vast majority of people engaged in fishing-related activities in developing countries. World Bank (2010) estimates that as of the mid-2000s, small scale fisheries employed about 79 million people, of which 23 million are engaged in fishing and 56 million in post-harvest employment, whereas large scale fishing employed a total of only 5 million, of which 15 are fishers and 3.5 are engaged in post-harvest activities.

2.2 Overview of Uganda's fisheries sector

Water covers 18% of Uganda's total surface area and major lakes include Lake Victoria, Kyoga, Albert and George/Edward.

There are also over 160 minor lakes and many rivers, floodplains and swamps all of which are critical fish breeding and nursery grounds. Currently fish production is estimated at 416,000 tons per annum and fish export has risen from 4,751 tons (1991) tons to 36,600 tons (2005) worth USD 5,308 million and USD 143,168 million respectively.

Fish exports continue to grow and contributed US$143 million to Uganda in 2005; the highest foreign exchange contribution to the economy of any commodity.

Nearly 300,000 people, including the majority of poor men and women, are directly involved in fishing, fish processing and trading.

More than 1.2 million people are directly dependent on the fisheries sector as the main source of household income. (Nyeko, 2006)

2.3 Fisheries in Uganda

Uganda has a long artisanal fishing tradition (an estimated 80% of fishers can be categorized as artisanal) but its fisheries industry only began to grow, along with the rest of the economy, in the late 1980s after the country emerged from a tumulus period (UNEP 2006). Officially, recorded fish exports grew from USD 1 million in 1990 to cover USD 45 million must six years later(Ponte, 2007), peaking in 2005 at around 143 million but declining since then with the 2010 value of exports amounting to 120 million (Fishsite, 2008). Uganda has a relatively high ratio of industrial to artisanal fisheries compared to other LDCs (an estimated 20% of fisheries in Uganda are categorized as industrial) (UNEP 2006).

Total annual production ranged between 200,000 to 250,000 tons through the 1900s into the mid-2000s but persistent over fishing, capture of immature fish and pollution of lake Victoria over the last decade has led to increasing concerns over the decreasing fish stocks in capture fisheries while the declining fall in exports has compounded these fears (FAO, The State of Fisheries and Aquaculture, 2011). Total catch from Lake Victoria has fallen since 2005 from 238,533 tons to 183,824 tons in 2011 (NaFIRRI 2012). Government policies to control unsustainable fishing practices; the promulgation of new regulatory laws, stricter licensing and equipment requirements and reorganization of community level monitoring bodies, seem to have stabilized production in 2012 and 2013(Fish site 2013).

2.4 Contribution of fisheries to total exports

In contrast to the past, agriculture has become an integral part of a country's policy for economic development (Bruinsma, 2003). Among various agricultural products, fish products are the most valuable commodity. There is an increasing trend in its international trade. It is very interesting that annual sales of this commodity are around 80 billion USD and this value is increasing each year (FAO, Fisheries Databases and Statistics, 2006a). In developing countries, fish exports are an important source of foreign revenue. Not only fisheries contribute to income but also help to eliminate poverty by offering more employment opportunities (FAO, Newsroom, 2006b). In fact when agricultural sector improves, automatically export increases, thus revenue start to climb. A study has shown that countries with high growth showed rapid increase in their export which ultimately depend upon production. Export oriented strategy is better than import substitution strategy. Thus import and export are valuable indicators of a county's economic status and portray its economic standing (http://www.investopedia.com).

Total fish productionin2014 amounted to 461,726 metric tons of which 17,597 metric tons were exported. This generated 17, 597 million USD (MAAIF; ASSP2015/16-2019/20). Nile perch accounts for 9percent of fish export earnings. The EU is the largest market for Ugandan Nile Perch, followed by Australia, USA, South East Asia, the Middle East and Africa (Maurice, 2011).Export flows to major destinations generally resemble the overall trend of rising exports until 2005, informal exports to neighbouring countries are estimated to have increased from USD 60 million in the mid-2000s to closer to USD 70 million in the late 2000s (DFR 2011)

In 1991 the Uganda government banned export of unprocessed fish seeking to provide the initial stimulus for the growth of local processing operations (Ponte, 2007). While it is unclear whether the ban played any major role in the subsequent success of the industry, it is certain that declining stocks of 'ground fish' species, particularly cod and haddock, in Europe, during the 1900s created an opportunity for Ugandan exporters.

More recently, Nile perch exports have declined partially due to overfishing and emerging competition from exports of similar species from other countries. The rapid increase in the global supply of salmon and the ensuing price decrease has made salmon a viable substitute to Nile perch. The rise of farmed cod has also dented the EU market share of Nile perch exports from Uganda.

Uganda is one of the few LDCs that have permission to export fish into the EU but this was not always the case. Between 1997 and 2000, the EU imposed three export bans on fish from

Uganda because of safety and quality issues (UNEP, 2006). The ban catalysed government-led reform in the fisheries sector. These measures led to the lifting of EU bans on Ugandan fish exports in 2001 and the DFR was designated as the EU competent authority that monitors quality and safety throughout the value chain (UNEP 2006). In 2004, a National Fisheries Policy was put in place to replace the Fish Act of 1964 to establish n updated framework to regulate the sustainability of fish. Now, Uganda is one of the LDCs allowed to export products from both capture and aquaculture fisheries to the EU. The drive to improve the sustainability of Ugandan fisheries, which has included efforts to map the major breeding grounds of species in Lake Victoria and increased regulation of harmful fishing equipment, seems to have arrested the decline in production and exports (DFR 2011; Fish Site 2013).

2.5 Contribution of fisheries to employment

Employment in fisheries and aquaculture has grown substantially in the last 30 years with an average rate of increase of 3.6 percent a year since 1980, although some of this increase may simply represent improved counting in employment statistics. In 2008, an estimated 44.9 million people were directly engaged, full time or part time, in capture fisheries or aquaculture production. For each person employed in capture fisheries and aquaculture production, about three jobs are produced in secondary activities, including post- harvest, resulting in an estimated total of more than 180 million jobs in the whole of the fish sector. If, on average, each job holder provides for three dependents or family members, the primary and secondary sectors support the livelihoods of a total of about 540 million people, or 8 percent of the world population (FAO, The State of Fisheries and Aquaculture, 2011). Dyck and Sumaila (2010) additionally estimated that wages from marine capture fisheries amounted to US$63 billion in income. Such figures have not yet been calculated for inland fisheries and aquaculture.

In 2008, 85.5 percent of fishers and fish farmers were in Asia, followed by Africa (9.3 percent). China is the country with the highest number of fishers and fish farmers, representing nearly a third of the world total (FAO, The State of Fisheries and Aquaculture, 2011). Although capture fisheries continue to provide by far the greater number of jobs in the primary sector, the share of employment in capture fisheries is stagnating or decreasing and increased opportunities are being provided by aquaculture. In 2008, fish farmers accounted for one-quarter of the total number of workers in in the fisheries sector, totaling almost 11 million people. Most of the growth in aquaculture employment has been in Asia, particularly in China. Employment in fishing is decreasing in capital intensive economies, particularly in most European economies, North America and Japan. This is the result of several factors, including decreased catches,

programs to reduce fishing capacity and increased productivity through technical progress (Allison, 2011).

2.5 Fisheries and nutrition

Interpretation of the importance of fisheries for human nutrition depends on the units of scale of analysis. In terms of energy, less than 1 percent of the daily world gross consumption of food products (33,000 giga calories per day in 2003) comes from aquatic products, with 88 percent coming from plants and 11 percent from land- based animal protein (Paillard, 2011). In terms of protein, however, the picture changes. In 2007, fish accounted for 15.7 percent of the global population's intake of animal protein, and 6.1 percent of all protein consumed. Globally, fish provides more than 1.5 billion people with almost 20 percent of their average per capital intake of animal protein, and 3 billion with 1 percent of such protein (FAO, The State of Fisheries and Aquaculture, 2011).

2.6 Contribution of fisheries to poverty reduction

Where fisheries and aquaculture are significant activities, poverty reduction are in the form of economic multipliers; for example the fisher folk are landless and have daily cash incomes to spend in areas sometimes remote from markets, which helps sustain markets for agricultural produce, consumption goods and various services and ensures that the income from fishing stays in the local area (Allison, 2005; Bene et al, 2007; Thorpe et al, 2007). The taxation on fisheries access and license fees sometimes contribute to local government revenue. The macro economic effects of fisheries trade and revenue generation from taxes, licenses and access agreements contribute towards foreign currency generation and government budgets. If the revenues are significant and they are spent effectively, they can contribute towards macroeconomic growth as the most effective way of large scale poverty reduction. Except in a few cases, fisheries and aquaculture are unlikely to be a major national 'engine of growth', but they can be at a local level.

2.7 Contribution of fisheries to trade

Fish is one of the most traded food commodities- second to only fruits and vegetables in value. Developing countries, in particular China, Thailand, and Vietnam, accounted for80 percent world fishery production in 2008 with their exports accounting for 50 percent (US$ 50.8 billion) of world exports of fish and fishery products in value terms (FAO, The State of Fisheries and Aquaculture, 2011).

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2.8 Increasing fish production

Aquaculture is often cited as one of the means of efficiently increasing food production. Fish provides a good source of protein and essential micronutrients and thus plays an important role in the prevention of many human diseases (Williams and Poh-Sze, 2003). About 9 million people are employed in the aquaculture industry, which provides them with supplementary income during lean seasons (FAO, The Role of Aquaculture in Improving Food Security and Nutrition, 2003a). Aquaculture could increase the availability of low cost fish in local markets bringing poor household above poverty threshold levels relatively quickly. Larger scale commercial aquaculture, practiced by many developing countries, can enhance the production for domestic and export markets, bringing much needed foreign exchange, revenue and employment, thereby contributing to economic development. (Ridler and Hishamunda, 2001; Subasinghe, 2003).

To meet the ever increasing demand for fish, aquaculture has expanded very rapidly and is now the fastest growing food- producing industry in the world. By 2030, over half of the fish consumed by the world's people will be produced by aquaculture (FAO, The State of World Fisheries and Aquaculture, 2000). Total aquaculture production increased from 10 million tons of fish in 1984 to 38 million tons in 1998(FAO, 2000), and a growth rate of 11% per year has aquaculture on a pace to surpass beef production by 2010. Not only is the total amount of fish being produced important, but also how and where it is produced. While 80% of cattle are raised in industrialized nations, fish farming has been growing almost six times faster in developing countries than in developed countries. The FAO states that "As an inexpensive source of a highly nutritious animal protein, aquaculture has become an important factor for improving food security, raising nutritional standards, raising nutritional standards, and alleviating poverty, particularly in the world's poorest countries". Indeed, in those areas where the need is greatest, the contribution of fish and shrimp farming is expected to increase.

2.9 Definition of GDP

According to investopedia.com, GDP is one of the primary indicators used to gauge the health of a country's economy. It represents the total dollar value of all goods and services produced over a specific period of time; you can think of it as the size of the economy.

GDP measures the monetary value of final goods and services produced in a country in a given period of time. It counts all the output generated within the borders of a country (Callen, 2017).

2.10 Global GDP

After expanding by just over 5 percent in 2010, global GDP in real terms is expected to slow to around 4 percent in 2011. With real growth in developed economies foreseen to rise by 1.6 percent in that year, global prospects are underpinned by an expected 6percent rise in the economies of developing countries. The recovery is mostly complete in all developing regions, with the pace of growth increasingly dictated by rapid improving global trade, robust domestic demand, and increasingly binding capacity constraints (FAO, n.d.).

GDP growth rates in developing economies are on average higher than those in developed economies. Over the period 1965-99, the average annual growth rate was 4.1 percent in low income economies, 4.2 percent in middle income countries and 3.2 percent in high income countries. However the much faster population growth in developing countries is offsetting comparatively faster GDP growth, causing GDP per capita growth rates in these countries to be relatively low or even negative. (Bank, www.worldbank.org, n.d.)

2.11 GDP and Agriculture

The agriculture sector, buoyed by very high commodity prices, has demonstrated astonishing resilience during the global economic turmoil. In 2009, agricultural value added at the world level rose by 4 percent, which can be contrasted to a 5 percent fall in global sector-wide GDP. In developing countries, the increase in agricultural GDP over this period was far more pronounced at 8 percent. (FAO, n.d.)

Agriculture continues to play an important role in Ugandan economy, but its share has significantly declined over time. In the end of 1980s, the agriculture accounted for 51 percent of GDP, but in 2008 its share was 15.4 percent. The declining share of agriculture in the national economy is not necessarily a bad thing if rural-urban migration stimulates manufacturing and services. (Bank, Uganda: Agriculture for Inclusive Growth in Uganda, 2011)

2.12 Fisheries and GDP

It has become the fact that countries neglecting expansion in agriculture cannot boot their economy. There exists a close relationship between agriculture and economic upliftment. High agricultural growth ensures high economic growth and vice versa (Timmer, 2002).

Fish production generally contributes 0.5-2.5 percent of GDP, globally (Bene, 2007) which makes the sector appear a minor contributor to the world economy. However, in some

countries (Mauritania and Vietnam), fisheries contribute more than 10 percent GDP and around 50 percent agricultural GDP.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section looks at the sources of data used, sample size, data collection techniques, presentation and analysis of the data.

3.1.1 Research design

The study will be purely quantitative involving collection, analysis and interpretation of quantitative data on GDP, value of fish and fish products exported, employment data and tax revenue from the fisheries sector.

3.1.2 Data and its sources

We shall majorly use quantitative data for this study. The data will be obtained from UBOS mainly the statistical abstracts, FAOSTAT, the World Bank, URA and MAAIF.

We shall consider the period from 2010 to 2015.

3.1.3 Data Analysis

We shall use STATA, a statistical software package, for analysis. Analysis and interpretation will be done with respect to our objectives and the hypotheses to be tested. It will be done in three stages;

i. Univariate analysis

This will involve analysing the trends of the data corresponding to the different variables independently. We shall use descriptive statistics for continuous data and frequency tables for the categorical ones. GDP, tax revenue and fish and fish products' data is continuous while employment data is categorical.

ii. Bivariate Analysis

This will involve establishing the relationship between each independent variable and our dependent variable; GDP.

Where both the dependent and independent variables are continuous, we shall use correlation and test for the level of significance.

iii. Multivariate Analysis

We shall use a multiple linear regression model that will help us to determine the effect of a unit change in each of the independent variables the dependent. We shall have to introduce a dummy variable for our binary variable; employment in order to be able to use the linear regression model.

We shall assume the model;

$y_i = A + B_i X_{ij} + E_i$; *where* $i = 1, 2, 3, 4, 5, 6$ *and* $j = 1, 2, 3$

Equation 1: Multiple Linear regression model

where

EI - the error term for the i^{th} observation

Yi- GDP for the i^{th} period

A – Intercept (the value of GDP in the i^{th} period if all other variables are zero)

Bi – co-efficient (shows the effect of a unit change in the independent variable on the dependent variable)

Xij –value the i^{th} o0bservation on the j^{th} variable

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND PRESENTATION OF FINDINGS

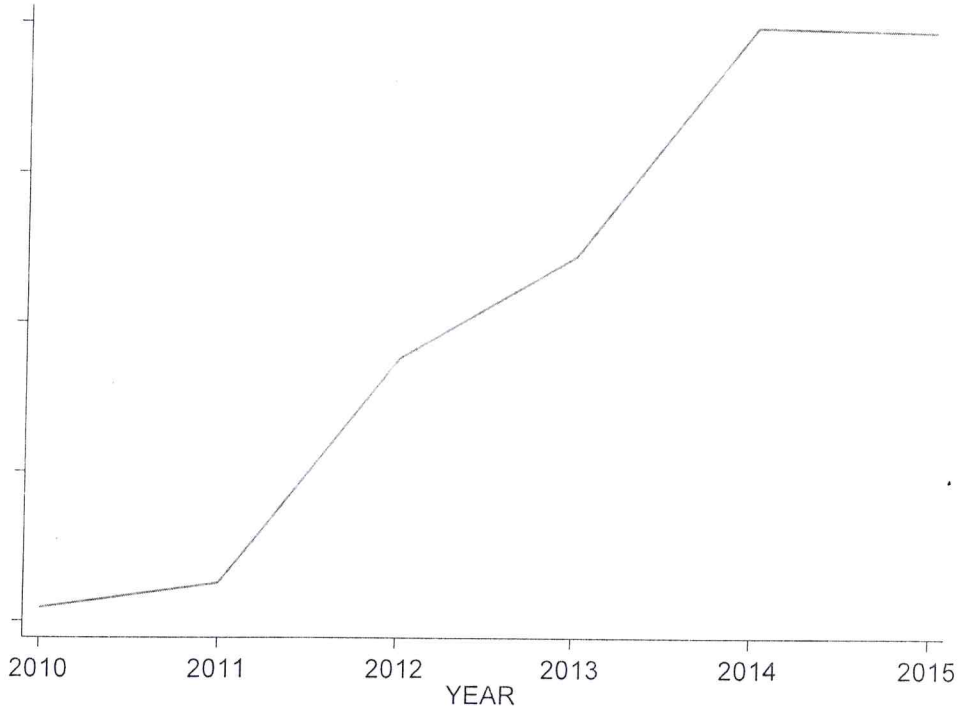
4.0 Introduction

This chapter presents the discussion of findings in detail. It presents tables and graphs of the results of the analysis for the study.

In particular, it presents the trends of Uganda's GDP, and the trends of the contribution of fish and fish products to taxes, total exports and contribution to GDP.

4.1.1 The trend of Uganda's GDP

Figure 4.1: Graph showing trend of Uganda's GDP



Source: Statistics got from UBOS website

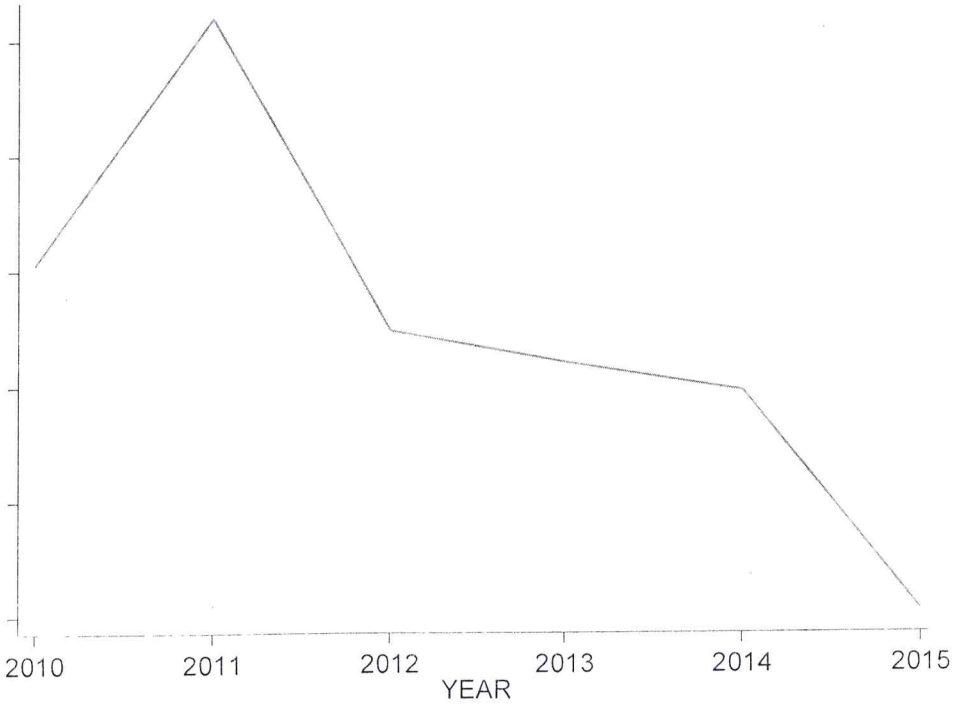
This section provides details on the trend of Uganda's GDP using data collected from UBOS. The data was originally in billions of shillings but using the exchange rates for the corresponding years, conversions were made to USD.

The above graph shows that Uganda's GDP has continued to rise with time. This is consistent with the World Development Indicators report that states that the real GDP grew at an average rate of 6.7 percent per annum over the period 1990-2015 (Bank, World Development Indicators, 2017). However, the rates of growth vary and this is shown by the variation in the steepness of the slope in the graph.

This strong economic performance has been driven by growth in the industrial and services sectors (with value added for these activities growing at an average of 9.9 percent and 8.1 percent between 1992 and 2011) and has been underpinned by strong investment and export growth (with gross fixed capital formation growing on average by 8.6 percent per year during this period and export of goods and services growth by 17.2 percent).This prolonged phase of economic growth has benefitted from a period of relative macroeconomic and political stability, especially since the end of the armed conflict in Northern Uganda in the mid-2000s. Growth has also been bolstered by large inflows of ODA, averaging 14.7 percent of GNI from 1991 to 2010, as well as by a general policy of openness to both foreign investment and international trade (UNDP, 2012).

4.1.2 The trend of the contribution of fish and fish products to GDP.

Figure 4.2: Contribution of Fish and Fish Products to GDP



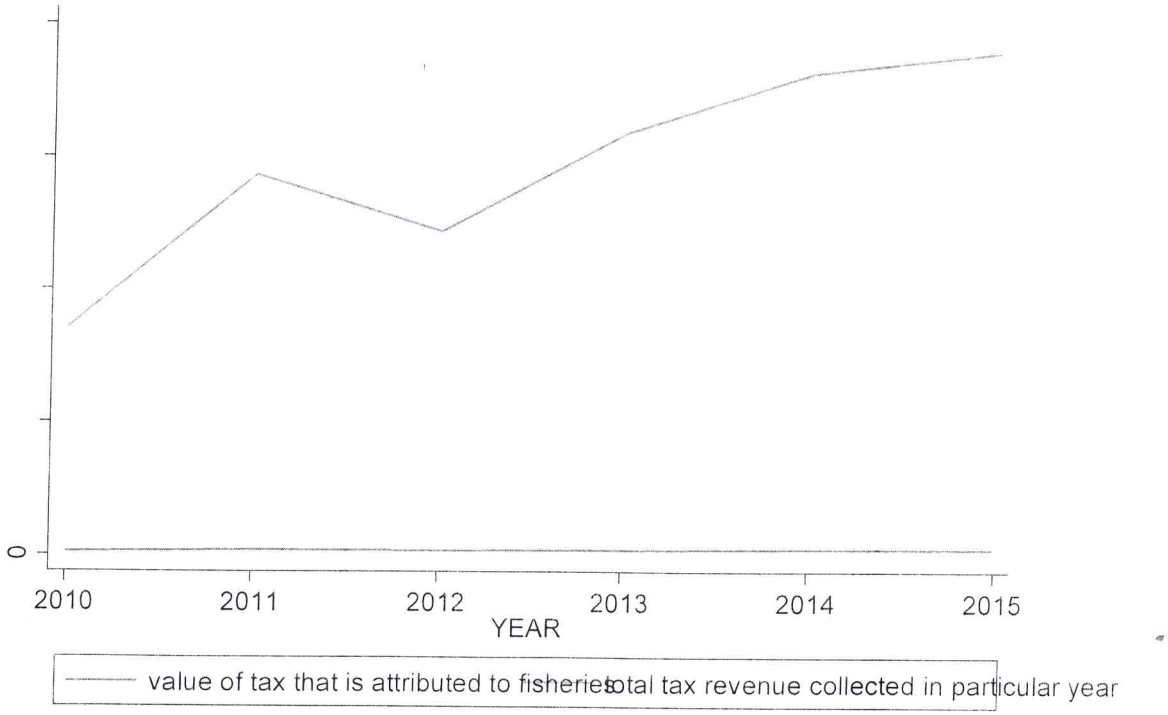
Source: Data obtained from UBOS

Using data obtained from UBOS statistical abstracts, the contribution of fish and fish products to GDP was analysed.

The above graph shows a downward trend in the contribution of fish and fish products to GDP.This implies that the growth of the economy is accompanied by a reduction in the share of its agricultural output in GDP. The World Development Indicators, 2017 states that the country has undergone economic transformation where the share of agricultural value added in GDP declined from 56% in 1990 to 24% in 2015.

4.1.3 The trend of the contribution of fish and fish products to tax revenue collected

Figure 4.3: Graph showing the trend of the contribution of fisheries to tax revenue



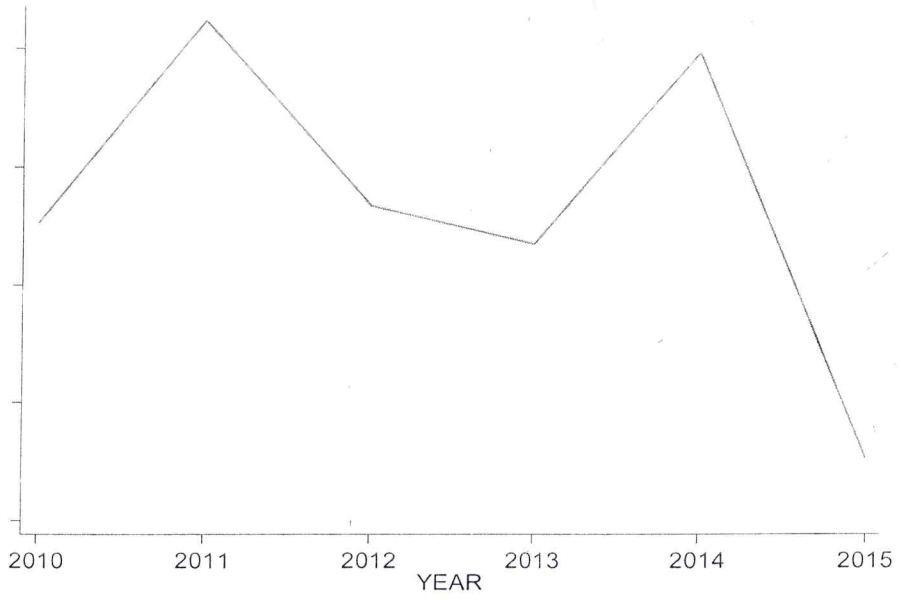
Source: URA Website

Using data obtained from URA historical data, analysis on the contribution of fisheries to total taxes collected was done.

The above graph show that Uganda's total tax revenue is growing. Uganda has seen a significant increase in the total tax revenue in the financial years 2011/12- 2015/16 (SEATINI, 2017). However, the contribution of fisheries to tax revenue is relatively the same.

4.1.4 The contribution of fish and fish products to the total exports

Figure 4.4: Graph showing the contribution of fish and fish products to total exports.



Source: Data was obtained from URA website

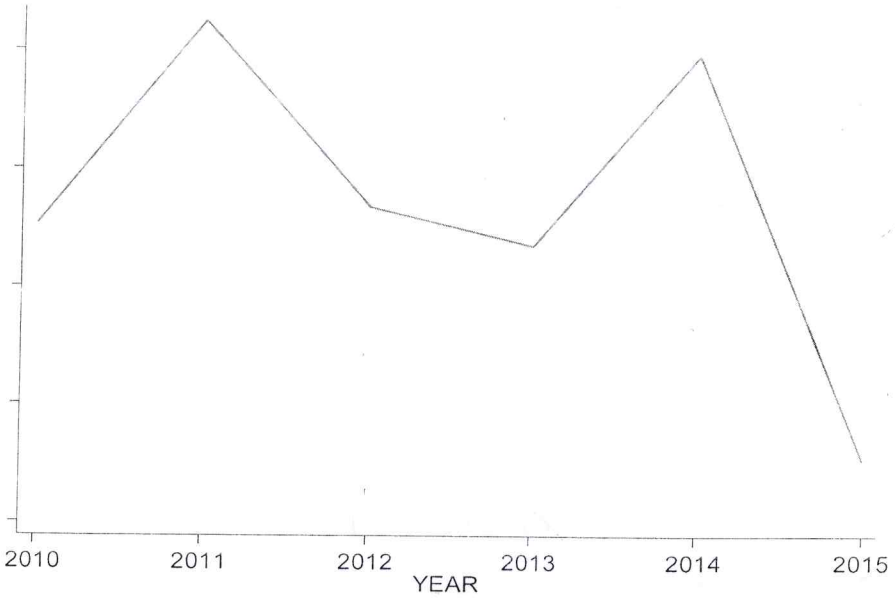
The monetary value of fish and fish products in total exports for each year were analysed using data obtained from the statistical Abstracts for the corresponding years.

The above graph shows fluctuations in the value of fish and fish products exported between 2010 and 2015. This implies that although fish and fish products are the second largest exports after coffee, the country's export earnings from the sector are quite unstable.

The value of fish and fish products exported reached a peak in 2011 after which it fell before it began to rise and peak again in 2014. This can be attributed to an increase in the fish catch by 16.6 percent between 2010 and 2014 (MAAIF). We however notice the decline after 2014. This is explained by the decline in Nile Perch exports, partially due to over fishing and emerging competition from exports of similar species from other countries. The rapid increase in the global supply of farmed salmon and the ensuing price decrease has made salmon a viable substitute to Nile Perch. The rise of farmed cod from Vietnam has also dented the EU market share of Nile Perch exports from Uganda (Stephen Golub, 2014).

4.1.4 The contribution of fish and fish products to the total exports

Figure 4.4: Graph showing the contribution of fish and fish products to total exports.



Source: Data was obtained from URA website

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4.2 Summary statistics of the independent variables

Table 4.2: Summary Statistics of independent Variables

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. summarize
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Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	6	2.41e+07	3405664	2.02e+07	2.79e+07
Contributi~P	6	224880.9	16738.06	200432	251973.5
Total_expo~s	6	2178647	287488.6	1618604	2407736
contributi~s	6	128551	6661.832	117597	136218
tax_revenue	6	2931922	776385.6	1710000	3781104
Contributi~x	6	36635.39	7909.756	23940	45373.25
YEAR	6	2012.5	1.870829	2010	2015

Source: UBOS, URA (The data is in '000 USD)

Since the data has no outliers, we used the mean to describe the different independent variables.

From our data, the mean GDP is24,100 million USD with the minimum GDP as 20,200 million USD in 2010 and the maximum as 27,900 million USD in 2014. The difference between our maximum and minimum GDP values is 7,700 million USD which implies an increase in the country's GDP over time. This is consistent with findings stated in the World Development Indicators, 2017.

The mean contribution of fisheries to GDP is 224.8809 million USD with the minimum and maximum values of the contribution of fisheries to GDP being 200.432 (in 2015) and 251.9735 (in 2011) million USD respectively. This finding is consistent with studies by other scholars that state that as a country's economy grows, the fall in the share of agriculture to its GDP is inevitable. (Byerlee Derek, 2009)

4.3 Bivariate Analysis

A bivariate analysis was carried out to establish whether the independent variables are significantly related to the dependent variable. For our study, since all our independent variables are continuous, we used correlation and in particular used spearman's rank correlation since our number of observations was small (n=6).

Table 4.2: Independent Variables, their correlation co-efficient and P-Values.

Variable	Correlation co-efficient	P-Value
Contribution to GDP	0.4875	0.3287
Contribution to total exports	0.6571	0.1562
Contribution to tax revenue	-0.4857	0.3287

From the above table, there is a weak positive relationship between contribution of fisheries to GDP and GDP(r=0.4875) and since (P=0.3287<0.5). We conclude that the two variables are not independent of each other and therefore the value of the contribution of fisheries to total GDP is taken on for further analysis. Our analysis also implies that fisheries has a positive impact on GDP and is consistent with Gillett and Lightfoot, 2002, who emphasize the importance of fishing and fisheries to economies.

Also, there is a strong positive relationship between Contribution of fisheries to total exports and GDP(r=0.6571) and the two variables are not independent of each other (since P=0.1562<0.5) therefore the contribution of fisheries to total exports is taken on for further analysis. This

The above table also shows the weak negative relationship between the contribution of fisheries to tax revenue and GDP(r=0.4857) and the (since P=0.3287<0.5), the independent variable is taken on for further analysis since the two variables are not independent of each other.

Since all the independent variables under consideration significantly predict GDP, they will all be included in our model.

4.4 Regression analysis and hypothesis testing

In this section, we test the null hypothesis against the alternative hypothesis using the p-value statistics for individual relationships. The analysis was done using STATA and the findings are recorded in the table below.

P-Value=0.0088

R^2=0.9941

Table 4.3: Variables and their respective p-values

Source	SS	df	MS
Model	5.7653e+13	3	1.9218e+13
Residual	3.3958e+11	2	1.6979e+11
Total	5.7993e+13	5	1.1599e+13

Number of obs	6
F(3, 2)	113.18
Prob > F	0.0088
R-squared	0.9941
Adj R-squared	0.9854
Root MSE	4.1e+05

GDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Contributio~P	-205.1646	22.3763	-9.17	0.012	-301.442	-108.8872
contributio~s	248.5433	50.13311	4.96	0.038	32.8379	464.2486
Contributio~x	181.6412	29.14997	6.23	0.025	56.21901	307.0634
_cons	3.17e+07	3833837	8.26	0.014	1.52e+07	4.82e+07

95% level of significance

The independent variables used in this model significantly predict GDP (since P=0.0088<P-critical=0.05).

99.41% of the GDP is explained by the independent variables used in this model.

The study results showed that the contribution of fisheries to GDP was significant (since P=0.012<P-critical=0.05). This independent variable also had a co-efficient of -205.1646 which implies that a unit increase in the contribution of fisheries to GDP would lead to a decrease in the GDP by 205164.6 USD.

The results also showed that the contribution of fisheries to total exports was a significant determinant of the GDP (P-value=0.038<P-critical=0.005).The co-efficient for this dependent variable was 248.5433 which implies that a unit increase in the value of the total contribution of fisheries to total exports would lead to an increase in the GDP by 248543.3 USD. This confirms the role of the fisheries sector exports in national economic growth, consistent with previous findings by Awokuse (2003), Anh (2008), and Thompson and Thompson (2010).

From our findings, the contribution of fisheries to tax revenue significantly determines the GDP (since P-value=0.025< P-critical=0.05). Our co-efficient, implies that a unit increase in the contribution of fisheries to total tax revenue would imply an increase in the value of GDP by 181641.2 USD. The Positive relationship between the tax revenues from fisheries and GDP is consistent with Petersen (2003). He emphasizes the significance of the fishery industry and

underscores that fishery revenue represents a sizeable amount of government revenue and therefore GDP. (Petersen, 2003)

The study results gave an intercept of 31,700,000 which implies that when the values of the contribution of fisheries to GDP, total exports and tax revenue are zero, the GDP will be 31,700,000 USD.

The model

From the above findings, our model is;

$$GDP_i=31,700,000 -205.1646A_i+248.5433B_i+248.5433C_i +E_i$$

$$(83.94188)\ (247.3108)\ (801.8789)$$

Equation 2: Model Specification

Where;

GDP_i- GDP for i^{th} period

A_i- value of the contribution of fisheries and fish products to GDP in the i^{th} period

B_i-value of the contribution of fish and fish products to total exports

C_i-value of the contribution of fisheries and fish products to total revenue

E_i- error term

and the standard errors are reported in brackets.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary of the findings, conclusions and recommendations of the study. It presents the conclusions based on findings from the preceding chapter and recommendations with regards to the findings.

5.1 Summary of findings

The summary of findings is based on the objectives for our study.

5.1.1 The relationship between GDP and the contribution of fisheries to GDP.

From the data analysis, we concluded that the relationship between GDP and the value of the contribution of fisheries to GDP is negative and not significant. We therefore accept our null hypothesis and conclude that fisheries does not significantly contribute to GDP. We can therefore conclude and say that a decrease in the contribution of fisheries to GDP implies an increase in the GDP. This is due to higher income elasticities of demand for non-agricultural goods and services. This is consistent with previous conclusions that a declining share for agriculture in national employment and GDP is an inevitable consequence of economic progress (Byerlee, de Janvry and Sadoulet, 2009; Cervantes and Brooks, 2009).

5.1.2 Relationship between GDP and the contribution of fish and fish products to total exports.

From our analysis, relationship between GDP and the contribution of fish and fish products to total exports is positive but not significant. We therefore accept our null hypothesis and conclude that the value of fish and fish products exported does not significantly contribute to GDP and conclude that in increase in the value of fish and fish products exported implies an increase in the GDP. This is consistent with previous conclusions that when agriculture sector improves, exports increase and revenue hence GDP starts to climb (http://www.investopedia.com).

5.1.3 Relationship between GDP and the contribution of fisheries to tax revenue

Basing on the analysis in the previous chapter, the relationship between the contribution of fisheries to tax revenue and GDP is negative but not significant. We therefore reject the null hypothesis and conclude that the contribution of fisheries to tax revenue does not significantly contribute to GDP and that an increase in the GDP implies a reduction in the contribution of fisheries to total tax revenue collected. This is attributed to an improvement in the manufacturing sector hence more sources of tax revenue implying a lower share of fisheries in the total tax revenue contributed. This is consistent with existing literature (Le, Moreno-Dodson, & Bayraktar;2012).

5.2 Conclusion

The Contribution of fisheries to Uganda's GDP.

As discussed in previous chapters, the contribution of fisheries to GDP in relation to its share in the overall GDP, its contribution to tax revenue and contribution to total exports was discussed. These variables were analysed at univariate, bivariate and multivariate levels and conclusions were drawn.

The results from our study showed a positive relationship between the value of the contribution of fisheries to exports and GDP. However the two other independent variables showed an inverse relationship with GDP.

These results imply that an increase in the value of fish and fish products exported would lead to an increase in the GDP and a reduction in the contribution of fisheries to GDP and tax revenue would imply an increase in the GDP as a result of discovery other financing mechanisms for both GDP and tax revenues respectively. This was found to be consistent with other literature as cited above.

5.3 Recommendations

Given the above discussions, we notice that an increase in the value of fish exports positively contributes to the country's GDP. However, Uganda's fish sector has continued to register drastic falls in production. Government policies and using Beach Management Units to control and restore the sector have not registered the desired success. The increasing population and pressure on the fisheries resources has made the situation worse.

I would therefore front aquaculture as one of the major solutions to the problems in our fisheries sector. More resources should be directed towards educating the fishing population on how to

improve the quantity and quality of their fish stock in order to make it more marketable on the global market. This is consistent with recommendations in Contribution of fish and Aquaculture as a major way of increasing the volume and value of fish production. (Bene, 2015)

The government should also put in place policies that attract both local and foreign investors to the fishing industry both in production and processing as this will increase on the value and volume of exports, number of people collected and the tax revenue collected from the sector.

Finally, there is need to package policies, formulating and enforcing by-laws and regulations, information systems, regulate fisheries activities coordination, well formulated approaches to fisheries conflict arbitration and other management options that address these issues at local, national and international levels and provision of scientific information and data to guide management decisions.

Hopefully, with the implementation of the above recommendations, the contribution of fisheries to Uganda's GDP in absolute terms could increase.

5.4 Areas for further study

The aim of this paper was to determine the contribution of fisheries to Uganda's GDP. The objective was to evaluate the quality of the quality of that evidence and identify the key conclusions that emerge from the study and asses its consistency with other sources.

The researcher cites the lack of concrete evidence of how fish consumption, production and trade result into developmental benefits ultimately improve a country's GDP as results vary from place to place and different factors are at place in each of these different scenarios. Therefore there is need to develop methods that put all these factors into consideration when determining the contribution of fisheries to a country's development.

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APPENDICES

The data used for this research was obtained from UBOS, URA and World Bank for the periods 2010-2015. The data in billion shillings was converted to USD using exchange rates for the corresponding years.

Appendix 1: Exchange rates (1 USD=X UGX)

YEAR	2010	2011	2012	2013	2014	2015	2016
RATES	2489.857	2313.735	2682.0642	2517.98	2655.86	2988.545	3535.98

Source: https://www.poundsterlinglive.com

Appendix 2: GDP (Billion USD)

YEAR	2010	2011	2012	2013	2014	2015
GDP	20.18	20.51	23.52	24.88	27.93	27.86

Source: World Bank

Appendix 3: Contribution of fish and fish products to total exports ('000 USD)

YEAR	2010	2011	2012	2013	2014	2015
Value of fish and fish products exported	127,651	136,218	128,322	126,727	134,791	117,597
Value of total exports	1618,603.71	2,159,077.3	2,357,493.2	2,407,735.6	2,261,964.0	2,267,009

Source: UBOS

Appendix 4: Contribution of fish and fish products to total revenue('000 USD)

YEAR	2010	2011	2012	2013	2014	2015
Tax revenue	1,710,000	2,860,000	2,433,946	3,177,149	3,629,332	3,781,104.
Contribution of fisheries to tax revenue	23,940	37,180	3,1641.298	38,125.788	43,551.984	45,373.248

Source: URA