



**FACULTY OF NATURAL RESOURCES AND ENVIRONMENTAL SCIENCES**  
**DEPARTMENT OF FISHERIES AND WATER RESOURCES MANAGMENT**  
**A RESEARCH REPORT ON THE ROLE OF AQUACULTURE EXTENSION**  
**SERVICES ON AQUACULTURE PRODUCTION IN KAPYANGA AND MUTERERE**  
**SUB- COUNTIES, BUGIRI DISTRICT**

**BY HISAMBO EMMANUEL**

**REG. NUMBER BU/UP/2020/0790**

**A RESEARCH REPORT SUBMITTED TO THE FACULTY OF NATURAL**  
**RESOURCES AND ENVIRONMENTAL SCIENCES, DEPARTMENT OF FISHERIES**  
**AND WATER RESOURCES MANAGEMENT, IN PARTIAL FULFILLMENT OF THE**  
**REQUIREMENTS FOR THE AWARD OF A BACHELOR OF SCIENCE DEGREE OF**  
**FISHERIES AND WATER RESOURCES MANAGEMENT.**

**JULY 2024.**

## **DECLARATION**

I, **Emmanuel Hisambo** declare that to the best of my knowledge this research report is completely out of my efforts, about tasks that I accomplished during the three weeks spent during my research study, and therefore has never been submitted to any university for the award of any qualification.

**APPROVAL**

This report was done under the supervision of:

Sign: ..... Date: .....

**Dr. John. S. Balirwa**

## **DEDICATION**

I dedicate this research report to Miss Orishaaba Prossy, my family and friends.

## Table of Contents

<b>DECLARATION</b> .....	<b>2</b>
<b>APPROVAL</b> .....	<b>3</b>
<b>DEDICATION</b> .....	<b>4</b>
<b>List of figures</b> .....	<b>8</b>
<b>List of tables</b> .....	<b>9</b>
<b>ABBREVIATIONS AND ACRONYMS</b> .....	<b>11</b>
<b>1.0 CHAPTER ONE</b> .....	<b>13</b>
<b>1.1 Background to the study</b> .....	<b>13</b>
<b>1.2 Problem Statement</b> .....	<b>13</b>
<b>1.3 Research Objectives</b> .....	<b>13</b>
<b>1.4 Main Objective</b> .....	<b>13</b>
<b>1.5 Specific objectives</b> .....	<b>13</b>
<b>1.6 Research Questions</b> .....	<b>14</b>
<b>1.7 Significance of the Study</b> .....	<b>14</b>
<b>1.8 Justification of the study</b> .....	<b>14</b>
<b>1.9 Conceptual Framework</b> .....	<b>15</b>
<b>2.0 CHAPTER TWO: LITERATURE REVIEW</b> .....	<b>17</b>
<b>2.1 Definition of agricultural extension</b> .....	<b>17</b>
<b>2.2 History of Agricultural extension services delivery in Uganda</b> .....	<b>17</b>
<b>2.3 Role of extensions services</b> .....	<b>18</b>
<b>2.4 Challenges faced by extension officers</b> .....	<b>19</b>
<b>3.0 CHAPTER THREE: MATERIALS AND METHODS</b> .....	<b>21</b>
<b>3.1 Period of the study</b> .....	<b>21</b>
<b>3.2 Location of Kapyanga and Muterere sub-counties in Bugiri district</b> .....	<b>22</b>
<b>3.3 Location of Kapyanga and Muterere Sub Counties</b> .....	<b>22</b>
<b>3.4 Location of Muterere Sub County</b> .....	<b>23</b>
<b>3.5 Research Design</b> .....	<b>23</b>
<b>3.6 Sample size</b> .....	<b>24</b>
<b>3.7.1 Surveys and Questionnaires</b> .....	<b>24</b>

3.7.2	Observations .....	24
3.7.3	Document Analysis .....	24
3.7.4	Remote Sensing and GIS:.....	24
3.8	Data analysis .....	24
3.9	Limitations.....	24
3.9.1	Limited Access and Infrastructure: .....	24
3.9.2	Language Barriers: .....	24
3.9.3	Limited Internet and Communication Facilities:.....	24
3.9.4	Limited Resources: .....	24
3.9.5	Health and Safety Concerns:.....	25
3.9.6	Weather changes.....	25
4.0	<b>RESULTS AND DISCUSSIONS</b> .....	28
4.1	Distribution of respondents (farm owners, casual laborers and farm managers) .....	28
4.2	Socio-economic characteristics of respondents.....	29
4.2.1	Age of respondents.....	29
4.2.2	Education levels .....	29
4.2.3	Experience of respondents in aquaculture.....	30
4.2.4	Gender .....	31
4.2.5	ICT literacy levels.....	32
4.2.6	Relationship between experience and production .....	32
4.2.7	Extension Workers and Extension Service Delivery .....	33
4.2.8	Relationship between extension worker visits and production .....	34
4.2.9	Expectations from farmers.....	35
4.3	Major constraints .....	35
5.0	<b>CONCLUSION AND RECOMMENDATION</b> .....	38
5.1	Conclusion .....	38
5.2	Recommendation.....	38
	<b>Appendices</b> .....	43
	<b>FISH FARMER QUESTIONNAIRE FORM</b> .....	43
	<b>EXTENSION WORKER QUESTIONNAIRE FORM</b> .....	47

## List of figures

<b>Figure 1.</b> Map of Bugiri District showing Kapyanga and Muterere sub-counties.....	<b>21</b>
<b>Figure 2.</b> Map of Kapyanga and Muterere sub-counties.....	<b>22</b>
<b>Figure 3.</b> Amap of the study area showing distribution of respondents .....	<b>28</b>
<b>Figure 4.</b> Age of respondents .....	<b>29</b>
<b>Figure 5.</b> Education levels .....	<b>30</b>
<b>Figure 6.</b> Extension workers experience.....	<b>31</b>
<b>Figure 7.</b> Gender of respondents .....	<b>31</b>
<b>Figure 8.</b> ICT literacy levels.....	<b>32</b>
<b>Figure 9.</b> Relationship between aquaculture experience and production .....	<b>33</b>
<b>Figure 10.</b> Relationship between extension visits and production.....	<b>34</b>

**List of tables**

<b>Table 1. Experience of respondents in aquaculture .....</b>	<b>30</b>
<b>Table 2. Extension Workers and Extension Service Delivery .....</b>	<b>34</b>
<b>Table 3. Expectations from farmers .....</b>	<b>35</b>



## ABBREVIATIONS AND ACRONYMS

etc: And other Similar Things  
FAO: Food and Agricultural Organisation

GoU/GOU: Government of Uganda

Ha: Hectare

i.e: That is to say

Kg: Kilogram

Km: Kilometer

MAAIF: Ministry of Agriculture, Animal Industry and Fisheries

MWE: Ministry of Water and Environment

NAADS: National Agricultural Advisory Services

NARO: National Agricultural Research Organisation

NDP: National Development Plan

NEMA: National Environment Management Authority

NFA: National Forestry Authority

NGOs: Non Government Organisations

*spp*: Species

UWA: Uganda Wildlife Authority

## **ABSTRACT**

Many aquaculture fish farmers, particularly in rural Kapyanga and Muterere sub-counties of Bugiri district in Uganda, face challenges in adopting efficient and sustainable practices which results into these farmers not maximizing available opportunities in the sector, hence limiting overall aquaculture production. This study assessed the role of aquaculture extension services on aquaculture production in the sub-counties of Kapyanga and Muterere in Bugiri district (February 2024). The study examined the socio-economic characteristics of fish farmers (specifically managers, laborers and owners of fish farms) and extension worker perceptions. 18 Respondents who had been practicing aquaculture for at least 3 years and the extension officers in charge of the sub-counties occupied by the farmers were selected purposively for this study. The findings of the study indicated that all respondents (managers, laborers and owners of fish farms) had access to the extension services available.

11, (55%) of the farmers prioritized feed formulation as their top most need, 8 (39%) of the 20 respondents fall within the age class of more than 35 years with 61% being in the age class of 26-35 and none of the respondents were less than 25 years.

The study showed that 44% of the respondents (farm owners, casual laborers and farm managers) had acquired primary education, 39% secondary education and 17% were graduates. Generally, increase in the number of visits increased productivity amongst the farmers and aquaculture extension had a significant positive influence on aquaculture production. There is likely a possibility of improving production through advocating for ICT based extension service delivery and by increasing women's participation in the aquaculture sector.

## **1.0 CHAPTER ONE**

### **1.1 Background to the study**

Aquaculture extension services are associated with dissemination of information and knowledge about various aspects of aquaculture, which include farm management, species selection, disease management, environmental sustainability, market development, financial, and business management. In addition, approaches including on-site visits, training workshops, demonstrations, educational materials and digital platforms are used to deliver to fish farmers. (Hilkens, 2018).

Fish farmers continue to experience obstacles to obtaining adequate access to aquaculture extension services yet Knowledge has to be transferred to farmers, so that they should be able to appreciate the value of the skills, provided under extension, for purposes of improving farming experiences, to be able to have increased yields, for home consumption and sale purposes. (Anderson & Feder, 2004).

### **1.2 Problem Statement**

Many aquaculture fish farmers, particularly in rural Kapyanga and Mutere sub-counties in Bugiri district face challenges in adopting efficient and sustainable practices. Therefore, these fish farmers do not maximize available opportunities in the aquaculture sector hence limiting overall aquaculture production. This can be linked to uneven provision of extension services to fish farmers leaving marginalized fish farmers vulnerable. This research aimed at addressing these gaps by investigating the role of aquaculture extension services in influencing aquaculture production.

### **1.3 Research Objectives**

#### **1.4 Main Objective**

The main objective of the study was to find out the role of aquaculture extension services on aquaculture production in Kapyanga and Mutere sub- counties in Bugiri district.

#### **1.5 Specific objectives**

1. To assess the frequency of provision of aquaculture extension services to fish farmers in Kapyanga and Mutere sub-counties.
2. To identify the key challenges and barriers faced by aquaculture farmers in accessing extension services and extension workers during the provision of extension services.
3. To analyze the impact of extension services on the overall productivity and profitability

## References

1. Anderson, J. L. (2007). Sustainable aquaculture: What does it mean and how do we get there. Species and system selection for sustainable aquaculture, 9-18.
2. Ani AO. Assessment of farmers' extension education needs in Yobe State, Nigeria. *Nigerian J Agric Educ.* 1998; 1:152-158.
3. Awuor, F. J., Opiyo, M. A., Obiero, K. O., Munguti, J. M., Abwao, J., Nyonje, B. M., ... & Stappen, G. V. (2021). Aquaculture extension service in Kenya: Farmers and extension officer's perspectives. *Journal of Agricultural Extension and Rural Development*, 13(1), 14-22.
4. Banga, M., Kudeeba Mwanja, R., Namumbya, S., Owani, S. O., Nadiope, E., Tenywa Mwanja, M., & Mwanja, W. W. (2018). Socio-economic considerations for rural aquaculture development of Singida tilapia, *Oreochromis esculentus* (Teleostei: Cichlidae, Graham 1928) in Uganda, East Africa.
5. Davidson AP, Ahmad M, Ali T. Dilemmas of Agricultural Extension in Pakistan: Food for thought. *Agricultural Research and Extension Network*, 2001, 116.
6. FAO. The state of world fisheries and aquaculture. Rome: Food and Agriculture, 2012.
7. Himanshu KD, Dileep KP. Constraints to women's involvement in small-scale aquaculture: an exploratory Study. *Int. J Agr Ext.* 2014s; 02(01):81-88.
8. Inoni OE. Allocative efficiency in pond fish production in Delta State, Nigeria: A production function approach. *Agric. Tropica Subtropica.* 2007; 40:127-134.
9. Iwama, G. K. (1991). Interactions between aquaculture and the environment. *Critical Reviews in Environmental Science and Technology*, 21(2), 177-216.
10. Lim G. Value chain upgrading: Evidence from the Singaporean aquaculture industry. *Mar. Policy*, 2015. <http://dx.doi.org/10.1016/j.marpol.2015.03.016>.
11. Machila M, Lyne M, Nuthall P. Assessment of an outsourced agricultural extension service in the Mutasa district of Zimbabwe. *J Agric Ext Rural Dev.* 2015; 7(5):142-149.
12. Mgbada JU. Effectiveness of Information sources on improved farming practices to women farmers in Enugu State, Nigeria. *Global Approaches to Extension Practice.* 2006; 2(1):67-78.
13. Moffitt, C. M., & Cajas-Cano, L. (2014). Blue growth: the 2014 FAO state of world fisheries and aquaculture. *Fisheries*, 39(11), 552-553.

14. Nandi JA, Gunn P, Adegboye GA, Barnabas TM. Assessment of Fish Farmers' Livelihood and Poverty Status in Delta State, Nigeria. *Agriculture, Forestry and Fisheries*. 2014; 3(5):427-433.
15. Naylor, R. L., Goldberg, R. J., Primavera, J. H., Kautsky, N., Beveridge, M. C., Clay, J., ... & Troell, M. (2000). Effect of aquaculture on world fish supplies. *Nature*, 405(6790), 1017-1024.
16. Naylor, R. L., Goldberg, R. J., Primavera, J. H., Kautsky, N., Beveridge, M. C., Clay, J., ... & Troell, M. (2000). Effect of aquaculture on world fish supplies. *Nature*, 405(6790), 1017-1024.
17. Oddsson, G. V. (2020). A definition of aquaculture intensity based on production functions—the aquaculture production intensity scale (APIS). *Water*, 12(3), 765.
18. Ottinger, M., Clauss, K., & Kuenzer, C. (2016). Aquaculture: Relevance, distribution, impacts and spatial assessments—A review. *Ocean & Coastal Management*, 119, 244-266.
19. Pauly, D., & Froese, R. (2012). Comments on FAO's State of Fisheries and Aquaculture, or 'SOFIA 2010'. *Marine Policy*, 36(3), 746-752.
20. Rahman, Mirza Aatur, Md Ghulam Mustafa, and Benoy Kumar Barman. "Impacts of aquaculture extension activities on female fish farmers in different areas of Bangladesh." *Bangladesh Journal of Zoology* 39.2 (2011): 213-221.
21. Rand, J., & Tarp, F. (2009). Impact of an aquaculture extension project in Bangladesh. *Journal of Development Effectiveness*, 1(2), 130-146.
22. Suleiman VR, Hall AJ. Beyond technology dissemination: Reinventing agricultural extension.
23. Tacon, A. G. (2020). Trends in global aquaculture and aqua feed production: 2000–2017. *Reviews in Fisheries Science & Aquaculture*, 28(1), 43-56.
24. Thompson, Paul M., A. K. M. Firoz Khan, and Parvin Sultana. "Comparison of aquaculture extension impacts in Bangladesh." *Aquaculture Economics & Management* 10.1 (2006): 15-31.