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Effect of Culture on Sustainability of Fish Farming in Uasin-Gishu County, Kenya

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Abstract
The paper sought to establish effect of culture on sustainability of fish farming in Uasin Gishu County, Kenya. The study employed descriptive survey design. The study was carried out in Moiben Sub-County, Uasin Gishu County in Kenya. The study population comprised of fish farmers and Extension Officers in Moiben Sub-County. The target population of 120 fish farmers and 8 Extension Officers. The data was collected using questionnaires and interviews. The data was analyzed using frequencies, percentages and regression. The study established that most people in Moiben Sub-County prefer other sources of protein over fish, and for this reason, fish farmers felt that the people in the locality needs to be educated to change their feeding habits in favour of fish. This was attributed to the fact that traditionally; fish farming was not a preferred choice for the members of the community dominant in the area. The study further established that most farmers in the locality would rather engage in other farming enterprises than fish farming. The study recommended that department of fisheries should conduct awareness campaigns to educate people on the advantages of fish as source of animal protein.
Keywords: *Effect, Culture, Sustainability of Fish Farming*

Introduction
Over centuries, fish and fish products have been important components of the population's diet globally (Brown, 2003). Fish has been providing an approximate of 16% of animal protein being consumed worldwide. Hetland (2008) also observed that, 90% of global aquaculture production is contributed by developed countries, which is significant to their foreign exchange earnings and Gross Domestic Products. In Asian countries, for example Bangladesh, Aquaculture has positive outcome, income, employment as well as on rural and urban food supply. According to FAO (2012), countries like Israel, was becoming widely recognized due to its economic feasibility of fish farming where over half the fish consumed in the country is harvested from fish farms.

In Sub-Saharan Africa, improved nation's diet, income generation to small scale farmers as well as employment creation has been as a result of fish farms. Hecht (2006), observed that in countries like Egypt, Ghana, Zambia, and Madagascar where aquaculture has been supported and managed well, has played a critical role in generating wealth leading to sustainable economic growth.

In Kenya today, fish farming interest have been renewed through Economic Stimulus Programme (ESP) a government initiative. In the year 2009, the government through aquaculture developed and commercialized African catfish (Clarias gariepinus) as well as Nile tilapia (Oreochromis niloticus) as part of its projects aimed at stimulating economic growth through job creation and business opportunities, alleviation of poverty and food insecurity which have been critical problems in the country. Under the ESP, the government of Kenya introduced commercial fish farming in 140 constituencies, whereby each farmer profited with funds for fish ponds, fingerlings, and fertilizers (GOK, 2009). In the financial year 2011/2012, the second phase of commercial fish farming under the Economic Recovery, Poverty Alleviation and Development Programme (ERPARDP) (MOFD 2010) added 20 more constituencies in the programme. Apart from increasing fish production, enhancing food security, and improving livelihoods of fish farmers, it was also aimed at providing employment for the youth (Uhuru, 2010). However, despite huge amount of resources used, there has been very little follow-up on the projects.

Fish farming is a new introduction in Moiben sub-county, its success has been influenced by key determinants that have not been featured in the initial design stage. Potential for sustainable fish farming exists but only when key socio-economic determinants are considered as well. The potential of fish production in the area has not been exploited to make fish farming more successful. Potentials in the county at present contribute 2.5% to our fishery, though it has more potential to contribute up to 50% to Kenya's fishery output (International Journal of Education and Research, 2014). It was on this premise that this paper sought to establish cultural factors affecting sustainability of fish farming in Uasin Gishu County.

Statement of the Problem
Fish farming in Kenya has great potential to produce large amounts of fish to meet the demand, supply and food security as outlined in the Kenya Vision 2030. In the 2009/2010 financial year, the Kenyan government introduced commercial fish farming under Economic Stimulus Programme in 140 constituencies (MOFD, 2010). Every constituency benefitted from funds for 15 kilogrammes of fertilizer, 200 fish ponds, as well as 1000 fingerlings. Twenty more constituencies were considered in the second phase in 2011/ 2012 financial year, which led to an addition of 100 extra fish ponds for the initial 140 constituencies and three hundred more fish ponds. The total funding for fish ponds was about 15 million US dollars (MOFD, 2010). The project aimed at increasing fish production, enhancing food security, improving livelihoods of fish farmers and providing employment to the youth (Uhuru, 2010). It is in this regard that the study proposed to assess the influence of selected socio-economic determinants on sustainable fish farming in Uasin Gishu County.

Literature Review

The wider adoption and development of aquaculture at the global level can be seen as a significant basis for improving income in households, food security and other desired welfare Ahmed and Lorica (2002). FAO (2013), projected a rise in fish consumption from 40 million tons to 150 million by the year 2016, based its steady increase. From their observation, the potential of aquaculture to contribute to food and nutritional status is possible in no less than three ways; adoption consumption linkage; adoption employment linkage and adoption income linkage. Ahmed and Lorica (2002) hypothesis on adoption consumption linkage is that, high amount of fish rich in micro-nutrients are consumed inappropriately in households, and hence through embracing of home consumption linkages, status in nutrition improves. Likewise, increased market supply is as a result of adoption of aquaculture that maintain fish prices down, and hence intake of micronutrients food increase Boris and Ahmed, (2002).

Okali, (2006) noted that the fishing communities' information from Gambia, Burkina Faso, Benin, Gabon and the Democratic Republic of Congo, the indicates that; there is a problem of women are not having a voice on important matter as well as attending any groups within the community. This contributes to women denied opportunities to participate in fish farming and related projects. Women and fish-for-sex is an emerging matter in gender in fisheries (Bene & Merten, 2008). He also noted that fish-for-sex isn't really a reliable phenomenon, but an emerging practice reported in several developing countries with leading number of cases in Sub-Sahara Africa with inland fisheries observed. Fish-for-sex is also a new phenomenon in Kafue, Zambia, increasing exposure and contraction of HIV/AIDS. According to (Shitote *et al.* 2013), majority of the fish farmers in Siaya County, Kenya, are male (71.9%), while the females are (28.1%). His study was also supported by USAID (2009) on the challenges facing women in Burkina Faso, which stated that; women are not considered in terms of access to land, control of production, decision making on use assets and also control over household income.

In Africa, fish consumption and farming has not been put into consideration due to socio-cultural beliefs coupled by poverty levels and education among the population. According to observations of Rothius *et al.* (2011), cultural traditions and fishing areas is reflected by the proximity of fish consumption patterns, though people have included fish in their diet leading to increase in its demand, therefore making aquaculture production more extensive throughout in developing countries including Kenya.

According to FAO (2011), the need for more fish for consumption in Kenya led to fish farming in ponds around 1920's. The initial practice started by using tilapia species of which later included common carp and African catfish. The need to increase the production was the governments need to meet the Millennium Development Goal (MDG) of food security by 2030.To achieve this goal, the government made an effort to popularize the sector through the "Eat more fish" Campaign that led to expansion of tilapia farming which led to increase in construction of small fish ponds particularly in western and central provinces in Kenya. According to GOK (2009), the fish farming projects were intended to create employment opportunities, improve nutrition as well as to improve income. However, due to

cultural beliefs and misconceptions many people from communities around the study area do not eat fish.

In his study, Maina, Ngugi, Omolo, Orina, Mbuthia, Karuri, Wangia, Owiti, (2012) noted that in Mwea division of Kirinyaga County, gender had significant influence on fish farming management practices. In their findings, the majority of the respondents felt that there is little consumption fish in their household when men are managing fish farming income. They felt that the results maybe associated to those men who due to their cultural foods have not fully absorbed fish into their main stream diets, hence have further left the task of fish rearing to their spouses where they happen to have a fish pond. Women being able to access their credit facilities and enlightened more on proper feeding habits disregarded the norms surrounding consumption of fish and adopted its consumption. From this information, it is evident that cultural practices can be an influence to fish farming adoption and consumption.

Kimathi *et al.,* (2013) concluded that some cultural beliefs and practices may affect fish consumption patterns in Tigania East District though not to a large extent. Kimathi *et al.,* (2013) in their recommendations noted that there is need to sensitize the community on the benefits of eating fish as evidenced by the emerging eating habits of white meat. They added that there is also need to empower women to access units of ownership and income generating opportunities.

Methodology
Research Design
This study employed descriptive survey design, since it enabled the researcher to get information about a social system and give a description concerning a particular issue. It was used due to its versatility to accommodate various methods of data collection such as questionnaires, interview, observation, focused group discussion as well as data analysis (qualitative and quantitative) in order to deeply understand the problem under investigation. This design enabled the researcher obtain information that examines the influence of selected socio-economic determinants on sustainable fish farming in Moiben Sub-County.

Study Location
The study was carried out in Moiben Sub-County, UasinGishu County in Kenya. The study area comprised of five sub-county assembly wards namely; Tembelio, Sergoit, Karuna / Meibeki, Moiben and Kimumu. The estimate terraine elevation here is 2,454 metres above sea level. The geographical co-ordinates of Moiben sub-county are at latitude $0^0 58^1 0.01$ North and longitude $35^0 31^1 0.01$ East. Most of the agricultural land is sloppy hence prone to soil erosion. This is especially during heavy rains which lead to soil degradation, which makes the land less productive and it becomes very expensive to restore the soil fertility. The place is inhabited by people of diverse socio-cultural backgrounds with subsistence farming being main economic activity. These regions presents appropriate areas of study in that, a good number of farmers are practicing fish farming, and are distributed evenly in the five wards of the sub-county adequate to constitute the study population.

Study Population

The study population comprised of fish farmers and Extension Officers in Moiben Sub-County. The target population of the study was therefore made up of 120 fish farmers and 8 Extension Officers from Fisheries Department, Moiben sub-county (Uasin Gishu Agricultural Office 2016). This was used as the sampling frame from which the study's sample was picked. The fish farmers comprised of established fish pond farmers and newly started fish pond farming projects owned by individuals in the study area. The reason for selecting the category of farmers is that, established fish farmers have been trained on fish farming therefore have some level of knowledge and skills on fish farming.

Sampling Procedure and Sample Size

The researcher sampled fish farmers by the guidance of Kathuri and Pals (1993) principle to get the sample size. From the table, sample size for the study was found to be 72 fish farmers as in appendix IV. The target population from the five wards amounted to 120 fish farmers. The study adopted simple random sampling to obtain sample fish farmers from each sub-county ward. Established fish pond farmers are considered because they have spent more than five years in fish pond farming, therefore perceived to have more information on the influence of socio-economic determinants on sustainable fish farming in the study area. It was also used to reduce the population heterogeneity and increase the efficiency of the estimates. The researcher then employed purposive sampling to come up with the 5 extension officers from the agricultural and fisheries department to participate in the study. The participants of this study was drawn from the five wards of Moiben Sub-County in order to give a good representation of the study area.

Data Collection Instruments
Questionnaire

The instrument was used to gather information from both extension officers and fish farmers. The tool was systematic and structured, and concurrently aimed at obtaining data from a large population of respondents, in an open, direct and confidential manner (Kothari, 2004). Questionnaires covered a large sample of respondents thereby allowing reasonable degree of generalization of the findings thus was considered appropriate. Open and closed ended questions were used. Questionnaire items was designed in such a way as to draw respondents' views concerning the socio-economic challenges of fish farming in Moiben sub-county in Uasin Gishu County. Closed-ended questions in a five-point Likert scale were suitable as they limit unnecessary responses and were easier to analyze. However, they may have limitations such as the respondents being compelled to answer the questions according to the researcher's choices and the tendency to skip what they are not sure leaving such questions not completed. The questionnaire was based on the following themes; to assess farmers' level of education, examine farmers' level of awareness on fish farming practice, socio-cultural constraints to fish farming, and to establish the main economic challenges influencing sustainable fish farming in Moiben sub-county, Uasin-Gishu County Kenya.

Interview Schedule

The information was collected from the agricultural and fisheries extension officers and fish farmers using a structured interview technique. This is because it provides a safe basis for generalization,

more economical and requires relatively lesser skills on the interviewer's part (Kothari, 2004). Interview schedule was important because it helped in eliciting in-depth responses that may enable deep understanding of the study problem.

Data Analysis

Data collected from the farmers and extension officers was sorted, classified, edited and coded for analysis. Quantitative data was analyzed using descriptive statistics; frequencies and percentages while multiple regression was used in inferential statistics with the aid of SPSS version 20.0. Qualitative data was transcribed and organized into themes and sub-themes. The regression model adopted was;

$$Y_i = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where;

Y_i- Sustainability of fish farming

β_0- Constant

$\beta_1,$ - Coefficient

X_1- Cultural factors

ε -error term

Findings

Influence of Culture on Sustainability of Fish Farming

The objective of the study was to establish effect of culture on sustainability of fish farming. From the results, majority of the fish farmers were males 74.0% while 26% were females, as indicated in figure1.
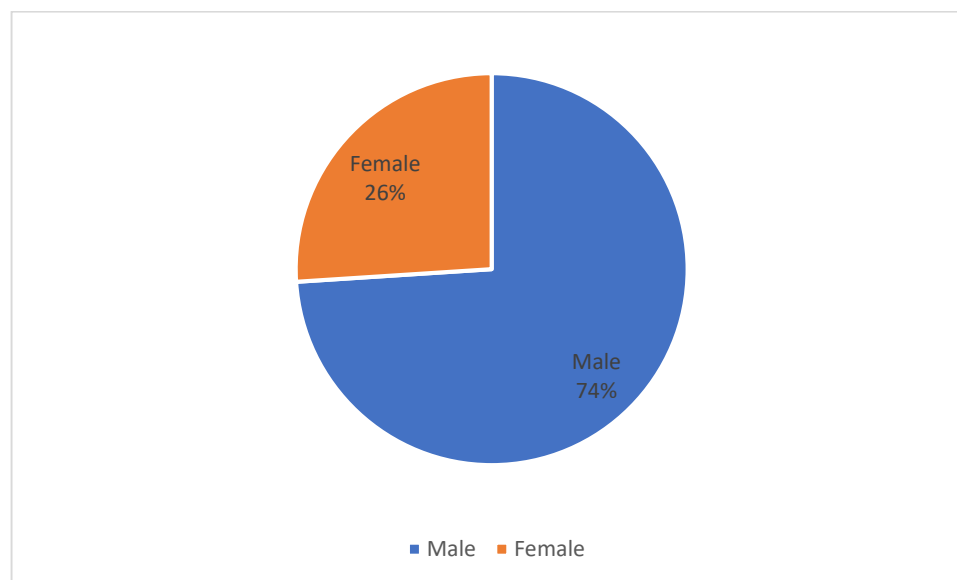
Figure 1: Gender distribution of fish farmers

This was also evidenced from the observation that majority of the fish farmers 62(84.9%) were married, 9(12.3%) were single, 1(1.4) was widowed, and 1(1.4%) was either divorced or separated, as indicated in figure 2.
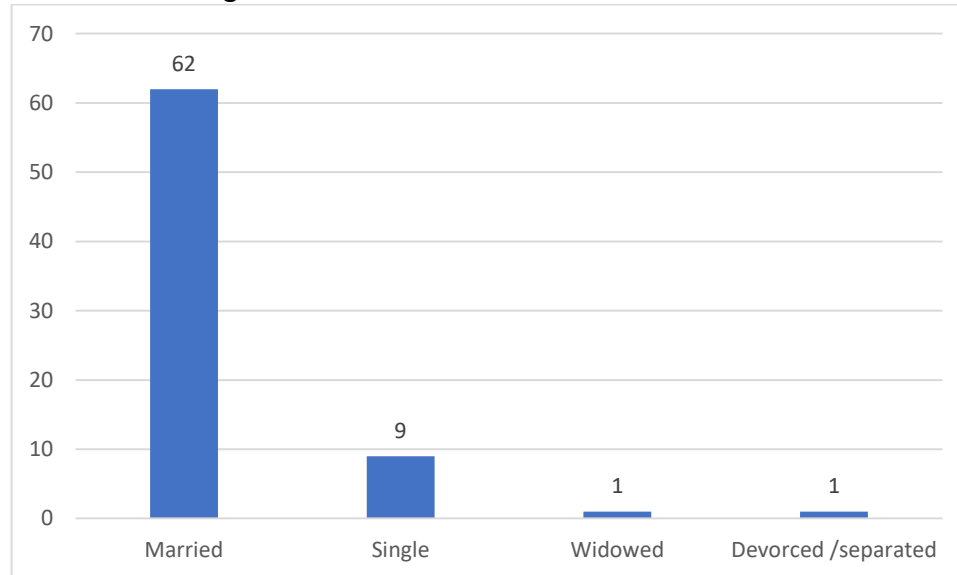

Figure 2: marital status of fish farmers

The study established that most members of the family of the respondents prefer other sources of protein over fish, as indicated by 27(37.0%) of the respondents who agreed and 20(27.4%) who strongly agreed with the statement, while 13(17.8%) strongly disagreed and similar proportion disagreed with the statement. Most respondents 26(35.6%) agreed and 31(42.5%) strongly agreed that members of the family are supportive of the fish farming. Majority of the respondents 35(47.9%) disagreed and 12(16.4%) strongly disagreed with the statement that most people in the neighborhood prefer fish as a source of animal proteins, while a small proportion 18(24.7%) agreed and 5(6.8%) strongly agreed with the statement. Most respondents 50(68.5%) strongly agreed and 18(24.7%) agreed that the people in the locality needs to be educated to change their feeding habits in favour of fish. This is evidenced by the response on statement that traditionally, fish farming is not a preferred choice for the members of my community, where 41(56.2%) of the respondents strongly agreed and 15(20.5%) agree with the statement.

The study established that most farmers in the locality would rather engage in other farming enterprises than fish farming, as evidenced by 24(34.9%) of the respondents who agreed and 39(53.4%) who strongly agreed with the statement. Despite above trend, it was established that fish farming has future potential, as most of the respondents 36(49.3%) strongly agreed and 15(20.5%) agreed with the statement that there is a change in culture in the locality in favour of fish farming. Majority of the respondents 53(72.6%) disagreed with the statement that fish farming is practiced by males only, the response is presented in table 4.3. From above responses, it indicates that cultural factors affect sustainability of fish farming, the findings concur with Maina *et al.* (2012), who noted

that in Mwea division of Kirinyaga County, gender had significant influence on fish farming management practices. In their findings, most respondents felt that when men are controlling fish farming income, there is little fish consumption in their households. They felt that the results maybe associated to those men who due to their cultural foods have not fully absorbed fish into their mainstream diets, hence have further left the task of fish rearing to their spouses where they happen to have a fish pond. Women being able to access their credit facilities and enlightened more on proper feeding habits disregarded the norms surrounding consumption of fish and adopted its consumption. From this information, it is evident that cultural practices can be an influence to fish farming adoption and consumption. Shitote et al also agree with tis results that majority of fish farmers in Siaya county, Kenya, are male (71.9 %), while the females are few (28.1%). The study is also supported by USAID (2009) on the challenges women are facing in Burkina Farso, which stated that women are not considered in terms of access to land, control of production, decision making on assets and control over household income.

Table 1: Response on influence of culture on fish farming

	SD		D		U		A		SA	
	F	%	F	%	F	%	F	%	F	%
Members of my family prefer other sources of animal proteins over fish	13	17.8	13	17.8	0	0.0	27	37.0	20	27.4
The members of my family are supportive of my fish farming	5	6.8	11	15.1	0	0.0	26	35.6	31	42.5
Most people in my neighbourhood prefer fish as source of animal proteins	12	16.4	35	47.9	3	4.1	18	24.7	5	6.8
People in my locality needs to be educated to change their eating habit in favor of fish as source of protein	2	2.7	2	2.7	1	1.4	18	24.7	50	68.5
Most people in my locality will rather engage in other farming activities other than fish farming	3	4.1	3	4.1	4	5.5	24	32.9	39	53.4
Traditionally, fish farming is not the preferred choice for members of my community	9	12.3	7	9.6	1	1.4	15	20.5	41	56.2
There is a general change in the culture in my locality in favour of fish farming	8	11.0	11	15.1	3	4.1	15	20.5	36	49.3
Fish farming is practice for males only	53	72.6	7	9.6	10	13.7	1	1.4	2	2.7

The extension officers mentioned that most farmers in Moiben Sub-county are hesitant to adopt fish farming, since they believe that culturally, they are not used to, hence they would rather adopt other farm enterprises such as dairy farming and crop farming than invest in fish farming.

Regression Analysis
Model Summary
Regression analysis was conducted to establish the cultural factors influencing sustainability of fish farming. The results indicate that cultural factors contributes 34.3% change on sustainability of fish farming. Hence other factors that were not considered in this study contribute the remaining percentage.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.586[a]	.343	.306	.45027

    a. Predictor: (Constant), Cultural-factors

Analysis of Variance
Analysis of variance indicates whether the data collected for the study fits in to the regression model that was used in the study. The results indicated that the data fits into the model (F 9.138, p = 0.0000) since p is less than 0.05.

Table 3: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.411	4	1.853	9.138	.000[b]
	Residual	14.192	70	.203		
	Total	21.603	74			

a. Dependent Variable: Sustainability
b. Predictor: (Constant), Cultural-factors.

Coefficients
The coefficient indicate the contribution of independent variable on the change on the dependent variable. Cultural factor was found to be a strong predictor of sustainability of fish farming, (β = 0.482, p = 0.000), since the p values for was found to be less than 0.05. The regression coefficients are presented in table 4.

Table 4: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.104	.609		.171	.865
	Cultural factors	.647	.133	.482	4.864	.000

a. Dependent Variable: Sustainability

The regression model adopted for the study was;

$Y_i = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$

Substituting the constant term and β values in to the regression model;

$Y_i = 0.104 + 0.020 X_1 + 0.318 X_2 + 0.482 X_3 + .295 X_4 + \varepsilon$

Conclusions and Recommendations

The study established that most people in Moiben Sub-County prefer other sources of protein over fish, and for this reason, fish farmers felt that the people in the locality needs to be educated to change their feeding habits in favour of fish. This was attributed to the fact that traditionally; fish farming was not a preferred choice for the members of the community dominant in the area. The study further established that most farmers in the locality would rather engage in other farming enterprises than fish farming. Despite this, it was established that fish farming has future potential due to a change in culture in the locality in favor of fish farming. Cultural factors were found to significantly affect sustainability of fish farming.

The study established that most people in Moiben Sub-County prefer other sources of protein over fish. In order to create local demand for fish farmers, the department of fisheries should conduct awareness campaigns to educate people on the advantages of fish as source of animal protein.

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