The Fisheries Sector in Zambia: Status, Management, and Challenges

by

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Technical Paper No. 4

August, 2015

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ACKNOWLEDGEMENTS

The Indaba Agricultural Policy Research Institute is a non-profit company limited by guarantee and collaboratively works with public and private stakeholders. IAPRI exists to carry out agricultural policy research and outreach, serving the agricultural sector in Zambia so as to contribute to sustainable pro-poor agricultural development.

This technical report was carried out in collaboration with the Ministry of Agricultural and Livestock (MAL). The authors wish to thank the staff at MAL and at IAPRI for their support and feedback. We also thank Patricia Johannes for her editing and formatting assistance.

We also wish to acknowledge the financial and substantive support of the Swedish International Development Agency (SIDA) and the United States Agency for International Development (USAID) in Lusaka.

Any views expressed or remaining errors are solely the responsibility of the authors.

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EXECUTIVE SUMMARY

The paper highlights the status of fisheries in Zambia with emphasis on status, management, and challenges of the subsector. An attempt has been made to give an overview of fish supply and consumption that includes the trade core. Both qualitative and quantitative secondary data were used from the Department of Fisheries (DOF) and Central Statistics Office (CSO). Department of Fisheries also provided the information on the major steps being undertaken in the subsector. In this paper, fisheries consists of two components, namely, aquaculture and capture fisheries.

The fisheries sector does not have a stand alone policy at the moment. It is covered by the National Agricultural Policy (NAP) (2004–2015) that governs the development of the agriculture sector in Zambia. However, the emphasis in the policy is on fish resource management and is related to capture fisheries with little mention of aquaculture that provides great potential to increase the country’s fish production. Zambia is a landlocked country with an estimated 12 million hectares of water and another 8 million of wetlands that represent huge natural resources for fish production. However, the consumption per capita of fish in the country has declined from 12 kg in the 1970s to 7.7 kg in 2012. Although there have been complaints about the amount of fish being caught from the fisheries, it is important to mention that the fish catches have been declining in only Kafue and Mweru Wantipa fisheries.

Zambia’s aquaculture fish production however, has grown significantly in the last two decades. From a total production of only 5,000 tons of fish per annum in 2006, the country produced about 20,000 tons in 2013. The government has introduced measures aimed at increasing fish production in the country. These include the development of fishery specific management plans, aquaculture strategy and development plans, financing mechanisms through the Citizen’s Economic Empowerment Commission (CEEC) and the Aquaculture and Fisheries Fund.

However, the subsector faces challenges that pose a danger to the growth of the sector. These include, but not limited to, low fish production and productivity, lack of fish storage facilities, unclear objectives in fisheries management, limited access to finances, and weak enforcement of regulations. Climate change also poses a major threat to the sustainability of the subsector. It is recommended that the DOF be split into two departments—Capture Fisheries and Aquaculture. There is an urgent need to create or intensify the already existing agricultural institute’s sections on fisheries and aquaculture. The management of capture fisheries should be based on biological and socio-economic objectives.
## CONTENTS

ACKNOWLEDGEMENTS ............................................................................................................ iii  
INDABA AGRICULTURAL POLICY RESEARCH INSTITUTE TEAM MEMBERS .......... iv 
EXECUTIVE SUMMARY ............................................................................................................. v  
CONTENTS .................................................................................................................................... vi  
LIST OF TABLES ......................................................................................................................... vii  
LIST OF FIGURES ....................................................................................................................... vii  
APPENDIX FIGURES .................................................................................................................. vii  
ACRONYMS ................................................................................................................................ viii  

1. INTRODUCTION ....................................................................................................................... 1  
   1.1. Overview of the Fisheries Sector in Zambia................................................................. 1  
       1.1.1. Capture Fisheries .................................................................................................. 1  
       1.1.2. Aquaculture Sector .............................................................................................. 2  

2. FISH CONSUMPTION ............................................................................................................... 4  
   2.1. Fish Imports and Exports ............................................................................................. 4  

3. POLICY AND REGULATORY FRAMEWORK ...................................................................... 6  

4. GOVERNMENT MEASURES AND INCENTIVES IN THE FISHERIES SECTOR .............. 7  
   4.1. Fisheries Management Plans ....................................................................................... 7  
   4.2. National Aquaculture Strategy.................................................................................... 7  
   4.3. Development of Aquaculture parks .......................................................................... 7  
   4.4. Block Environmental Project Briefs (EPB) ................................................................. 7  
   4.5. Extension Delivery ..................................................................................................... 7  
   4.6. The Aquaculture and Fisheries Fund ........................................................................ 7  
   4.7. Citizen Economic Empowerment Commission (CEEC) .......................................... 8  

5. MARKETING ARRANGEMENTS FOR FISH PRODUCTS ................................................... 9  

6. CHALLENGES BEING FACED BY THE FISHERIES SECTOR .......................................... 10  
   6.1. Conflicting Legal Framework ..................................................................................... 10  
   6.2. Low Production and Productivity ............................................................................. 10  
   6.3. Lack of Fish Storage Facilities .................................................................................. 10  
   6.4. Unclear Objective in Fisheries Management ............................................................. 10  
   6.5. Weak Institutional Arrangements and Regulatory Frameworks ............................... 10  
   6.6. Limited Access to Credit and Finance ..................................................................... 11  
   6.7. Weak Enforcement of Fisheries Regulations ............................................................ 11  
   6.8. Effects of Climate Change ......................................................................................... 11  

7. CONCLUSION AND RECOMMENDATIONS ....................................................................... 13  
   7.1. Institutional Rearrangement ....................................................................................... 13  
   7.2. Harmonization of the Relevant Legal Framework ..................................................... 13  
   7.3. Formulation of the Fisheries Sector Policy ................................................................. 13  
   7.4. Operationalization of the Aquaculture and Fisheries Fund ....................................... 13  
   7.5. Creation of a Think Tank Institution ......................................................................... 13  
   7.6. Stock Assessment ...................................................................................................... 13  
   7.7. Management of the Fisheries Based on Sound Objective ........................................ 14  

APPENDIX .................................................................................................................................... 15  
REFERENCES .............................................................................................................................. 21
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aquaculture Output in Kg per capita by African Producer (2010)</td>
<td>3</td>
</tr>
<tr>
<td>2. Estimates of the Fish Production from Capture Fisheries and Aquaculture</td>
<td>4</td>
</tr>
</tbody>
</table>

LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trend of Fish Production and Fishers from Capture Fisheries (1974-2013)</td>
<td>2</td>
</tr>
<tr>
<td>2. Trend of Fish Production from Aquaculture (1974-2013)</td>
<td>3</td>
</tr>
<tr>
<td>3. Quantity of Fish Imported against Exported</td>
<td>5</td>
</tr>
<tr>
<td>4. Value of Fish Imported against Exported</td>
<td>5</td>
</tr>
<tr>
<td>5. Fish Marketing Chain</td>
<td>9</td>
</tr>
</tbody>
</table>

APPENDIX FIGURES

A. Trend of Fish Catches for Lake Bangweulu (1974–2013) | 15 |
B. Trend of Fish Catches for Lake Mweru Luapula (1974–2013) | 15 |
C. Trend of Fish Catches for Lake Mweru Wantipa (1974–2013) | 16 |
D. Trend of Fish Catches for Lake Tanganyika (1974–2013) | 16 |
E. Trend of Fish Catches for Kafue River (1974–2013) | 17 |
F. Trend of Fish Catches for Lake Kariba (2003–2013) | 17 |
G. Trend of Fish Catches for Lukanga River (1974–2013) | 18 |
H. Trend of Fish Catches for Upper Zambezi River (2003–2013) | 18 |
I. Trend of Fish Catches for Lusiwashi (2003–2013) | 19 |
J. Trend of Fish Catches for Lower Zambezi (2003–2013) | 19 |
K. Trend of Fish Catches for Itezhi-Ttezhi (2003–2013) | 20 |
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADP</td>
<td>Aquaculture Development Plan</td>
</tr>
<tr>
<td>CEEC</td>
<td>Citizen Economic Empowerment Commission</td>
</tr>
<tr>
<td>CSO</td>
<td>Central Statistics Office</td>
</tr>
<tr>
<td>DOF</td>
<td>Department of Fisheries</td>
</tr>
<tr>
<td>EMA</td>
<td>Environmental Management Act</td>
</tr>
<tr>
<td>EPB</td>
<td>Environmental Project Brief</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organisation</td>
</tr>
<tr>
<td>IAPRI</td>
<td>Indaba Agricultural Policy Research Institute</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labor Organization</td>
</tr>
<tr>
<td>kgs</td>
<td>kilograms</td>
</tr>
<tr>
<td>MAL</td>
<td>Ministry of Agriculture and Livestock</td>
</tr>
<tr>
<td>NAP</td>
<td>National Agricultural Policy</td>
</tr>
<tr>
<td>PLARD</td>
<td>Programme for Luapula Agricultural and Rural Development</td>
</tr>
<tr>
<td>Ramsar</td>
<td>The Convention on Wetlands of International Importance</td>
</tr>
<tr>
<td>SADC</td>
<td>Southern African Development Community</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

Over the coming decades, population growth, urbanization, and income growth, especially in developing countries, will result in huge increases in demand for animal and fish products. There is evidence that suggests that as people emerge from absolute poverty, dietary diversification, including increased consumption of high value and high protein foods, such as those derived from livestock and fish, tends to be one of the first manifestations of their increased spending power (Delgado et al. 2003). A recently conducted fish value chain report by ILO (2014) estimates a current fish supply deficit of 57,000 metric tons. Nearly a quarter of the available fish in the country is being imported. The fish supply deficit is bound to increase with rapidly increasing demand and declining natural fisheries stocks unless production from aquaculture or imports can be increased at a higher rate to offset this deficit. Increased production from aquaculture by especially small- and medium- scale sector in suitable areas would be beneficial, as this would significantly contribute to reducing the high rural poverty levels.

This paper highlights the status, management, and challenges the fisheries subsector faces in Zambia. An attempt has been made to give an overview of fish supply and consumption that includes the trade core. Both qualitative and quantitative secondary data were used from the Department of Fisheries (DOF) and Central Statistics Office (CSO). Department of Fisheries also provided the information on the major steps being undertaken in the subsector. Online resources were also utilized.

1.1. Overview of the Fisheries Sector in Zambia

Zambia is endowed with 12 million hectares of water in form of rivers, lakes, and swamps and 8 million hectares of wetlands (ADP 2009). This endowment represents a huge fisheries and aquaculture resource that is segmented into three major water basins that include the Congo, Luapula, and the Zambezi catchments. The Congo basin is the smallest and is represented by Lake Tanganyika. The Luapula Basin consists of the Chambeshi River and the Bangweulu Lakes and Swamps Complex, Luapula River, Mweru-wa-Ntipa and Lake Mweru. The Zambezi catchment area is the largest and consists of the Luangwa River, Lukanga swamps, Kafue River, Zambezi, the Middle Zambezi (now dominated by Lake Kariba), and Lower Zambezi.

The fisheries subsector is important in the economy of Zambia as it is projected to contribute about 0.4% to the agriculture sector (Central Statistics Office 2014) and that it supports around one million people both directly and indirectly (DOF 2014). Furthermore, fish contributes 53.4% of animal protein in the diets of Zambians (FAO 2012a). Although globally the fish consumption has grown from 9.9 kg in 1960s to 19.2 kg in 2012 (FAO 2014b), the scenario in Zambia has remained subdued.

The fisheries sector in Zambia consists of two subsectors namely capture fisheries and aquaculture. The distinctions between the two are explained below.

1.1.1. Capture Fisheries

Capture fisheries involves the harvesting of naturally occurring fish resources in the naturally occurring water bodies such as lakes, rivers, and any impoundments. The major capture fisheries include Lakes Kariba, Mweru–Luapula, Mweru–Wantipa, Lusiwasi, Itezhi Tezhi, and Tanganyika. The major rivers include Kafue, Luangwa, Lukanga, Chambeshi, and
Zambezi. Therefore, emphasis is on fisheries management in order to sustain fish production from natural water bodies.

The production from capture fisheries is not likely to increase from the current 75,000 tons\(^1\) on average since they are being over-exploited due to the use of destructive methods coupled with an increasing number of fishers. For instance, there were 7,696 fishers in 1976 against 18,150 fishers in 2013 in the Lake Bangweulu complex alone. This may explain why the fish production from capture fisheries has started to decline since 2010 (Figure 1). It is important to mention that the fish catches have been declining in only Kafue and Mweru Wantipa fisheries (Appendix 1).

1.1.2. Aquaculture Sector

Aquaculture refers to the cultivation, propagation or farming of fish, aquatic vegetation, or other living aquatic resources whether from eggs, spawn, spat, or seed, or by rearing fish lawfully taken from the wild or lawfully imported into the country, or by other similar process (Fisheries Act No. 22 2011). In Zambia, the tilapia and the catfish are the main fish types grown through either the cage system or the pond system, the systems that have been adapted to the country. The latter system has been rapidly expanding since 2004 especially in Lake Kariba. Its upscaling is also being witnessed in Lakes Mweru, Bangweulu complex, and Tanganyika. While fish diseases, theft, and pollution are well known challenges, the cages have great advantage in that they have a relatively lower investment cost in that they use the already existing water body compared to pond culture. Furthermore, productivity in cages is higher than in ponds.

Optimal fish growing requires specific climatic conditions. For Zambia, the best temperatures for growing tilapia and catfish are found in lower altitudes (below 1,000 m) in the Zambezi valley, the Luangwa River and Lake Tanganyika. Most Zambian waters are suboptimal temperature for tilapia and catfish (ILO 2014).

Figure 1. Trend of Fish Production and Fishers from Capture Fisheries (1974-2013)

\(^1\) The production is estimated through a Catch Assessment Survey conducted by the Department of Fisheries. The survey is standard international survey that is carried out by many countries in Africa.
However, Zambia’s aquaculture fish production has grown significantly in the last two decades. From a total production of only 5,000 tons of fish per annum in 2006, the country now produces about 20,000 tons in 2013 (Figure 2). The increase is mainly due to the rapid adoption of cage fish farming which is a high intensive system. Furthermore, the emerging of the private sector in fish seed and feed production has been too a catalyst in the upscaling of fish production in Zambia. Fish demand has also been an attractant to investment in aquaculture.

In comparison to other countries, Zambia’s aquaculture per capita fish production ranks low although highest in the region. The production is actually below Africa’s average (Table 1). Given the climatic conditions and water resources, there is potential for the country to produce and export more fish from the aquaculture sector.

**Figure 2. Trend of Fish Production from Aquaculture (1974-2013)**

![Graph showing fish production from aquaculture (1974-2013)]

Data source: Department of Fisheries 2013.

**Table 1. Aquaculture Output in Kg per capita by African Producer (2010)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>kg per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Egypt</td>
<td>11.34</td>
</tr>
<tr>
<td>2</td>
<td>Zanzibar</td>
<td>3.84</td>
</tr>
<tr>
<td>3</td>
<td>Uganda</td>
<td>2.84</td>
</tr>
<tr>
<td>4</td>
<td>Nigeria</td>
<td>1.27</td>
</tr>
<tr>
<td>5</td>
<td>Zambia</td>
<td>0.79</td>
</tr>
<tr>
<td>6</td>
<td>Madagascar</td>
<td>0.53</td>
</tr>
<tr>
<td>7</td>
<td>Ghana</td>
<td>0.42</td>
</tr>
<tr>
<td>8</td>
<td>Kenya</td>
<td>0.30</td>
</tr>
<tr>
<td>9</td>
<td>Zimbabwe</td>
<td>0.21</td>
</tr>
<tr>
<td>10</td>
<td>Malawi</td>
<td>0.21</td>
</tr>
<tr>
<td>11</td>
<td>Tanzania</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Africa</td>
<td>1.64</td>
</tr>
</tbody>
</table>

Source: FAO 2012.
2. FISH CONSUMPTION

Although the country has abundant water resources, fish consumption per capita has been declining over the decades. For instance, the annual fish consumption per capita has reduced from 12 kgs in 1970s to 7.7 kgs in 2012. The higher fish consumption than production is attributable to an increased amount of fish imports mainly from Asia and South Africa (Figure 4). Given that the global fish consumption per capita has grown from 9.9 kg in the 1960s to 19.2 kg in 2012 (FAO 2012a), Zambia’s fish consumption per capita rate remains worrisome. The CSO projects that by 2025, Zambia will have a population of 20.5 million requiring fish production of 247,000 tons to meet the local demand if the 12 kg consumption per capita is envisaged. The fish deficit is estimated to escalate to over 171,000 tons (excluding exports and imports) of fish by the year 2025. Given the current fish production, considerable effort must be made to explore the fisheries sector if the supply demand gap has to be bridged (Table 2).

2.1. Fish Imports and Exports

The data on fish imports and exports between 2001 and 2010 show that Zambia imports much more fish than it exports. Of great concern is that fact that exports continue to decline while imports have tremendously increased in the last three years as shown in Figures 3 and 4. If no deliberate measures are employed to halt the existing trend, this scenario is likely to continue in many years to come and, as fish demand increases, it would impact negatively on the country’s fiscal policy.

<table>
<thead>
<tr>
<th>Year</th>
<th>Capture fisheries (tons)</th>
<th>Aquaculture (tons)</th>
<th>Exports (tons)</th>
<th>Imports (tons)</th>
<th>Deficit (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>50,988</td>
<td>750</td>
<td>DU</td>
<td>DU</td>
<td>16,203</td>
</tr>
<tr>
<td>1990</td>
<td>64,868</td>
<td>3,562.5</td>
<td>DU</td>
<td>DU</td>
<td>24,679.4</td>
</tr>
<tr>
<td>2000</td>
<td>66,671</td>
<td>4,240</td>
<td>DU</td>
<td>DU</td>
<td>47,716</td>
</tr>
<tr>
<td>2010</td>
<td>76,396</td>
<td>10,291</td>
<td>-</td>
<td>-</td>
<td>66,742.7</td>
</tr>
<tr>
<td>2020</td>
<td>75,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>139,625.1</td>
</tr>
<tr>
<td>2025</td>
<td>75,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>171,889.7</td>
</tr>
</tbody>
</table>

Source: Department of Fisheries 2013; Central Statistical Office 2014.
Note: DU–Data unavailable.
Figure 3. Quantity of Fish Imported against Exported

Source: Department of Fisheries 2013.

Figure 4. Value of Fish Imported against Exported

Source: Department of Fisheries 2013.
3. POLICY AND REGULATORY FRAMEWORK

The fisheries sector does not presently have a standalone policy. It is covered by the National Agricultural Policy (NAP) (2004–2015) that governs the development of the agriculture sector in Zambia. However, the emphasis in the policy is on fish resource management, which is related to capture fisheries with little mention of aquaculture, which provides great potential to increase the country’s fish production.

The Fisheries Act No. 22 of 2011 is the Principal Act of Parliament, supplemented by the Fisheries Regulations No. 24 of 2012. This Act provides for the promotion of sustainable development of fisheries and a precautionary approach in fisheries management, conservation and utilization, and the regulation of commercial fishing and aquaculture. In addition, other Acts affect the fisheries sector including:

- The Environmental Management Act (EMA) No. 12 of 2011;
- The Water Resource Management Act, 2011;
- Local Government Act, Chapter 281;
- Biosafety Act No. 10 of 2007;
- Public Health Act repealed by the Act No. 22 of 1995;
- Zambezzi River Authority Act No of 17 of 1987;
- Lands act of 1995 (CAP 184);
- ZAWA Act No. 12 of 1998;
- Animal Health Act No. 27 of 2010;
- Cooperatives Act No. 20 of 1998; and

However, there are overlaps in some Acts, which are recipes for confusions in the implementation of the same pieces of the legislation. For example, both the Fisheries Act No. 22 of 2011 and the Animal Health Act No. 27 of 2010 provide for restrictions of the importation of fish. In this regard, the public get confused as which institution is the responsible authority for monitoring fish imports.

Furthermore, Zambia is a signatory to a number of international and regional conventions, treaties, and protocols that are related to the Fisheries and Aquaculture development. These may include the Convention on Biological Diversity, the Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries and Aquaculture, the SADC Protocol on Fisheries, the SADC Protocol on Shared Water Bodies, the SADC Treaty on Management of Watercourse Systems, the Ramsar Conventions, and the Convention on the Sustainable Management of Lake Tanganyika.
4. GOVERNMENT MEASURES AND INCENTIVES IN THE FISHERIES SECTOR

4.1. Fisheries Management Plans

The Ministry of Agriculture and Livestock (MAL) through the DOF has been developing the Fisheries Management Plans that define how the fisheries will be managed. These spell out specific management interventions including investment plans for the fisheries.

4.2. National Aquaculture Strategy

With financial support from FAO, Zambia developed the National Aquaculture Strategy in 2006 and the National Aquaculture Development Plan in 2008. These have been used to attract private sector investment in aquaculture.

4.3. Development of Aquaculture Parks

The country was demarcated into Aquacultural High Potential Zones that include the Aqua Parks in Rufunsa in Lusaka Province, Gwembe in Southern Province, Kasempa in North Western Province, and Mungwi in Northern Province. According to FAO, an aqua park is the delimited areas in aquatic environment, composed of several aquaculture areas, and where compatible activities may be carried out in intermediate spaces (FAO 2012).
http://www.fao.org/docrep/019/i3363e/i3363e.pdf

4.4. Block Environmental Project Briefs (EPB)

It is mandatory to conduct an environmental assessment [EMA Act No. 12 of 2011] that spells out the environmental, social, economic, and political impacts associated with the project and the mitigation and enhancement measures where necessary when establishing an aquaculture production venture. This requirement is seen as unnecessary expense to small-scale farmers. MAL through DOF has been developing the block EPBs for small-scale farmers in Lakes Bangweulu and Mweru with the financial support from the Programme for Luapula Agricultural and Rural Development (PLARD II).

4.5. Extension Delivery

The Ministry of Agriculture and Livestock through DOF has extension workers in most parts of the country. Ideally, it should be in every district and camp. However, due to inadequate number of staff some areas are not serviced. At present, the staffing levels in the department stand at 18% of the total establishment. It is important to note that the aquaculture section is the subsection that mainly needs experienced extension workers who can effect change in the farming community. Capture fisheries, at this time, requires enforcement of the existing regulations to avoid unsustainable fish exploitation methods.

4.6. The Aquaculture and Fisheries Fund

The Fisheries Act No. 22 of 2011 provides for the creation of an Aquaculture and Fisheries Fund with the aim of developing the fisheries and aquaculture sector and facilitating a community-based approach to fisheries management and development. Despite this provision, the establishment of the fund has not been fulfilled.
4.7. Citizen Economic Empowerment Commission (CEEC)

Established by the Zambian Government through an Act of Parliament No. 9 of 2006, CEEC is mandated to implement various economic empowerment programs across the country. The Commission has been promoting aquaculture in the country. This initiative has motivated small-scale fish farmers to scale up their production.
5. MARKETING ARRANGEMENTS FOR FISH PRODUCTS

Most of the fish produced in the country go through the informal marketing channels, as there is high demand for fish at both fishery and farm gate. Large-scale producers have set up their marketing arrangements in the country to sell their products. However, as the sector grows, there is every need to promote a formal marketing mechanism along the value chain to promote more market opportunities for the fish producers and processors. The current situation is that either fish producers sell to wholesalers or to traders who later sell to the retailers where the fish reaches the consumer (see Figure 5). However, it is also common to sell directly to consumers upon fish capture from either a natural water body or an aquaculture facility.

Figure 5. Fish Marketing Chain

Source: Authors.
6. CHALLENGES BEING FACED BY THE FISHERIES SECTOR

The fisheries sector is facing numerous challenges that require address if the sector has to see gains that benefit the people and the economy of Zambia. The following are the major ones identified.

6.1. Conflicting Legal Framework

The Fisheries Act No. 22 of 2011 and The Animal Act No. 27 of 2010 have several clauses that resemble one another. For instance, Article 57 in the Animal Act and Article 20 of the Fisheries Act are similar. On the other hand, the quality of the effluent as defined by the Environmental Management Act No. 22. 2011 conflicts with the optimal fish production from aquaculture. For example, the permitted lower limit of pH is not ideal for the physiology of the fish.

6.2. Low Production and Productivity

The production of fish from both aquaculture and capture fish subsectors is very low compared to the amount of water that Zambia is endowed with (20% of its total surface area to water natural resources in the form of lakes, rivers, streams, and reservoirs). The production being reported by the DOF does not include Chisense but this is one of the most important fisheries in the country. Furthermore, fish production from other fisheries such as Upper Kafue River is not reported. Productivity from fishponds is as low as 2.8 tons per hectare as opposed to the recommended 6–8 tons per hectare.

6.3. Lack of Fish Storage Facilities

Storing fresh fish has remained a challenge especially among the small-scale fishers and fish farmers. As most of the fish areas are not connected to electricity, the use of refrigeration is highly limited. As a result, most of the fish from the small-scale fishers and fish farmers ends up dried or salted which may negatively affect the nutritional value. Post-harvest losses have a negative impact on the income and nutrition of the majority who depend on the fish.

6.4. Unclear Objective in Fisheries Management

While it is undeniable that achieving a combination of biological, economic, social, and political objectives is the best as observed by Mardle et al. (2002) and Hilborn (2007), optimising these objectives simultaneously is impossible (Pope 1997). This is why it is important to define a clear objective so that the fishing effort is regulated according to the set goal. Unfortunately, there is none in Zambia and regulating the fishing effort is difficult without a clear objective.

6.5. Weak Institutional Arrangements and Regulatory Frameworks

The Department of Fisheries is mandated to manage the sector and has two major sections, namely capture fisheries and aquaculture. While both are about the fish, the objectives are different. Aquaculture is fish production through farming while capture fisheries is wild fish resources management. Traditionally the priority has been placed on capture fisheries with greater financial resources being devoted to it, while aquaculture has continued to receive less
attention. However, it is undeniable that aquaculture is the future of the fish production to meet the ever increasing demand.

The NAP does not suit the unique features of the subsector especially the capture fisheries that encompasses resource management and this has resulted in mismatches and overlaps in the administration of the subsector.

The extension delivery and research are very weak due to inadequate resources. Research and extension integration it into the development agenda is also largely overlooked.

6.6. Limited Access to Credit and Finance

Although the government has financed some initiatives for the subsector, such as for the CEEC initiative, low investment by both government and the public sector persists. However, there is steady growth from investment in the aquaculture subsector, mainly by large scale producers, while small scale fish farming investment by government financing to the department of agriculture has remained very low—at less than 5% of the total budget.

6.7. Weak Enforcement of Fisheries Regulations

MAL through the DOF is mandated to manage the fish as enshrined in an Act of Parliament No. 22 of 2011 through a number of management measures. The measures include imposition of the closed fishing season which runs from December first to the last day of February, gear mesh size restriction, and licensing of boats to limit the number of fishing operators thereby maximizing the economic benefits of the fishery among the others. However, due to inadequate financial and human resources, enforcement is very weak encouraging the use of inappropriate fishing methods.

6.8. Effects of Climate Change

Climate change has been ignored in the fisheries sector despite its effect being evident in the sector. For instance, Bangweulu Complex has been drying up slowly in the last few decades. According to the data obtained from the Department of Water Affairs and reported by the Department of Fisheries, the depth of the lake has decreased 0.66 meters between 1974 and 2011 and the correlation between that period and water level is significant (Figure 6). We hypothesize that the drying up of the lake is a result of the climate change. However, we are mindful that anthropogenic activities may be at play too.

The scenario calls for immediate adaptation measures that should address the effect of low water levels in the lake. Clearly as the water level declines, the extraction rate of fish increases meaning the over exploitation of the fish will continue. This may be similar in all other fisheries.
Figure 6. Trend of Water Level Decline in Lake Bangweulu (1974-2011)

Data source: Department of Fisheries 2014.
7. CONCLUSION AND RECOMMENDATIONS

Data on fish catches in major fisheries indicate an increase fish supply due to an increasing number of fishers being recruited in the subsector. However, the catch per fisher has been declining over the last four decades. The subsector faces many challenges that need to be addressed to maximize the benefits of the natural resources. It is undeniable that fish from capture fisheries will not increase but aquaculture should be supported, as it is the only source that has a huge potential for rapid development and thus, reduce the fish imports to safeguard the country’s foreign exchange.

7.1. Institutional Rearrangement

As mentioned above, the DOF is responsible for both aquaculture and capture fisheries but the resources are skewed towards the latter despite that increased production is only going to be achieved through aquaculture. The current institutional set up does not suit aquaculture development. There is need to split the department into two namely, a Department of Capture Fisheries and a Department of Aquaculture. The Department of Capture Fisheries will be responsible for wild fish resources management. The Department of Aquaculture will oversee the aquaculture production. Otherwise there is need to strengthen the aquaculture section within DOF so that it is in tandem with the projected required fish production.

7.2. Harmonization of the Relevant Legal Framework

There must be a deliberate effort to harmonize the various Acts of the Parliament in any way affect the fisheries sector to avoid conflicts.

7.3. Formulation of the Fisheries Sector Policy

There is an urgent need to formulate the fisheries sector policy that will guide the development of aquaculture and fisheries.

7.4. Operationalization of the Aquaculture and Fisheries Fund

The fund must be operational so that it catalyzes the fish production especially in aquaculture where tremendous amounts of resources are required. It is by law that the fund was created, therefore, it must be operationalized without delays.

7.5. Creation of a Think Tank Institution

The fisheries sector does not have a think tank institution that must offer research and policy analysis that can be used as guides in the development agenda of the sector. There is an urgent need to create one or the already existing agricultural institutes need to intensify the sections on fisheries and aquaculture.

7.6. Stock Assessment

There is every need to estimate the stocks in the major fisheries in order to understand the dynamics of the stocks. At present, apart from the kapenta fishery, it is difficult to discuss the
over fishing of the fisheries since the catches show an increase. The increase in itself may not mean that the fisheries are being improved rather they may deduce over exploitation due to a large entry of the fishers coupled with the deployment of destructive fishing methods.

7.7. Management of the Fisheries Based on Sound Objective

As discussed earlier, the management of capture fisheries should be based on biological or socio-economic objectives. This is because the level of fishing effort differs accordingly.
APPENDIX

TRENDS OF FISH CATCH

Figure A. Trend of Fish Catches for Lake Bangweulu (1974–2013)

Source: Department of Fisheries 2013.

Figure B. Trend of Fish Catches for Lake Mweru Luapula (1974–2013)

Source: Department of Fisheries 2013.
Figure C. Trend of Fish Catches for Lake Mweru Wantipa (1974–2013)

Source: Department of Fisheries 2013.

Figure D. Trend of Fish Catches for Lake Tanganyika (1974–2013)

Source: Department of Fisheries 2013.
Figure E. Trend of Fish Catches for Kafue River (1974–2013)

Source: Department of Fisheries 2013.

Figure F. Trend of Fish Catches for Lake Kariba (1974–2013)

Source: Department of Fisheries 2013.
**Figure G. Trend of Fish Catches for Lukanga River (1974–2013)**

Source: Department of Fisheries 2013.

**Figure H. Trend of Fish Catches for Upper Zambezi River (2003–2013)**

Source: Department of Fisheries 2013.
Figure I. Trend of Fish Catches for Lusiwashi (2003–2013)

Source: Department of Fisheries 2013.

Figure J. Trend of Fish Catches for Lower Zambezi (2003–2013)

Source: Department of Fisheries 2013.
Figure K. Trend of Fish Catches for Itezhi-Ttezhi (2003–2013)

Source: Department of Fisheries 2013.
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