



FACULTY OF NATURAL RESOURCES AND ENVIRONMENTAL SCIENCES

**AN ASSESSMENT OF THE ROLE OF FISH FARMING IN ENHANCING FOOD
SECURITY IN BUMWONI SUB COUNTY, NAMISINDWA DISTRICT**

BY WATENYELA RASHID BU/UP/2021/3427

**RESEARCH REPORT SUBMITTED TO THE FACULTY OF NATURAL
RESOURCES AND ENVIRONMENTAL SCIENCES IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF
BACHELOR OF SCIENCE IN FISHERIES AND WATER RESOURCE
MANAGEMENT OF BUSITEMA UNIVERSITY**

DECEMBER, 2024

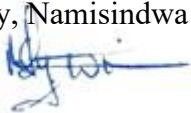
DECLARATION

I, **Watenyela Rashid** hereby declare that the information given in this report is out of my own efforts and to the best of my knowledge has never been submitted to any institution of higher learning for any academic award

Signature  Date 

APPROVAL

This is to certify that Watenyela Rashid a student of Busitema University carried out research on the topic “An assessment on the role of fish farming in enhancing food security in Bumwoni Sub County, Namisindwa District” under my keen supervision.

Sign.......... Date 28/01/2025

Tebitendwa Sylvie Muwanga

DEDICATION

This report is a special dedication to my beloved mummy and my lovely wife for their tireless efforts until the completion of this research report. May the Almighty God bless the work of their hands abundantly

ACKNOWLEDGEMENT

I acknowledge; God the Creator of heaven and Earth for the gift of life in abundance that everyone and I enjoy at zero cost. Without this gift, this research report would have not been completed. May His name always be glorified to the Highest.

I also acknowledge my research supervisor Dr. Tebitendwa Sylvie Muwanga for her tireless support towards the successful completion of this research report. May the Almighty God bless the work of her hands.

TABLE OF CONTENTS

DECLARATION	i
APPROVAL	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xi

CHAPTER ONE

INTRODUCTION

1.1 General Background	1
1.2 Problem Statement	2
1.3 Aims and objectives	2
Specific objectives	2
Research Questions	3
1.5. Justification of the study	3
Figure 1.1: Showing the Conceptual Framework	4

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction	5
------------------------	---

2.1. The current status of food security.....	5
2.2. The existing practices and challenges of fish farming in the area.	7
2.3. The potential impact of fish farming on enhancing food security.	9
2.4. Indices used to measure food security	10
2.5. The socio-economic factors influencing the adoption and sustainability of fish farming.....	10

CHAPTER THREE

METHODOLOGY

3.1 Study area.....	13
3.2 Sampling design.....	14
3.3. Sample size	14
3.4 Sources of Data.....	15
3.5. Data Collection Instruments	15
3.6.1 Validity and reliability of data collection instruments.....	16
3.6.2 Ethical considerations	16
3.6.3 Data processing and analysis	17

CHAPTER FOUR:

RESULTS

4.1 Socio demographic characteristics.....	18
4.2 Status of fish farming in Bumwoni Sub county.....	19
4.2.2 Species of Fish reared by farmers in Bumwoni Sub-County.....	20

4.3: Fish production per aquaculture production system	20
4.4: Proportion of income spent on aquaculture products to that spent on other food items	21
4.5: Contribution of Aquaculture to Household Income:	22
4.6: Challenges faced by fish farmers in Bumwoni Sub-County.....	23

CHAPTER FIVE

DISCUSSIONS, CONCLUSION AND RECOMMENDATION

5.1: DISCUSSION	24
5.2: CONCLUSION:.....	26
5.3: RECOMMENDATIONS	26
REFERENCES	27

LIST OF FIGURES

Figure 1.1: Showing the Conceptual Framework	4
Figure 3.1: showing the map of Bumwoni Sub-County.	13
Figure 4.1: Socio-demographic characteristics of respondents	19
Figure 4.2: Quantity of fish produced per production system	21
Figure 4.3: Proportion of income spent on aquaculture products to that of other food items.	22

LIST OF TABLES

Table 4.1: Socio-Demographic characteristics of respondents.....	18
4.2 Status of fish farming in Bumwoni Sub county.....	19
Table 4.2: Fish production systems practiced by farmers in Bumwoni Sub County.....	20
Table 4.3: Species of fish reared by farmers in Bumwoni Sub County.....	20
Table 4.4: Proportion of income expenditure, aquaculture visa vi other food items.....	21

LIST OF ABBREVIATIONS

FAO	:	Food and Agriculture Organization
UN	:	United Nations
EAC	:	East African Community
NDP	:	National Development Plan
WFP	:	World Food Programme
CSI	:	Coping Strategies Index
HDDS	:	Household Dietary Diversity Scale

ABSTRACT

Fish farming, also known as aquaculture, has gained significant attention worldwide as a means to enhance household income, offer employment opportunities and improve nutrition from direct consumption. This study thus sought to unravel information regarding the contribution of fish farming in enhancing food security in Bumwoni Sub- county, Namisindwa District. The objectives of the study were: i) to evaluate the current status of fish farming in terms of production systems used and cultured fish species in Bumwoni subcounty; ii) to determine fish production from aquaculture production systems in Bumwoni sub-county; iii) to compare the proportion of income spent on aquaculture products to that spent on other food items, and, iv) to determine the contribution of aquaculture to house hold income. Across sectional study involving quantitative approaches was employed in this study. Dependent variables were food security status, fish consumption, income from fish while independent variables were fish farming resources and fish farming access. The study revealed that the contribution of fish farming to household income was 16.02%, 74.24% practice earthen pond and 46.97% of respondents' farm cat fish. There was no statistically significant difference between the proportions of income spent on fish products to that of other food items in the study area, p-value = 0.9478. In conclusion, the study highly recommends the farming community of Bumwoni to specialize in farming of cat fish and use of earthen pond because to its adaptive, highly productive, feed friendly and environmentally friendly.

REFERENCES

- Abbas, S., Iqbal, A., Anjum, K. M., Sherzada, S., Atique, U., Khan, M. K. A., Akmal, M., Rahman, A., Asif, A. R., Ahmad, S., Malik, A., Khan, S. A., Ahmad, S., & Inayat, M. (2023). Body composition, growth performance and enzyme activities of *Labeo rohita* fed different commercial fish feeds. *Brazilian Journal of Biology*. <https://doi.org/10.1590/15196984.250402>
- Aquaculture Extension Training Manual for Uganda. (2020).
- Adebayo, I.A. & S.A. Adesoji (2008). Aquaculture and Inland Fisheries Project, National Special Programme for Food Security, 148 pp.
- Adeleke, B., Robertson-Andersson, D., Moodley, G., & Taylor, S. (2020). Aquaculture in Africa: A Comparative Review of Egypt, Nigeria, and Uganda Vis-À-Vis South Africa. In *Reviews in Fisheries Science and Aquaculture*. <https://doi.org/10.1080/23308249.2020.1795615>
- Aliaga, M. A., Ribeiro, M. S., Dos Santos, S. M. C., & Trad, L. A. B. (2020). Participatory food and nutrition security assessment in a community of Salvador, Brazil. *Ciencia e Saude Coletiva*. <https://doi.org/10.1590/1413-81232020257.25252018>
- Atukunda, G., Atekyereza, P., Walakira, J., & State, A. E. (2022). Increasing Farmers' Access to Aquaculture Extension Services: Lessons from Central and Northern Uganda. *Uganda Journal of Agricultural Sciences*. <https://doi.org/10.4314/ujas.v20i2.5>
- Au, H.-L., Lim, L.-S., Amornsakun, T., Rahmah, S., Jung Liew, H., Musikarun, P., Promkaew, P., Jye Mok, W., Kawamura, G., Seok-Kian Yong, A., Shapawi, R., & Mustafa, S. (2020). Feeding and nutrients requirement of Sultan fish, *Leptobarbus hoevenii*: A review. *International Journal of Aquatic Science*.
- Ayoola, A., Fredrick, C. & Akinuoye, B. (2012). Effects of the shape of culture tanks on production of the African catfish (*Clarias gariepinus*) juveniles. *Journal of Agriculture and Social Research (JASR)*, 12 (1): 11
- Boonyabancha, S., Kerr, T., Joshi, L., & Tacoli, C. (2019). How the urban poor define and measure food security in Cambodia and Nepal. *Environment and Urbanization*. <https://doi.org/10.1177/0956247819863246>

- Carine, T. N. (2019). Review on Aquaculture Research in Cameroon: Fish Farming. *International Journal of Oceanography & Aquaculture*.
<https://doi.org/10.23880/ijoac16000170>
- Charisiadou, S., Halling, C., Jiddawi, N., von Schreeb, K., Gullström, M., Larsson, T., & Nordlund, L. M. (2022). Coastal aquaculture in Zanzibar, Tanzania. *Aquaculture*.
<https://doi.org/10.1016/j.aquaculture.2021.737331>
- Chimatiro, S. K. (1998). Aquaculture production and potential for food safety hazards in subSaharan Africa: With special reference to Malawi. *International Journal of Food Science and Technology*. <https://doi.org/10.1046/j.1365-2621.1998.3320169.x>
- Chiu, M. C., Yan, W. M., Bhat, S. A., & Huang, N. F. (2022). Development of smart aquaculture farm management system using IoT and AI-based surrogate models. *Journal of Agriculture and Food Research*. <https://doi.org/10.1016/j.jafr.2022.100357>
- Cowx, I. G., & Ogutu-Owhayo, R. (2019). Towards sustainable fisheries and aquaculture management in the African Great Lakes. *Fisheries Management and Ecology*.
<https://doi.org/10.1111/fme.12391>
- Craig, S., & Helfrich, L. a. (2002). Understanding Fish Nutrition, Feeds, and Feeding. *Virginia Cooperative Extension*.
- Çukur, T., & Saner, G. (2013). Determining effective factors on earthen pond fish farming adaptation process with Cox regression model. *Journal of Food, Agriculture and Environment*.
- Cunningham, L. (2005). Assessing the contribution of aquaculture to food security: a survey of methodologies. *FAO Fisheries Circular*.
- Dhakal, D., & Mueser, P. (2023). Agricultural cooperatives and the failure to achieve commercialization of agriculture in Nepal: A case study of the Chitwan district. *Research in Globalization*. <https://doi.org/10.1016/j.resglo.2023.100165>
- Egwenomhe, M. , Oghenewairhe ,E., & Ugbotor, E. (2020). A Survey of Fish Culture Facilities used by Farmers in Edo South, Nigeria. *Journal of Agriculture and Environment*. 16(2):63-72
- Harohau, D., Sulu, R. J., Phillips, M. J., Sukulu, M., Pickering, T., & Schwarz, A. M. (2016).

- Improving household tilapia (*Oreochromis mossambicus*) aquaculture through participatory action research. *Aquaculture*. <https://doi.org/10.1016/j.aquaculture.2016.09.024>
- Hinrichsen, E., Walakira, J. K., Langi, S., Ibrahim, N. A., Tarus, V., Badmus, O., & Baumüller, H. (2022). Prospects for Aquaculture Development in Africa : A review of past performance to assess future potential. *African Chapter World Aquaculture Society*.
- Ifeonu, C. F., Chukwuemeka, V., & Agwu, A. E. (2019). Challenges of youths involved in fish farming in the Federal Capital Territory, Abuja, Nigeria. *Journal of Agricultural Extension*. <https://doi.org/10.4314/jae.v23i3.14>
- Ike, P. C., & Chuks-Okonta, V. A. (2014). Determinants of Output and Profitability of Aquaculture Fish Farming in Burutu and Warri South West Local Government Areas of Delta State, Nigeria. *Journal of Biology, Agriculture and Healthcare*.
- Iqbal, U., Li, D., & Akhter, M. (2022). Intelligent Diagnosis of Fish Behavior Using Deep Learning Method. *Fishes*. <https://doi.org/10.3390/fishes7040201>
- Jacobsen, K. I., Battista, W. J., Kaplan, L. M., Price Tack, J. L., Villarreal, M. D., & Costello, C. (2016). A model to assess trade-offs between environmental impact and profitability of offshore salmon farms: A case study on Chile. *Journal of Applied Aquaculture*. <https://doi.org/10.1080/10454438.2016.1175831>
- Kawarazuka, N., & Béné, C. (2010). Linking small-scale fisheries and aquaculture to household nutritional security: An overview. *Food Security*. <https://doi.org/10.1007/s12571-010-0079y>
- Kifuko, R. (2015). The State of Cage Fish Farming in Uganda : Actors , Enabling environment , Challenges and Way forward. *International Journal of Education and Research*.
- Kotta, J., Stechele, B., Barboza, F. R., Kaasik, A., & Lavaud, R. (2023). Towards environmentally friendly finfish farming: A potential for mussel farms to compensate fish farm effluents. *Journal of Applied Ecology*. <https://doi.org/10.1111/1365-2664.14422>
- Kundu, R., Mucai, M., Njiru, J. M., & Nyamweya, C. (2016). Effect of Social and Economic Drivers on Success of Small Scale Fish farming in Western Kenya. *African Journal of Tropical Hydrobiology and Fisheries*.

- Kyule-Muendo, D., Otachi, E., Awour, F., Ogello, E., Obiero, K., Abwao, J., Muthoni, C., & Munguti, J. (2021). Status of fish health management and biosecurity measures in fish farms, cages and hatcheries in western Kenya. *AgriRxiv*. <https://doi.org/10.31220/agrxiv.2021.00048>
- Lamm, K., Mulvaney, C., Lamm, A., Davis, K., & Masambuka-Kanchewa, F. (2021). Model of Success: Extension Services Helping Ugandan Youth Find A Career in Agriculture. *Journal of International Agricultural and Extension Education*. <https://doi.org/10.5191/jiaee.2021.28301>
- Loga, D. E., Kibwika, P., & Birungi Kyazze, F. (2022). Can the current youth agricultural groups be sustainable? Experiences from Mid-Western Uganda. *Cogent Social Sciences*. <https://doi.org/10.1080/23311886.2022.2057634>
- Loga, D. E., Kibwika, P., & Kyazze, F. B. (2022). How do youth innovate to make agriculture gainful? Challenges and youth entrepreneurs in mid-western Uganda. *International Journal of Agricultural Research, Innovation and Technology*. <https://doi.org/10.3329/ijarit.v12i1.61030>
- Mahaliyanaarachchi, R. P., & Bandara, R. (2010). Commercialization of Agriculture and Role of Agricultural Extension. *Sabaragamuwa University Journal*. <https://doi.org/10.4038/suslj.v6i1.1686>
- Mehrim, A. I., & Refaey, M. M. (2023). An Overview of the Implication of Climate Change on Fish Farming in Egypt. In *Sustainability (Switzerland)*. <https://doi.org/10.3390/su15021679>
- Micheal, U. O., Akinbile, L. A., & Ikechukwu, C. S. (2018). Management Information Needs of Fish Farmers in Egbeda Local Government Area of Oyo State. *Journal of Agricultural Extension*. <https://doi.org/10.4314/JAE.V22I1.15S>
- Mohammed, R. A., Kamil, T. M., & Bakr, M. M. (2023). A Comparison of Fish Ponds in the Lailan, Daqoq, Yayji, and Sarkaran Areas in Terms of Temperature and Ph. *International Journal of Agriculture and Animal Production*. <https://doi.org/10.55529/ijaap.36.10.17>

- Nabirye, H., Mwebaza-Ndawula, L., Muyodi, F. J., & Bugenyi, F. (2016). The evaluation of cage fish farming effects on water quality using selected benthic macro-invertebrate community parameters in the Napoleon gulf, northern Lake Victoria. *International Journal of Fisheries and Aquatic Studies*.
- Namaemba, C., Sibiko, K., and, E. O.-E. A. A., & 2022, undefined. (2023). Factors Affecting Productivity and Profitability of Cage-Fish Farming in Siaya County, Kenya. *Kalro.Org*.
- Namisindwa District Development Plan Three, 2021/2022
- Ogunji, J., & Wuertz, S. (2023). Aquaculture Development in Nigeria: The Second Biggest Aquaculture Producer in Africa. In *Water (Switzerland)*. <https://doi.org/10.3390/w15244224>
- ogunkalu, O. A. (2023). Climate Smart Aquaculture for Poverty Alleviation. *Scholars Journal of Agriculture and Veterinary Sciences*. <https://doi.org/10.36347/sjavs.2023.v10i12.001>
- Ogutu-Ohwayo, R., Odongkara, K. N., Okello, W., Wandera, S. B., Bwambale, M., Efitre, J., Komutunga, E., Kyosingira, F., & Tumushabe, G. (2012). Impacts and Adaptations to Climate Variability and Change in Inland Riparian and Aquatic Ecosystems and Fisheries: A Review of Scientific Literature. *Impacts and Adaptations to Climate Variability and Change in Inland Riparian and Aquatic Ecosystems and Fisheries: A Review of Scientific Literature*. 26 Pp. 2012.
- Ouma, A. O., N. Kibutu, D. T., & O. Onsongo, D. F. (2023). Social Economic Determinants of Adoption of Fish Farming in Gem Sub-County, Siaya County, Kenya. *Middle East Journal of Applied Science & Technology*. <https://doi.org/10.46431/mejast.2023.6405>
- Participation of Youth in Aquaculture. (2015). *Journal of Aquaculture Research & Development*. <https://doi.org/10.4172/2155-9546.1000386>
- Rosales, A., Young, S., Mendez, T., Shelden, K., & Holdaway, M. (2023). Collaborative Strategies to Improve Nutrition Security and Education: Lessons Learned During a Pandemic. *Journal of School Health*. <https://doi.org/10.1111/josh.13247>
- Savary, S., Waddington, S., Akter, S., Almekinders, C. J. M., Harris, J., Korsten, L., Rötter, R. P., & Van den Broeck, G. (2022). Revisiting food security in 2021: an overview of the past year. In *Food Security*. <https://doi.org/10.1007/s12571-022-01266-z>

- Teeuwen, A. S., Meyer, M. A., Dou, Y., & Nelson, A. (2022). A systematic review of the impact of food security governance measures as simulated in modelling studies. *Nature Food*.
<https://doi.org/10.1038/s43016-022-00571-2>
- Tilapia Fish Farming Assessment using Water Wells in Fayoum and Egypt: Case Study. (2022).
International Journal of Sustainable Development and Science.
<https://doi.org/10.21608/ijrsrd.2022.273927>
- Tuholske, C., Andam, K., Blekking, J., Evans, T., & Caylor, K. (2020). Comparing measures of urban food security in Accra, Ghana. *Food Security*. <https://doi.org/10.1007/s12571-02001011-4>
- Uganda Bureau of Statistics Report, 2020
- Uganda Bureau of Statistics Report, 2023
- Zanna, B. (2023). Cost and Return Analysis of Fish Farming in Nigeria. *International Journal of Oceanography & Aquaculture*. <https://doi.org/10.23880/ijoac-16000273>