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DEPARTMENT OF FISHERIES AND WATER RESOURCE MANAGEMENT

THE FUTURE OF THE NILE PERCH CATCHES AND VALUE AND IT'S MAW.

A CASE STUDY AT KIYINDI LANDING SITE, LAKE VICTORIA, UGANDA

BY

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DECLARATION

I, Kafuba James Buyinza declare that this work is original and it has never been submitted to any University or higher institution of learning for any academic award.

SIGNATURE: ……. **DATE…….**

KAFUBA JAMES BUYINZA

APPROVAL

I hereby affirm that this dissertation has been developed under my guidance and supervision.

SUPERVISOR

SIGNATURE…… DATE:……..…..……

Dr Bassa Samuel (PhD)

DEDICATION

I dedicate this dissertation to my family and friends for all their unconditioned, compassionate care, guidance and support.

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Exaltation is to the All-Powerful God for His guidance and protection through many situations right from the Pandemic of Covid-19 to the accomplishment of this original research report.

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LIST OF ACRONYMS

CPUE:	Catch per Unit Effort
GDP:	Gross Domestic Product
LVFO:	Lake Victoria Fisheries Organisation
SDG:	Sustainable Development Goals
GPS:	Global Positioning System

ABSTRACT

Nile perch is a source of food but most importantly, the maw from it is of great economic importance. This is because its price is almost twice that of the Nile perch fish meat. Despite the economic benefits of the maw, its source, the Nile perch is at great risk of depletion. This possesses a great threat to the fishery economy especially the revenue got from exporting Nile perch maw. This drove the need for a study to be conducted to understand how fish maw size is influenced by size of Nile perch and how the prices (both selling and purchasing) are influenced by Nile perch maw size at Kiyindi Landing site on Lake Victoria.

The study comprised of 301 individual Nile Perch fish which were obtained randomly from the fishermen at the Landing site. Two parameters, weight and length, were considered for the study in both the fish and the maw. Weight for individual fish and maws was measured using a weighing scale in (kgs) for the individual fish and (g) for the fish maws while length for individual fish and maws, was measured using a tape measure.

The findings of this study revealed a significant positive correlation between fish size and maw size at implying that maw size of Nile perch is directly affected by the fish size($r=.799$ and $p=.000$ for fish and maw length), ($r=.831$ and $p=.000$ for fish length and maw weight), ($r=.822$ and $p=.000$ for fish weight and maw length), ($r=.847$ and $p=.000$ for fish weight and maw weight).. Furthermore, a significant positive correlation ($r=.828$, $p=.000$) was revealed between maw length and its selling price at $\alpha=0.01$.

The findings of this study will help alleviate the Uganda's revenue from Nile perch maw exporting thus boosting Uganda's economy. However, if more efforts to enforce strict laws on fishermen who harvest sexually immature fish are taken into consideration it will greatly improve Uganda's revenue base from the fishery industry.

CHAPTER ONE: INTRODUCTION

1.1 Back ground

Nile perch (*Lates niloticus*), a warm water fish species, is the most important commercial fish species in East Africa and approximately 100,000 tonnes of Nile perch are processed in Uganda alone, annually (Muyonga et al., 2004). Furthermore, it is the largest and biggest freshwater fish in the world (with mature weight ranging up to 200 kg and 2 meters in length) and most of the time this fish is caught before it can grow up to this size (Greenwood et al., 1966).

This fish species is native to Africa in the central, western and eastern zone of Africa water bodies widely in rivers and Lakes), and throughout the region of Ethiopia, Nile river (after Murchison fall on the White Nile), as well as the Congo, Niger, Volga, Senegal rivers and Lakes Chad and Turkana (Asnake, 2018). Studies suggest that this fish species was introduced in Lake Victoria between 1950s and early 1960s from Lake Albert and Lake Turkana (Mhitu & Chande, 2004; Okaronon et al., 1999).

This fish, like others, is a source of food to many people due to its nutritional composition (Okeyo et al., 2009). Its by-products such as fish maws drives its price since a kilogram of the maw fetches a far higher price than a kilogram of the fish itself (Guloba et al., 2022). The maws have also been used in continents such as Asia as they are believed to have some traditional medicinal properties, particularly in winter, as a tonic for those recovering form, attempting to ward off illness and for women after child delivery (Bagumire et al., 2018). Nile perch also has Uganda's highest commercial and recreational value (Guloba et al., 2022).

Despite this, its population has been affected by unsustainable fishing practices and environmental degradation (LVFO, 2016). There has also been a decline in the catch per unit effort (CPUE), a shift in distribution and diet, and a decline in body size of Nile perch according

REFERENCES

Asnake, W. (2018). Nile Perch (*Lates niloticus*): The promising white meat of the world. *Journal of Nutrition & Food Sciences*, *8*(2), 680.

Bagumire, A., Muyanja, C. K., & Kiboneka, F. W. (2018). The value chain analysis of Nile perch maw trade in East Africa. *The Responsible Fisheries Business Chains Project of Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) under Contract*, *83285575*, 1–52.

Bassa, S. (2011). *The effect of hook size on the catch rate and size of the Nile perch Lates niloticus (Linne) fishery in the Napoleon Gulf, Lake Victoria, Uganda*. Islamic University In Uganda, Environmental Science.

Ben-Hasan, A., de Mitcheson, Y. S., Cisneros-Mata, M. A., Jimenez, E. A., Daliri, M., Cisneros-Montemayor, A. M., Nair, R. J., Thankappan, S. A., Walters, C. J., & Christensen, V. (2021). China's fish maw demand and its implications for fisheries in source countries. *Marine Policy*, *132*, 104696.

Bwathondi, P. O. J., Ogutu-Ohwayo, R., & Ogari, J. (2001). *Lake Victoria fisheries management plan*.

Clarke, S. (2002). *Trade in Asian dried seafood: characterization, estimation and implications for conservation*. Wildlife Conservation Society.

Clarke, S. (2004). Understanding pressures on fishery resources through trade statistics: a pilot study of four products in the Chinese dried seafood market. *Fish and Fisheries*, *5*(1), 53–74.

Greenwood, P. H., Rosen, D. E., Weitzman, S. H., & Myers, G. S. (1966). *Phyletic studies of teleostean fishes, with a provisional classification of living forms. Bulletin of the AMNH; v. 131, article 4*.

Guloba, M. M., Birabwa, E. A., Mbowa, S., & Kahunde, R. (2022). Enhancing Agro-Industry For Productive And Decent Work For Youth And Women In Uganda: The Case For The Fish And Cotton Value Chains.

Kamanyi, J. R., Nabbongo, H., & Kibrige, L. (2006). *The hook fishery on lake victoria, Uganda*.

Li, G. J., Qian, Y., Sun, P., Feng, X., Zhu, K., & Zhao, X. (2014). Preventive effect of

polysaccharide of Larimichthys Crocea swimming bladder on activated carbon-induced constipation in mice. *Journal of the Korean Society for Applied Biological Chemistry*, *57*, 167–172.

Ligtvoet, W., Mous, P. J., Mkumbo, O. C., Budeba, Y. L., Goudswaard, P. C., Katunzi, E. F. B., Temu, M. M., Wanink, J. H., & Witte, F. (1995). The Lake Victoria fish stocks and fisheries. In *Fish stocks and fisheries of Lake Victoria. A handbook for field observations* (pp. 11–53). Samara Publishing Ltd.

LVFO. (2016). *Fisheries Management Plan III (FMPIII) for Lake Victoria Fisheries 2016–2020*. LVFO Secretariat Jinja, Uganda.

Mata, M. Á. C. (2020). *Evaluación de la poblavión de Totoaba Macdonaldi*. INAPESCA.

McClatchie, S., Alsop, J., & Coombs, R. F. (1996). A re-evaluation of relationships between fish size, acoustic frequency, and target strength. *ICES Journal of Marine Science*, *53*(5), 780–791.

Mhitu, H. A., & Chande, A. I. (2004). Diurnal feeding patterns and food habits of *Lates Niloticus* in the Speke Gulf, Lake Victoria. *Tanzania Journal of Science*, *30*(1), 93–99.

Moura, H. T. G. de S., Mescouto, N. L. da C., de Souza, M. C. P., Nunes, Z. M. P., & da Silva, B. B. (2023). Performance indicators for the large-scale Acoupa weakfish fishery of the Amazon continental shelf. *Fisheries Management and Ecology*, *30*(5), 545–554.

Muhame, A. M., Mugampoza, E., Lubuulwa, L. L., Byarugaba-Bazirake, G. W., & Mutambuka, M. (2020). *Microbiological quality and safety assessment of sun dried Rastrineobola argentea (Mukene) sold at selected landing sites of Lake Victoria and Peri Urban Kampala City Markets*.

Muyonga, J. H., Cole, C. G. B., & Duodu, K. G. (2004). Characterisation of acid soluble collagen from skins of young and adult Nile perch (*Lates niloticus*). *Food Chemistry*, *85*(1), 81–89.

Okaronon, J. O., Muhoozi, L., & Bassa, S. (1999). *Current status of the fish stocks of Lake Victoria (Uganda).*

Okeyo, G. O., Lokuruka, M. N. I., & Matofari, J. W. (2009). Nutritional composition and shelflife of the lake victoria nile perch (*Lates niloticus*) stored in ice. *African Journal of Food, Agriculture, Nutrition and Development*, *9*(3).

Paterson, J. (2009). *Response of an introduced aquatic predator, the Nile perch, to environmental change*.

Pringle, R. M. (2005). The origins of the Nile perch in Lake Victoria. *BioScience*, *55*(9), 780–787.

Sajriawati, S. (2020). Variasi Harga Jual Gelembung Ikan oleh Nelayan Lampu Satu di Kabupaten Merauke. *Musamus Journal of Agribusiness*, *3*(1), 46–52.

Sajriawati, S. (2021). Catching Technology of Fish Maw Snapper's: Case Study of the KMN Nur Aqila07 Fishing Boat in Kumbe Village, Malind District, Merauke Regency, Papua. *E3S Web of Conferences*, *328*, 8011.

Taabu, A. M., Steinarsson, B. A., & Hjörleifsson, E. (2005). Assessment of the status of the stock and fishery of nile perch in lake Victoria, Uganda. *Project Report for United Nations University–Fisheries Training Program 54pp*.

Wen, J., Zeng, L., Sun, Y., Chen, D., Xu, Y., Luo, P., Zhao, Z., Yu, Z., & Fan, S. (2015). Authentication and traceability of fish maw products from the market using DNA sequencing. *Food Control*, *55*, 185–189.

Zhao, Y.-Q., Zeng, L., Yang, Z.-S., Huang, F.-F., Ding, G.-F., & Wang, B. (2016). Anti-fatigue effect by peptide fraction from protein hydrolysate of croceine croaker (Pseudosciaena crocea) swim bladder through inhibiting the oxidative reactions including DNA damage. *Marine Drugs*, *14*(12), 221.