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The contribution of fish farming to household wellbeing of Fish Farmers in Kitui Central Sub-County, Kitui County

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Abstract: *Fisheries are a significant sector to the national and household economies in Kenya. The Kenya government initiated the Economic Stimulus Program (ESP) in 2010 to help aquaculture projects in order to jump start the economy by providing food and income to the rural inhabitants as a way of eradicating poverty and creating jobs to the poverty stricken areas. However, there is little information on the contribution of fish farming to the household wellbeing of the farmers adopting the fish farming inKitui Central sub-county. Therefore, the researcher carried out this study to determine the contribution of fish farming to the household wellbeing of the fish farmers in the Kitui Central Sub- County, Kitui County. A sample of sixty (60) fish farmers were used from the targeted 200 fish farmers who benefitted from the government ESP support. Semi structured questionnaires were used to collect primary data that was analyzed using Excel and Statistical Package for Social Sciences (SPSS) version 22. The study revealed that*

fish farming had a significant contribution to the household wellbeing (income) of households in Kitui Central Sub-county, Kitui County. This was by improving household income (38.9%) and putting idle land to use (24.1%). The harvested fish was sold to the market as indicated by 63% of the respondents as well as home consumption (37%). This ended up improving the livelihood of the fish farmers. Other benefits from fish farming included; more household assets (50.6%), fees payment (40.7%), better health care (38.9%) and 33.3% diet diversity. It was also established that there is a strong positive correlation ($r = 0.73$, $P < 0.05$) between fish farming and household wellbeing.

This study presents lessons from farmers who are attempting to eke out a livelihood from small scale fish farming with or without government support. It illustrates some of the successes and challenges of the activity and offers insight to future fish farming success for farmers willing to attempt it. To the existing farmers it provides an eye opener on their weaknesses. This research will enable the government, other development partners to get information to help them make informed decisions in future and refocus on how best to support the fish farming industry for sustainability.

Key words: *Economic Stimulus Program, Aquaculture, livelihood, income.*

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I. Introduction

Fish farming improves the lives of its citizens through enhancing the sectors' contribution to wealth creation, increased employment for youth and women, food security and improves the economy through foreign exchange earnings of fish exports (ESP, 2009). Aquaculture is of increasing importance globally, and plays an important role in global food security. It is the fastest food growing production system globally, with an increase of 8.8% in production of animal products per year since 1995 (FAO, 2007. Aquaculture was introduced to sub-Saharan Africa in the 1950s' with the main objectives of improved nutrition in rural areas, generation of additional income, diversification of activities to reduce risk of crop failures and the creation of employment in rural areas (Hecht, 2006) In some countries in Sub-Saharan Africa, growth has been held back by persistent bottlenecks such as access to good-quality feed, seeds and market. However, Africa governments have demonstrated increasing support for aquaculture, presumably anticipating benefits for economic growth, food supply and security as well as in the form of poverty alleviation (FAO, 2010). In addition, about 43% of African continent has the potential for Tilapia, African Catfish and Carp culture (Ridler and Hishamunda, 2001)

Fish farming was first begun in Kenya by colonists in the early 1900 through the introduction of trout in rivers for sport fishing (Ngugi et al., 2007). This progressed into static pond culture of species such as Tilapia, Common carp and Cat fish in 1920s' (Maaret al., 1966). According to Ngugi et al., (2007), the government popularized fish farming in 1960s' through the "eat more fish campaign", as a result fish farming spread in many parts of Kenya including areas of non-fish eating communities. However, the number of productive ponds

declined in 1970s' mainly because of inadequate extension services, lack of quality fingerings and insufficient training for extension workers. Until mid-1990s' fish farming in Kenya followed a pattern similar to that observed in many African countries which is characterized by small ponds, subsistence level of management and very low levels of production (Ngugi et al., 2007) The Kenyan aquaculture industry has seen slow growth for decades until recently, when government funded Economic Stimulus Program (ESP) that increased fish farming nationwide..

The ESP coordinated by the ministry of fisheries development was introduced through the 2009/2010 budget with the aim of stimulating the long term growth and development of Kenya's economy through rapid creation of business opportunities and jobs (MoFD, 2010). The program focused on sectors of the Kenyan economy that would generate maximum benefits, restore confidence and assist the business community, while protecting the livelihood of the poor and creating jobs to the youth (GoK, 2009). This program had key objectives of boosting the country's economic recovery as well as returns the economy to the envisioned medium term growth plan. The program invested in long term solutions to the challenges of food security, expanding economic opportunities in rural areas for employment creation and promoting regional development of equity and social stability (Manyala, 2011).

Under the ESP, large investments were undertaken in 27 key sectors of the economy, fisheries/aquaculture being one of them. According to a study conducted by Mwangi (2008), the government has taken keen interest in fisheries due to its potential and has given it the priority it deserves. His sentiments are confirmed by the government's incorporation of fish farming in the ESP to help jump start the economy by providing food and income to the rural inhabitants eradicating poverty and creating jobs to the poverty stricken areas (GoK, 2009). The program targeted areas with high population, small farmland and mass poverty with low incomes and fluctuating farm productivity but with water available to sustain the program.

In 2010, the ministry of fisheries development rolled out the Fish Farming Enterprise Productivity Program (FFEPP) under the ESP and the Economic Recovery Poverty Alleviation and Regional Development Program (ERPARDP). Phases1 and 2 of the FFEPP were implemented in 2010 under the ESP and ERPARDP respectively (Maina et al., 2014).The main activity of both phases was to establish fish ponds in selected regions in the country in order to promote commercial aquaculture. This was executed through the provision of extension services where farmers were trained in order to improve nutrition, alleviate poverty and create over 120,000 employment opportunities (TISA, 2010). Two hundred fish ponds were constructed for 140 selected political constituencies (Charo, 2012) at an estimated cost of Kshs. 1.12 billion (Kshs 8 million per constituency), GoK, 2012). During the second phase 2011/2012 financial year, additional 100 fish ponds were added to each of the first 140 constituencies and an additional 20 new constituencies benefited with 300 fish ponds each making a total of 48,000 ponds countrywide.

Fish farming in Kitui County begun in 1980s' but on extensive levels whereby the fish farmers did very little in terms of pond management practices, Mutambuki, (2011). When the government introduced fish farming in over 140 constituencies in Kenya under ESP, farmers in Kitui County particularly Kitui Central Sub-County jumped at the offer in what promised to revolutionalize fish farming which has been a sojourn of trials and error over many years in the area. The first phase of ESP (2009/2010) was implemented through the Ministry of Agriculture under the Kitui district fisheries department currently the Kitui County fisheries department Two hundred farmers were identified as beneficiaries in Kitui central Sub-County. Fish farmers who were selected as beneficiaries were funded with Kshs. 40,000 to construct a pond, provided with 1000 fingerlings of monosex tilapia per fish pond and 15kg of fish feeds. Ponds were dug by the willing youth within the benefiting constituency.

Despite the government's effort to promote aquaculture, the projects did not perform as expected, and most farmers in Kenya and Kitui region slowly adopted the fish farming projects. In addition, not all fish ponds constructed were stocked with the 1000 tilapia fingerlings. The beneficiaries of the project had the responsibility to purchase and install the polythene pond liners; some of the farmers were not able to meet these requirements by the time the ESP program funding come to close, Musyoka and Mutia, (2016). There are many cases where farmers eventually abandoned their ponds even before the first harvest. Mwamuye et al., (2012) and 4Munguti et al., (2014) found out that, most farmers who are still holding on to the venture are yet to realize their returns due to challenges they are faced with. This was the case in Kitui Central sub-county, where many of the fish ponds that were initiated under the ESP are being abandoned or have been abandoned, while other ponds have a low output in terms of harvest That notwithstanding, very little has been done to establish the status of fish farming in Kitui, Central Sub-County It is against this backdrop that a study was conducted in order to investigate the factors influencing fish farming in Kitui Central sub-county Kitui County and establish why this initiative on fish farming has suffered from slow adoption and non-sustainability

II. Materials And Methods.

2.1 Study Area

The research was carried out in Kitui Central sub-county,Kitui County. The study population included fish farmers who benefitted from the ESP of the governments undertheFish farming Enterprise and Productivity Programme(FFEPP).

Kitui County is situated in the former Eastern province of Kenya and borders TaitaTaveta County to the South, Makueni County to the West, Machakos to the North West, Tana River to the East,andEmbu and TharakaNithi to the North. The county has eight sub-counties namely: Kitui Central, Kitui South, Kitui East, Kitui Rural, Kitui West, Mwingi North, Mwingi West and Mwingi Central.

Kitui County covers an area of 3057.30Km^2 of which 6369 Km^2 is occupied by Tsavo East National Park(Kitui County Integrated Development Plan, 2013-2017).According to 2009 population censusithas a total population of 1,012,709 comprising of 205,492 households (KNBS, 2009).The human population growth rate is 2.1% (MOLFD, 2013).In addition, the Kitui County has high poverty levels (63%) and high age dependency ratio of 100:1089 .This necessitates the need for various livelihood support activities, like introduction of aquaculture under ESP to alleviate this high poverty levels and households to have economic gains from aquaculture.

The local people depend mostly on rain fed agriculture mainly crop farming of maize and small scale mixed farming of maize beans, millet, vegetables, dairy farming, poultry farming and fish farming. The government introduced ESP aquaculture project aimed to improve nutrition, alleviate poverty and create over 120,000 employment opportunities (TISA, 2010) to poverty stricken areas in Kenya, like Kitui County.

Figure 1: Map of Kitui County showing various sub-counties

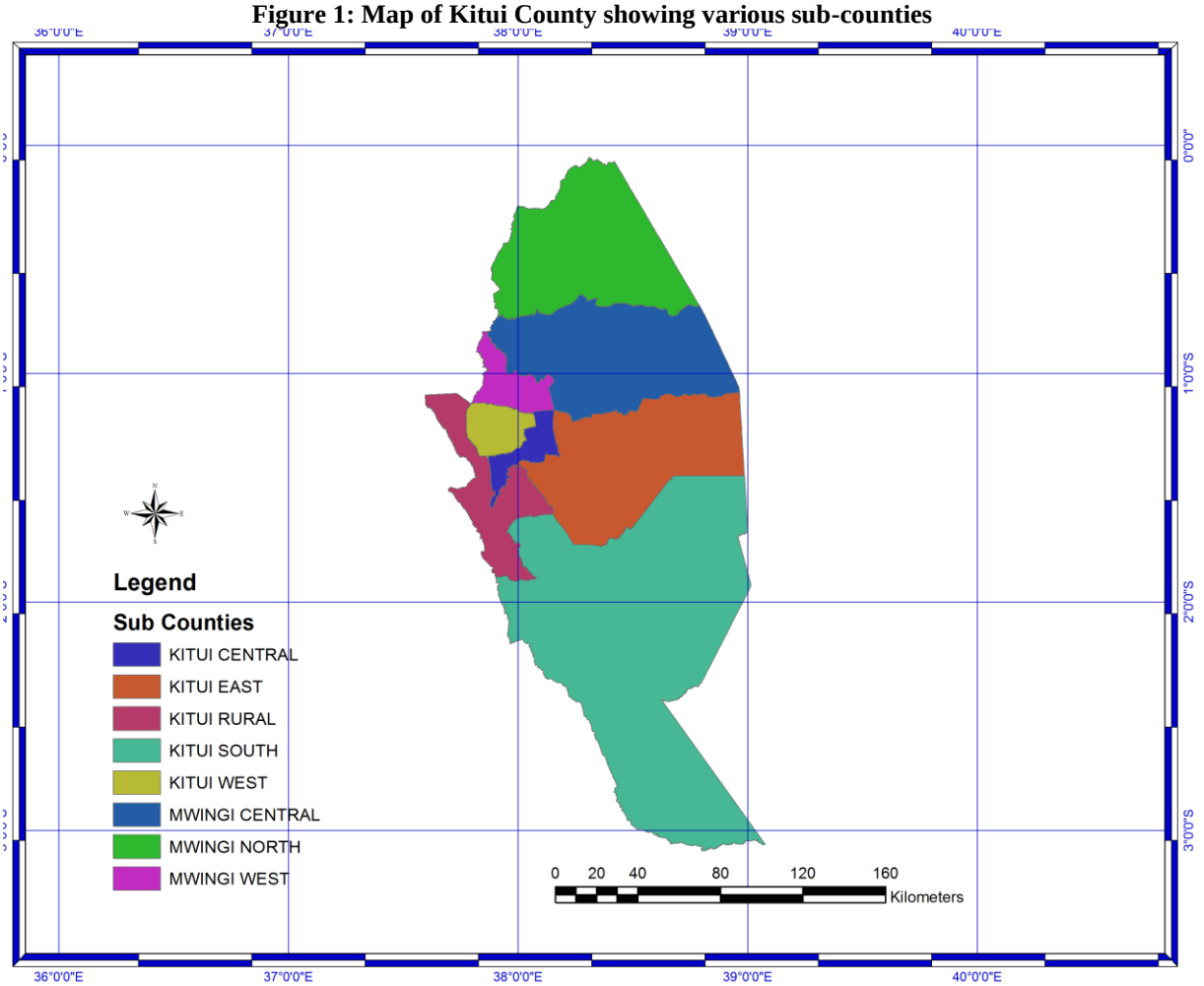

Figure 1: Map of Kitui County showing various sub-counties

Source: Author: 2017

Kitui Central sub-county, where this research was done has five political wards namely; Miambani, Township, Kyangwithya West, Mulango and KyangwithyaEast.Kitui Central sub-county has a total population of 131,715 as follows: Miambani (22,164), Township (26, 016), Kyangwithya West (22, 121), Mulango (28,

573) and Kyangwithya East (32, 841. (Kitui County Integrated Development Plan 2013-2017).The local inhabitants are mainly the Kambacommunity. The main economic activities are agriculture mainly crop farming of maize and small scale mixed farming of maize ,beans, millet, vegetables, dairy farming, poultry farming and fish farming.

The study area was chosen for thisresearch becauseKituiCentral sub-county has the highest concentration of fish farmers in KituiCounty. Therefore results of this study will be helpful to the farmers who are trying to eke their livelihoods in fish farming. In additionKitui Central,Mutito hills and YattaPlateau. Receive more rainfall than the other parts in the county, this is attributed to their high altitude between 600m and 900mthe, rainfall pattern is bi-modal with long rains in March to May, which is usually very erratic and unreliable. Short rains occur in October to December and are more reliable with average annual rainfall of between 200mm and 600mm and mean monthly temperatures of between 19 and 35^{0}C (MoLFD, 2013).rainfall is the main source of water for all aquatic organisms like fish.

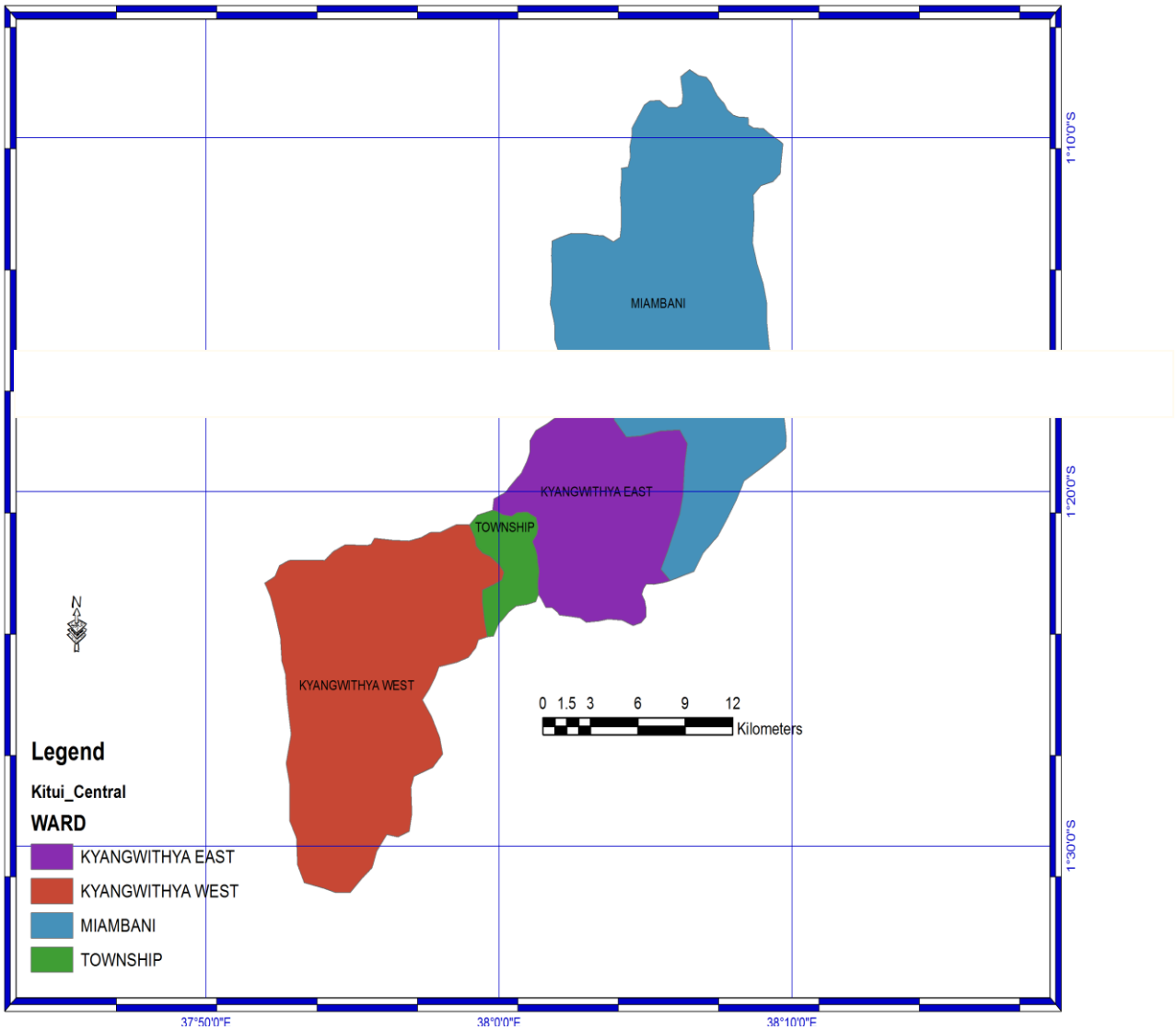

Figure 2 *map of Kitui Central Sub-county showing the different wards.*
Source: Author. 2017

2.2 Research Methodology

The study adopted a descriptive research method which focused on individual fish farmers as the unit of analysis (Kathori, 2004). Simple random sampling was used to select the respondents from the targeted farmers in the study area to participate in the study. The researcher considered farmers whose fish ponds were still functional and those who have abandoned their fish ponds. A record of fish farmers who benefitted from 2009 /2010 ESP was obtained from the Kitui Central sub-county fisheries offices in Kituitown. Thereresearcher targeted a population of 200 fish farmers under ESP in Kitui Central sub-county, Kitui County.

2.3 Sampling Procedure

The study used multi- stage sampling technique. First, purposive sampling was used to obtain fish farmers and key informants that benefitted from 2009 /2010 ESP from the sub-county fisheries office the records indicated that 200 fish farmers were engaged in the ESP in Kitui Central sub-county which was the target populationinthis study. Secondly, the study used simple random sampling technique to select the respondents from the targeted fish farmers. A sample of 60 (which represents 30% of the 200 target fish farmer's population) individual fish farmers was selected. This was in line with the suggestion by Mugenda and Mugenda (2009) that 30% of the population is deemed to be sufficient for statistical analysis in research work. Further, the study used random sampling to identify the farmers in the field during the administration of the sampling instrument.

2.4 Sampling Instrument

A semi-structured questionnaire was used to collect data. This was because most farmers were able to read and write without assistance and this ensured unbiased responses. The farmers who were not able to read and write were aided in understanding the answering of the questions.

2.5 Validity of Instrument

Orodho (2002) defines validity as appropriateness, meaningfulness and usefulness of the inferences a researcher makes Kathori(2001), defines validity as the extent to which a test measures what the researcher actually wishes to measure and how well a test measures what it is purposed to measure. To ensure that the instrument was valid, the researcher sought assistance from University supervisors. In addition, pilot testing of the research instrument was done with 5 respondents from KituiRural sub-county as information was not required for statistical analysis.

2.6 Reliability of the Instrument

According to Cozby(2001) reliability refers to participants actual score on an instrument which is influenced by both their true score and error. In the study, 54 randomly selected fish farmers willingly participated in the survey and 6 fish farmers didn't participate due to unavoidable circumstances, like sickness and commitment to social obligations or being uncooperative. The acceptance score was calculated by dividing the number of respondents who participated in the survey with the calculated sample size.

$$\text{Acceptance Score} = \frac{\text{Number of participants in survey}}{\text{Sample Size}}$$

Where 54 is the number of participants and 60 is the sample size

Therefore the acceptance score of the instrument was 0.88, was established and was deemed adequate and reliable.

2.7 Data Collection

The study used both primary and secondary data. The collection of primary data was through the use of semi structured questionnaire for the fish farmers.This was in line with Sherri, (2010) who noted that questionnaire is an important research tool in socio-economic survey. The questionnaire for fish farmers were structured with open-ended questions and closed questions. Respondents were randomly selected from the identified ESP fish farmers. Each individual respondent was allowed to fill only one questionnaire, the respondents were given a period of four days after which the researcher collected the filled questionnaire.

A return rate of 54 responses was obtained and6 respondents out of the 60 did not fill the questionnaires and were uncooperative. The researcher therefore adopted the sample size of 54 fish farmers. Secondary data was obtained from the records of Kitui County fisheries offices. A questionnaire guide was prepared and administered to two of the county extension officers, who successfully filled the questionnaire. Additional secondary data was obtained from books, journals and articles.

2.8 Data Analysis

According to Mugenda and Mugenda (2003) Data analysis is the process of bringing meaning to raw data obtained from the questionnaires was processed through editing and coding, It was then analyzed using Excel and Statistical Package for Social Sciences (SPSS) version 22software. The SPSS version 22 offers extensive data handling capabilities and numerous statistical analysis procedures that analyze small to large data set-to give descriptive statistics and regression analysis. Descriptive statistics involved the use of percentages and frequencies. Inferential and regression analysis involved the use of Chi-square and Pearson's correlation Coefficients. Results were presented in form of tables and correlation matrices.

III. Results And Discussion

Contribution of Fish Farming on Household Wellbeing

The study sought to establish the contribution of fish farming to household wellbeing (income) in Kitui Central sub-County, Kitui County. Using the Chi-Square (**(χ^2)** the following reasons were established to entice the farmers to start the fish farming in the study Area. Table 3.1shows the reasons why the farmers were adopting fish farming in Kitui Central sub-county, Kitui County.

Table 3.1: Contributions of Fish Farming to Household wellbeing

Gender	Food security	Income Generation	Dietary Diversification	Utilizing Idle land	Total	(χ^2)	P<0.05
Male	18(33.3%)	14 (25.9%)	8 (14.8%)	4 (7.4%)	44 (81.5%)	4.255	.5255
Female	7 (13.0%)	3 (5.6%)	0 (0.0%)	0 (0.0%)	10 (18.5%)		
Total	25 (46.3%)	17 (31.5%)	8 (14.8%)	4 (7.4%)	54		

The farmers practicing fish farming appreciated that there were economical benefits of engaging in commercial fish farming ventures. Households practicing fish farming in the study area attained food security (46.3%), especially the male headed (33.3%) compared to female headed households (13.0%). In attaining food security, it implied that the fish from fish ponds was used for home consumption for family members to have safe and adequate supply of the food. Male household heads, being the bread winner of most households engaged in fish farming that their families had food security. In addition, substantial adopters (31.5%), with low percent of the female fish farmers (5.6%) of the fish farming appreciated better income was generated upon venturing in the commercial fish farming compared to other agricultural enterprises, like cereal production or animal agricultural activities. This agrees with the ESP program objective of empowering communities through increasing their income and improving food security in the entire country.

Other benefits that the male fish farmers appreciated were dietary diversification (14.8%) and pastry utilization of idle land (7.4%) the farmers have in their farms. This implied that there was reduced pressure on the common sources of animal proteins, like beef, mutton or poultry meat and proper utilization of fragile land probably used to lie idle. The study revealed that no female headed household engaged in fish farming to diversify their dietary foods or utilize any idle land in their farms. However, the Chi-Square (χ^2) test value was insignificant p<0.05. This implied that there was no significant difference between the benefits of fish farming amongst the male and female fish farmers in KituiCentral sub-county. Thus the farmers were using fish farming to utilize idle lands in their farm lands to improve income generation, diversify dietary needs and attainment of food security in KituiCounty.

The researcher also sought to find out whether there is variation of levels of income between who had functional ponds and those who had abandoned fish farming. Table 3.2 shows the Chi-Square **(χ^2)** test results of the levels of income (average money accruing from the fish farming per year) of the fish farmers in Kitui Central sub-county.

Table 3.2: Variations of Income (Kshs) Levels among the Fish Farmers

	Functional Ponds	Abandoned Ponds	Total	**(χ^2)**	P<0.05
M	0.0% (0.00/=)	31 (54.4%)	31 (54.4%)	15.689	.001*
	3.7% (<100, 000/=)	0.0% (<100,000/=)	2 (3.7%)		
	16.7% (>100, 000 – 200,000/=)	0.0% (>100, 000 – 200,000/=)	9 (16.7%)		
	3.7% (>200, 000/=)	0.0%(>200, 000/=)	2 (3.7%)		
F	0.0% (0.00/=)	13.0% (0.00/=)	7 (13.0%)		
	3.7% (<100, 000/=)	0.0% (<100, 000/=)	2 (3.7.0%		
	1.9% (>100, 000 – 200,000/=)	0.0% (>100, 000 – 200,000/=)	1 (1.9%)		
	0.0% (>200, 000/=)	0.00% (>200,000/=)	0 (0.00%)		
Total	16 (29.6%)	38 (70.4%)			

*** Significant at p<0.05**

Table 3.2 shows that male fish farmers (24.1%) had better income accruing from the fish farming venture compared to the female fish farmers (5.6%). This is likely to be attributed to the fact that male farmers are firm in making decisions to manage their investments. In addition, the analysis shows that both male and female farmers with functional fish ponds had good income accruing from the fish farming ventures. This implies that if the fish farming is fully supported and constraints minimized the farmers can adopt the fish farming as income generating agricultural enterprises. Most famers (70. %) had abandoned fish farming and no income was realized from the abandoned fish ponds. This is an indicator that the fish ponds were not suitable for fish farming due to one reasons or another. The Chi-Square (χ^2) test shows that there was significant difference between income accruing from functional and abandoned fish ponds in the study area.

Further, the researcher sought to know whether the adoption of fish farming had influence and impacts on other livelihood parameters, like health care, education and asset ownership of the households. The table 3.3 shows the results of the impacts of income generated from the adopted fish farming in the study area.

Table 3.3: Influence of adopted fish farming on other livelihood parameters of Households

Livelihood Quality	Better	Same	Worse	Total	(χ^2)
Healthcare	21 (38.9%)	21 (38.9%)	12 (22.2%)	54 (100%)	12.465*
Education	22 (40.7%)	28 (51.9%)	4 (7.4%)	54 (100%)	
Asset Ownership	30 (55.6%)	19 (35.2%)	5 (9.2%)	54 (100%)	

The analysis shows that adoption of fish farming influenced and improved livelihood quality like health care, education of the children and the ownership of assets. This implied that the income that acrrued fron the functional fish ponds was used to cater for the family needs, like health care and education of their children. The surplus income was used to purchase assets for the households, which had the greatest influence.

For some households income levels remained the same for the livelihood quality parameters. This is likely contributed to the fact that the fish farmers realized income that could only cater for the expenses incured. This implied in this initial stages of fish production the fish farmers could only break even. This attributed to the fact that the fish farming is a new venture and the farmers lacked the necessary skills and training to do profitable fish farming. This is supported by earlier finding that training and skills of pond mangement influenced fish farming.

A small proportion of the fish farmers had their other livelihood quality parameter of health care, education and asset ownership worsen. This is attributed to the fact that the fish faring ventures are capital intensive and takes longer period for feasible production to be realized. This implied that the households heads spent their income from other sources or loans and profitable production not realized, losses were incurred. The losses incurred were great to the extent their effects were greatly felt as they affected and worsened the catering for education, health care and even ownership of assets. This is suspected to be due to poorly performing fish ponds and long payback period. In addition,the Chi-Square ($\chi 2$) test showed that there was significant difference between the extent of the influence of fish farming on health care, education and asset ownership of the households in the study area.

IV. Conclusion

From the results of this study, the following conclusions can be made;

The study did the following conclusions after thorough examination of responses in the analysis;

1 There is great potential for small holder aquaculture in Kitui central sub- county, however research is needed to develop and manage this potential for high production and sustainability of aquaculture.

2 Fish farming is capable of creating employment, improving food security and hence uplifting the living standards of people.

V. Recommendations

This study recommends the following

i. The National government through the county fisheries of Kitui needs to liaise with micro financial institutions for provision of loans and credit to fish farmers to ensure sustainability of projects after Government subsidies are terminated..

ii. A need exists to create linkages and collaboration among all stakeholders (research institutions, universities, Non-Governmental Organizations (NGOs), civil society, government officials, and policy makers) by creating a strong forum for exchange of information of fish farming in the dry lands.

Reference

[1]. Cozby, P. C. (2001 Measurement Concepts Methods in Behavioral Research (7th ed.). Mayfield Publishing Company, California
[2]. ESP (2009). Economic Stimulus, Handbook. Economic Stimulus Program 2009-201
[3]. Overcoming today's Challenges for a better tomorrow, 1-8, Nairobi, Kenya.
[4]. FAO, (2007).Small-scale Freshwater Fish Farming; Rome: FAO Fisheries, Rome.
[5]. Food and Agriculture Organization of the United Nations.(2010). Securing Sustainable SmallScale Fisheries: Bringing Together Responsible Fisheries and Social Development.
[6]. RAP Publication 2010/19. In: United Nations, Bangkok.
[7]. GoK(2009).Economic Stimulus Program, government printers- Nairobi, Kenya.
[8]. GoK (2012).National Agricultural Sector Extension policy (NASEP): Government Printer. Nairobi, Kenya
[9]. GoK (2012).National Agricultural Sector Extension policy (NASEP): Government Printer. Nairobi, Kenya
[10]. Hecht,T. (2006).Regional review on aquaculture development in Sub-Saharan Africa FAO
[11]. Fisheries Circular.No.1017/4, Rome.
[12]. Kenya National Bureau of Statistics. (2009). Population and Housing Census Results.(1471 2334).Approaches. Acts Press, Nairobi, Kenya.
[13]. Kitui County Integrated Development Plan, 2013-2017, Kitui, Kenya

[14]. Kothari, S.P., Capital Markets Research in Accounting (March 2001). JAE Rochester ConferenceApril2000.AvailableSSRN: https://ssrn.com/abstract=235798 or
[15]. Maar A, Mortimer MAE and Van der Lingen I. 1966.Fish Culture in Central East Africa. FAO, Rome, Italy.
[16]. Maina, J. G., Mbuthia, P. G., Ngugi, C, Omolo, B, Orina, P; Wangia, S. W, Karuri,E. ,G., Maitho, T., Owiti, G.O,(2014). Influence of social-economic factors, gender and the
[17]. Fish Farming Enterprise and Productivity Project on fish farming practices in Kenya.
[18]. Livestock Research for Rural Development 26 (2) 2014, Nairobi, Kenya.
[19]. Manyala, J. O. (2011). Fishery Value Chain Analysis. Background Report, Nairobi Kenya.
[20]. Ministry of Livestock and Fisheries (2013).Livestock Sector Developments Strategic Plan, Dar Salaam, Tanzania.
[21]. MOFD, (2010).Ministry of Fisheries and Development, Nairobi, Kenya
[22]. Mugenda, O. M. and Mugenda, A. G. (2003).Research Methods: Quantitative and Qualitative Approaches, Nairobi Act Press, Nairobi Kenya.
[23]. Mugenda, O. Mugenda (2009). Research Methods: Quantitative and Qualitative Approaches. Nairobi:
[24]. Munguti J. M., Mugiranea, J. K. and Ogello, E. O., (2014).An overview of Kenyan Aquaculture sector; Current status, Challenges and Opportunities for Future Development. Fisheries and Aquatic sciences,17(1);1-11, Nairobi Kenya.
[25]. Musyoka, S. N. and Mutia, G. M (2016).The Status of Fish Farming Development in Arid and Semi-Arid Counties of Kenya: Case Study of Makueni County. European
[26]. Mutambuki, M. K. and Orwa, B. H. (2011).Marketing Strategies of Commercial Fish Farming under Economic Stimulus Program (ESP) in Kenya: An Empirical Study of KituiCounty.International Journal of Humanities and Social Science 4.8(1), USA.
[27]. Mwamuye, M.K., Cherutich, B. K. and Nyam , H. M.(2012). Performance of commercial Aquaculture under the Economic Stimulus Program in Kenya. International Journal of Business and Commerce, 2 (3), 01-20, Nairobi, Kenya
[28]. Mwangi H.M. (2008). Aquaculture in Kenya- Status, challenges and opportunities, Nairobi, Kenya
[29]. Ngugi, C. C.; Bowman, J. and Omolo, B., (2007).A New Guide to Fish Farming in Kenya.Published by Aquaculture Collaborative Research Support Program. Printed by Pro Printer, Corvallis, Oregon.ISBN 978-0-9798658-0-0.100 Pages
[30]. Orodho, J.A. (2004). Element of Education and Social Science Research Methods.Masola
[31]. Publishers. Nairobi.
[32]. Ridler, N. and Hishamunda, N. (2001).Promotion of Sustainable commercial Aquaculture in Sub-Saharan Africa.Policy Framework. Rome: FAO. Volume 1.
[33]. Sherri, J. L. (2010). Research Methods (2nd Edition). Ward worth publishing
[34]. TISA (2010).How is the ESP Performing in Your Constituency? [Brochure]. Nairobi, Kenya

*Joyce M. Nzevu "The contribution of fish farming to household wellbeing of Fish Farmers in Kitui Central Sub-County, Kitui County." IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) 11.1 (2018): 69-76.