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Risk Management Skills, Market Intelligence skills and Success of Artificial Fish Farmingprojects in Uasin Gishu County, Kenya

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Abstract

Artificial fish farming is widely accredited for improving social and economic development of the rural unemployed youth in Kenya. However, despite this improvement youth groups seem to grapple with challenges associated artificial fish farming projects. The purpose of the study was to determine the extent to which risk management and market information influence the success of artificial fish farming projects among youth groups in Uasin Gishu County, Kenya. The objectives of the study were; to establish how risk management skills influence the success of artificial fish farming projects and to examine the extent to which market intelligence influence success of artificial fish farming projects among youth groups in Uasin Gishu County Kenya. The study adopted descriptive research design and correlation research design and a study population of 1025 youth from which a sample of 288 was desired using Yamene's sample size determination formula. A simple random sampling technique was used to pick the sample frame. Data was gathered by use of questionnaires, interview schedules and observation schedules. Quantitative data was analyzed descriptively using frequencies, percentages, mean scores and standard deviations while inferential analysis was undertaken using correlation and regression analysis. Null hypothesis was analyzed by paired t-test using *p*- value method. Artificial fish farming had a mean score of 2.597 (SD=1.443) implying that respondents lacked risk management skills while key informant interview showed that youth groups were in need of risk management skills. The regression analysis showed that 26.8% of success of artificial fish farming was explained by risk management skill. Paired *t*-test (267) = 2.866, $p < 0.05$, null hypothesis was rejected and it was concluded that risk management skills have a significant influence on the success of artificial fish farming projects among the youth groups. Market intelligence had a composite mean score of 3.178 (SD = 1.526) implying that it wasn't clear whether it had had influence on artificial fish farming projects. Interview showed that market intelligence among youth groups is not well developed. Regression analysis showed that 18.2% of success of artificial fish farming was explained by market intelligence skills. Paired *t*-test (267) = -5.814, $p < 0.05$, null hypothesis was not rejected and it was concluded that market intelligence skills have no significant influence on the success of artificial fish farming projects among youth groups. It is recommended that youth groups practicing artificial fish farming to undergo continuous training risk management and market intelligence in order to sharpen their skills.It is also recommended that Fisheries Department roll out capacity building Programme to enhance skills of youth in the artificial fish farming projects in Unsin Gishu County Kenya.

Key words: Risk Management Skills, Market Intelligence Skills, Artificial Fish Farming

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1. Introduction

Agriculture is the mainstay of the Kenyan economy. It contributes 27.3% directly and another 25% indirectly to the GDP through linkages with other sectors (Ministry of Agriculture, Livestock, Fisheries and Cooperatives (MALFC) (2020). Charo (2012) acknowledges that, 68% of the country's population live in the rural areas where they engage in various agricultural activities. Despite this significant contribution, Karuku (2018)points out that population increase is the single greatest cause of decline in agricultural productivity due to incessant land subdivision that has rendered hitherto productive agricultural hinterland uneconomical. MALFC (2020) concurs and points out thatthe decliningagricultural productivity has led to the adoption of alternative enterprises that use ofless land space for production. One such enterprise isthe artificial fish farming. In 2021 instance, the annual artificial fish production was USD 83.3 million withprojections estimated to rise by 76.9% to USD 147.4 million by 2030 (Kenya Private Sector Alliance, 2023). Due to this growth prospects, youth who ordinarily do not have access and control over land find artificial fish farming project a feasible alternative due to the limited space the enterprise occupies. MALFC (2020)reported that over half a million youth organizations registered as self-help groups in Kenya to produce 1.5 million metric tonnes of quality table size fish for both domestic consumption and export. However, despite increase in the uptake of artificial fish farming ventures,most youth groups grapple with challenges associated with artificial fish farming projects.

In 2019, Department of Fisheries through the support of Economic Stimulus Programme (ESP) promoted the adoption of 2,000 earthen ponds Young Farmers' Clubs and 4K Clubmembers in schools and colleges to(MALFC,2020). Obwanga, Rurangwa, van Duijn, Soma and Kilelu, (2018)reported that thefish sub-sector additionallywitnessed 25% growth withan estimated 450,000 Small-scale farmers and 150,000 out of school youth groups undertaking fish farming enterprises in 140 out of 290 constituencies. FAO (2004) attributed therapid adoption of artificialfish farming technologies to amongotherthings, the low capital outlay associated with this enterprise.Artificial fish farming is today dubbed the silver bullet that slayswidespread rural unemployment by economically empowering youth besides acting as a source ofprotein. Obiero, Meulenbroek, Drexler, ADagne, Akoll, Odong, Kaunda-Arara, and Waidbache (2019) rightly refer to fish as a source of ***'rich protein for the rural poor'*** since it is accessible and affordable source of animal protein at the farm where aquaculture is practiced.Funding through ESP has presented opportunities toyouth groups who previously undertook motorbike transport business, brick making, on-farm causal labor and hawking as a source of income to form youth groups and set upartificial fish farming projects (Kenya Private Sector Alliance, 2013).This means that adoption of artificial fish farming present economic growth prospects for most rural youth groups.

However, despite the social and economic advantagesassociated with artificial fish farmingventures set up by youth groups,most projects seem to grapple withmarket penetration challenges due to inadequate risk management skills and market intelligence skills.It is in the light of this realization that the study sought to determine the extent to which risk management skills and market intelligence skills among the youth influence success of artificial fish farmingprojects in Uasin Gishu County, Kenya.

1.1 Research Objectives

The study was guided by the following objectives;

i. To establish how risk management skills influence the success of artificial fish farming projects among youth groups in Uasin Gishu County, Kenya.
ii. To examine the extent to which market intelligence skills influence success of artificial fish farming project among youth groups in Uasin Gishu County, Kenya.

1.1.1 Research Hypothesis

The following alternative hypotheses were formulated and tested;

i. **H_1**: Risk management skills have a significant influence on the success of artificial fish farming projects among youth groups.
ii. **H_1**: Market intelligence skills have a significant influence on the success of artificial fish farming projects among youth groups.

2. Literature Review

Empirical and theoretical literature was reviewed in order to operationalize the variables under study and further develop a conceptual and theoretical understanding of the same.

2.1 Success of artificial fish farming projects

Artificial fish farming is a type of aquaculture in which man-madeunderwater structures or techniques is used for purposes of promoting marine life (Obiero*et al*, 2019). The structures come in many forms,types and sizes and are constructed where water or land mass is restrictive. The concept *"success"*on the other hand refers to the ability of a project to remainsustainable long after external support has been stopped or withdrawn (European Commission, 2006). Based on this understanding Kaliba and Norman (2004) visualize project success in terms of provision of satisfactory quantities and quality of goods and services to beneficiaries.In India, Dong, Chuah, and Zhai (2004) used the term *success* of artificial fish farmingin the context of 'willing to pay for inputs used for producing fish" as a measure of sustainability of youth group-initiated projects. This means that youth groups that own artificial fish farmingprojects are consideredsuccessful when they continually supply fish products long after external funding has ceased. The process of sustaining fish production through paid up inputs purchased by proceeds from sales from harvested fish is what constitutes success of artificial fish farming projects. This means that any youth groups'ability and willingness to pay for inputs is a suitable yard stick for measuring*"success"* of artificial fish farming projects.

Most rural out of school youth are unemployed and lack reasonable resourcesto eke out livelihood improvement initiatives. It was as a result of the absence of reliable livelihood sources that the Economic Stimulus Programme (ESP) was set up by the government of Kenya with the aim of reaching out to 60% of organized rural youth groups by 2030 (MALFC, 2020). The programme was initially intended to give unemployed youth opportunity to engage in agricultural production in order to address inherent socio-economic challenges such as;rural-urban migration, poverty in all its dimensions, food insecurity, unemployment and as well as the promotion of security in communities (Obiero *et al*, 2019). That notwithstanding, numerous challengers associated with the implementation of ESP do exist and have been cited.For instance, Mwaura and Ngugi (2014) point out that fish farming depend upon fresh water whose conveyance cause soil erosion and introduce invasive species making it difficult to produce fish without adequately addressing environmental degradation, loss of biodiversityand other ecosystem related challenges (Kaliba and Norman, 2004). Artificial fish farming therefore interfere with biodiversity and natural environment processeswhich in turn impacts on climatic

changes.Obwanga *et al* (2018) posit that such interference affectstransactional costs making investments in aquaculture a difficult endeavor. Therefore in order to develop strategies that enable and sustain environment an integrated approach to youth initiated artificial fish projects must be considered in order to drive change in aquaculture for food and nutritional security even as the sustainable management of the artificial fish projects is pursued (Maendo, 2007). This means that sustainable artificial fish projects for youth groups is only considered successful if environmental management is ensured.

2.3 Risk management skills and success of artificial fish farming projects

Risk management entails continuousidentification, analysis, evaluationand treatment of losses that may emanate from exposure to any future unforeseen event. This processtherefore is applicable and useful in any venture, organizationor project. Rodrigues-da-Silvaa and Crispim (2014) argue that decision-agents must identify, analyze and evaluate risks in the entire project management life cycle and use their organizational structure and administrative practices to act on emerging risks in favor of the project. Jainendrakumar (2015) additionally observes that the main objective of such decision agents is to increase probability and impact of positive events while decreasing probability and impact of negative events in the project. That is why projects embraced ways to reduce impacts caused by negative risks and maximize ways of exploiting opportunities created by positive risks (Alan, Gale, Brown, and Khan, 2010). In this study, risk management skills involved identifying sources of risks, assessments of those risks and establishment of different types of risk management plans.

Ali *et al* (2018) undertook a study todetermine the role of information communication technology in managing risks in fish farming projects in Malaysia. They used multistage cluster sampling technique to and showed that majority of themwere unaware of the use of ICT in risk management of fish farming ventures and therefore were not access information from extension services through its use. The consequences of which was that majority of beneficiaries sufferedfrom productivity and yield relatedrisks. In another study, Lebel, Lebel and Lebel, (2016) undertook to identify the important climate-related risks faced by cage aquaculture farms in the northern region of Thailand ostensibly to determine its impact on fish production. The study established that drought, low water levels, heat waves, cold spells and periods with dense cloud cover significantly reduced spawning which in turn led to financial losses to the fish projects. They further found out that such risks were managed in the short-term with techniques such as aeration and feed reduction to the fish cages. These findings illustrate that risk related skills knowledge is critical not only in forestalling decline in fish production, reducing financial losses but also in increasing production.

To say thatcompliance risk in food supply chain is closely intertwined with rick management skills is an understatement. Tran (2018) undertook a study aimed at exploring critical factors of compliance risk in food supply chain in Vietnamese seafood industry and established three main critical factor groups that influence compliance risk namely; challenges originating from food supply chain itself, characteristics of regulation and standards, and business environment. Based on this finding, he rightly recommended that compliance risk is best mitigated through enablers of food supply chains through relevant government agencies. In a related study Ngo and Azadi, (2018) sought to determine production risk, market risk, and financial risk related to the production of clams in the Thai Province of Vietnam. They applied a differentiating comparative analysis and multiple discriminant analysis method to determine the differences in risk management

strategies between and among clam farming households and the impact of those differences on their success/failure rates. The study showed that tactics related to increase in farm sizes, application of technical innovations, diversification of livelihood activities, and access to secure financial sources all provided better conditions for clam growth, diminished losses, that lead to speedier recovery from shocks. These studies demonstrate that application of risk management skills in aquaculture significantly reduce incidences of losses and chances of profit maximization through increased productivity.It is on the basis of this that the study sought to establish how risk management skills influence success of artificial fish farming projects among youth group projects in Uasin Gishu County, Kenya.

2.4 Market intelligence skills and success of artificial fish farming project

Market intelligence is the process of gathering and analyzing information about competitors, trends in the marketplace, and customer preferences in order to gain a better understanding of competition for strategic decision making.FAO (2004), acknowledges that the fisheries sub-sector in Kenya is faced with numerous challengeswhich include; inadequate market intelligence skills leading to variance between demand and supply of fish products in the market. This variance if remain unexploited may be the cause of under-exploitation fishresources, cross-border fishing and trade conflict, fish marketing, fish quality and post-harvest related challenges. In Kenya, the development of artificial fish farming has the potential to attract international and regional markets but only if proper market intelligence skills is developed by youth groups (Mclaney, 2000). The Kenya National Business Agenda II 2013-2018 reports that although Kenya's aquaculture is better developed than most Sub-Saharan Africa countries, domestic fish market is poorly organized leading to a lapse between market demand and supply of fish and its products. FAO (2004) report that fish market in Kenya could take advantage of poor infrastructure in the region to exploit both the local and international marketsopportunities through processing, storage and value addition. That is why AAK (2015)indicated that supermarkets, hotels, schools, fish outlet center are some of the main markets opportunities available to youth group fish producers. This means that availability of fish producer markets is not enough to develop the industry unless market intelligence skills are inculcated among youth groups who produce fish for sale.

It is apparent that market information can reduce transaction cost in fish production if not well articulated. That is whyMpofu (2010)posit that fish farmers' access to the market offers the greatest challengeto the improvement of fish business expansion. This challenge notwithstanding, several interventions have been put in place by the Department of Fisheries to promote competitiveness and access to fish market information (Lucy *et. al,* 2015). In his study Pinto (2007) while undertaking a study on small scale aquaculture marketing established that many challenges that are linked to access to market include; price risk and uncertainty, lack of organized small scale producers which increases transaction cost and inability to meeting the required market standards. Mpofu (2010)further showed that in countries such as South Africa, successful fish farmers are those groups of smallholders previously excluded from the mainstream economic opportunities due to their ease to adapt, access and use of market intelligence skillsto penetrate the market through forecasting and promotion of their products.This means that market intelligence requires flexibility on part of fish producers in order for them to advance and develop.

According to Ali, Man, Latif, Muharam and Omar (2018) farmers form cooperatives and collective marketing associations with the aim of increasing their bargaining power in the

market space. Burke (2008) reports that fisher folks in Kenya form cooperatives to strengthen their clout in the marketing of their fish. Cooperatives enable them form mutually beneficial alliancesfor forestalling middlemen, brokers and strengthen their bargaining power to overcome hurdles in the fish chain(Maendo, 2007).In his study Potts (2002), established that lack of good infrastructure to support the fish chain is the course of poor domestic markets the resultant of which low producer prices and weak competitiveness. Tran, (2018) on his part demonstrated that poor roadinfrastructure in Vietnam was the reason for high fish transportationand handling costs the distance to the market notwithstanding. These findings indicate that despite poor organization exhibited bydomestic fish market coupled with poor infrastructure, market intelligence among fish farmers is critical in understanding how to balancebetween strengths and weaknesses associated with the fish industry demands in order to exploit the available opportunities in the industry. In this study the researcher sought to examine the extent to which market intelligence skills influence success of artificial fish farming projects among youth groups in Uasin Gishu County, Kenya.

3. **Research Method**

The study adopted descriptive survey research design and correlation research design because the researcher was interested in describing characteristics of the phenomena and also examine the extent to which predictor variables influenced the dependent variable (Mugenda and Mugenda, 2005; Creswell, 2014). Thestudy population was 1020members of artificial fish farming youth groupprojects in Uasin Gishu County, Kenya from which a sample of 228 was desired using Yamane (1967) sample size determination formula given as follows;

$$n = \frac{N}{1 + N(e)2}$$

Where N = target population
n = sample size
e = error estimate at (95%) confidence level

$$n = \frac{1025}{1 + 1025(0.05)2}$$

n = 288

A sample of 228 subjects was selected from the sampling frame using computer random numbers.The youth groups were spread out in six Sub-Counties of Uasin Gishu County namely; Ainabkoi, Kapsaret, Kesses, Moiben, Soy and Turbo. The sampling design is shown in table 3.1.

Table 3.1: *Sampling Design*

Constituency	Target Population	The proportionof community members inthe population	Sample size
Ainabkoi	259	0.254	58
Kapsaret	67	0.065	15
Moiben	224	0.220	50
Soy	216	0.212	48
Kesses	65	0.064	15
Turbo	189	0.185	42
Total	**1020**	**1.000**	**228**

Questionnaire was the main data collection tool whose items had closed ended questions each with a 5-Likert scaleand was used to gather quantitative data. Interview guide and observation schedule were used to gather qualitative data. Quantitative data was analyzed descriptively usingmean scoresandstandard deviationswhileinferentialanalysisadopted Pearson's ProductMoment Correlationandregressionmodels. The multi-regression model was given as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_{2+} \varepsilon$$

Where; Y = Success of artificial fish farming projects.

β_0= Constant Term

β_1, β_2= Beta coefficients

X_1 = Risk management skills

X_2 = Market intelligence skills

ε = Error-term

Qualitative data was gathered from Department of Fisheries staff and analyzed using content analysis based on themes of the study. Additional qualitative data was gathered using observation schedule while secondary data was collected from fisheries project documents.

Alternative hypotheses were changed to null hypotheses and as follows;

i. **H_0**: Risk management skills have no significant influence on the success of artificial fish farming projects among youth groups.
ii. **H_0**: Market intelligence skills have no significant influence on the success of artificial fish farming projects among youth groups.

Null hypothesis was analyzed by paired t-test using *p*- value method and rejected if *p* value was less than 0.05 or otherwise not rejected.

4. Results and Analysis

4.1 General information about respondents

In this section data concerning general information of the respondents was analyzed.

Questionnaire Responses Rate

A total of 288 questionnaires were distributed to members of the artificial fish farming youth group projects out of which 268 were duly filled and returned representing. The returned questionnaires represented 93% response rate. Saunders *et.al* (2003),suggests that more than 75%response rate is good enough for generalization of research findings.Thismeansthat93%returnrateobtainedinthe study washighenoughto provide reliablestatisticsforgeneralizationoninfluence of risk management skills and market intelligence skill on success of artificial fish farming projects in Uasin Gishu County,Kenya.

Demographic information

Demographic information on members of the youth groups analyzed included was with respect to gender, age, and level of education. This data was important in obtaining background information of respondents with respect to success of artificial fish farming projects. A summary of demographic information is shown in table 4.1.

Table 4.1 Demographic information

Demographic information	Response	Frequency	Percentage
Gender of the respondents	Male	166	61.9
	Female	102	38.1
	Total	**268**	**100**
Age of the respondents	18 -22 years	32	11.9
	23 -26 years	42	15.7
	27 -30 years	115	42.9
	31 -35 years	79	29.5
	Total	**268**	**100**
Level of education	No basic education	31	11.6
	Primary	22	8.2
	Secondary	128	47.8
	Tertiary	63	23.5
	University	24	9
	Total	**268**	**100**
Number of years practiced artificial fish farming	Less than a year	72	26.9
	2-3 years	102	38.1
	4-5 years	90	33.6
	More than 6 years	4	1.5
	Total	**268**	**100**

In Table 4.1 concerning distribution of respondents by gender showed that 166(61.9%) of the youths were male while 102(38.1%) were female. This implies that more male than female gender were represented in artificial fish farming projects. This result differs from a study conducted by Ngugi *et al*., (2007) who established that males were more t in agriculture related projects. This means that success of artificial fish farming youth group project depend on the male gender due to their numbers.Distribution of respondents by age showed that 32(11.9%) and 42(15.7%) were aged between 18-22 years and 23-26 years respectively while 115(42.9%) and 79(29.5%) were aged between 27-30 years and 31-35 years respectively. This finding showed that more than 72.4% of the youth were aged between 27 to 35 years. This implies that majority of the members artificial fish farming projects were older youth. Charles, (2007) showed that majority of youth over 27years of age are more determined to settle in fish farming activities because they are in the 'out-of-college' job seeking category. This explains the reasons why youth older than 27 years are majority in artificial fish farming projects.

Distribution of respondents by level of education showed that 31(11.6%) and 22(8.2%) had no basic and primary education respectively while 128 (47.8%) and 63(23.5%) had secondary school and tertiary level of education respectively. Those with University education were 24(9%) of the youths.This implies that majority of the members of artificial fish farming projects numeracy and literacy skills necessary to manage such projects profitably. Distribution of respondents by the number of the years of artificial fish farmingpractice showed that 72(26.9%) and 102(38.1%) had been members of the projects for between 2-3 years respectively. In addition, 90(33.6%) had 4-5 years while4(1.5%) more than 6 years fish farming project experience. This implies that majority of the youth (71.1%) had practiced artificial fish farming only for a period between 2 to 5 years, an indication that although they had basic understand of artificial fish farming experience, they were lacking in critical aspects necessary. Wanjohi (2010) supports this view when he

observes that many yearsof project engagement most likely grants one the critical skills and experiential knowledge required for its operations.

4.2. Success of Artificial Fish FarmingProjects

The study sought to establish the level of success of artificial fish farming projects for youth groups in Uasin Gishu County, Kenya. Indicators for success of artificial fish farming projects are; No of members paying back loans, level of economic independence and No. of youth dependent on fish for nutrition. The response of respondents is presented in table 4.2.

Table 4.2: Success of artificial fish farming projects

No.	Statements	Mean	SD
	No of members paying back the loan		
5a1	Youth's group members have been paying back their loans from the projects.	3.455	1.480
5a2	The youth frequently repay loans within the stipulated time period.	2.508	1.518
5a3	Youth group members have been warned for non-payment or late loan payment	3.358	1.508
5a4	Youth repay their loan entirely with proceeds from artificial fish farming projects	2.362	1.417
5a5	I am satisfied with the youth group capacity to pay back the loan	2.605	1.521
	General mean and Standard Deviation =	**2.857**	**1.491**
	Level of economic independence		
5b1	Youth entirely depend on artificial fish farming project proceeds	3.358	1.528
5b2	Youth group members rely on other alternative sources of income for survival	3.519	1.505
5b3	The income generated by the fish project is sufficient to pay for expenses	3.414	1.468
5b4	The projects require external financial support to continue operating	2.653	1.520
5b5	I am satisfied with the way this project is sustaining lives of youth.	2.948	1.608
	General mean and Standard Deviation =	**3.178**	**1.526**
	No. of youth dependent on fish for nutrition		
5c1	Youths group members rely on fish harvested as part of their diet	4.724	1.392
5c2	Fish produced by youth projects is consumed by local households	4.601	1.507
5c3	Community members have increased fish consumption	4.455	1.556
5c4	Locally produced fish is more affordable than the other meat protein sources	2.989	1.599
5c5	I am satisfied with the manner fish is improving youth nutrition status.	4.597	1.467
	General mean and Standard Deviation =	**4.473**	**1.504**
	Composite Mean score and SD =	**3.502**	**1.507**

Table4.2indicatethatoutof268respondentswhoparticipatedinthestudy they allresponded toitemson success of artificial fish farming projects. Item 5a1 sought to determine whether youth group members paid their loans with proceeds from fish project and the response gave a mean score of 3.455 with standard deviation of 1.480. This indicated that respondents agreed that youth group members paid their loans with proceeds from fish project.Item 5a2 sought to determine whether the youth frequently repaidback their loans within the stipulated time frame and the response had a mean score of 2.508 with standard deviation of 1.518. This indicated that respondents disagreed that youth frequently repaid loans within the stipulated time period. Item 5a3 sought to determine whether youthgroup members were warned for non-payment or late loan paymentof loan and the response had a

mean score of 3.358 with standard deviation of 1.508. This implied that respondents were not sure whether youth group members were warned for non-payment or late loan paymentof loan. Item 5a4 sought to determine whether repay their loan entirely with proceeds from artificial fish farming projects and the response had a mean score of 2.362 with standard deviation of 1.417. This implied that they disagreed that youth repaid their loan entirely with proceeds from artificial fish farming projects. This meant that proceeds from the fish project is not entirely applied in repayment of loans. Item 5a5 sought to determine whether youth group members were satisfied with their capacity to repay back the loan advanced for artificial fish farming projects and the response had a mean score of 2.605 with standard deviation of 1.521. This meant that respondents were not sure whether all the youth group members were satisfied with their capacity to repay back the loan advanced for artificial fish farming projects. This means that whereas some youth groups managed to repay their loan others were not able to repay as scheduled with the net effect that both scenarios on payment and default existed.

The general mean score for number of youth group members paying back their loan had a mean score of 2.857 with a standard deviation of 1.491. This meant that respondents were not sure whether youth members paid back their loan. Interview however indicated that despite loan repayments, cases of non-payment did existed as one key informants stated that;

'……..some youth projects have defaulted in paying their loans although others have been making good their financial obligation when the repayment fall due……..'

This meant that cases of non-repayment was not generalized to all groups but was isolated. This observation is supported byMwaura and Ngugi (2014) who observed that success of agricultural ventures isdetermined by the extent to which their ability to repay for inputs or loans advanced works out. This means that while there were cases of artificial fish projects that were not repaying their loan there were also other that were able to internally generate revenue to cover loan repayments.

Item 5b1 sought to determine whether youth entirely depended on artificial fish farming project proceeds and the response had a mean score of 3.358 with standard deviation of 1.528. This meant that respondents weren't sure whether youth entirely depended on artificial fish farming project proceeds. Item 52b sought to determine whether group members relied on alternative sources of income for survival and the response had a mean score of 3.519 with standard deviation of 1.505. This implied that respondents agreed that youth entirely depended on artificial fish farming project proceeds. Item 5b3 sought to determine whether income generated by the fish projects was sufficient to pay for project expenses and the response had a mean score of 3.414 and standard deviation of 1.468. This meant that respondents agreed that income generated by the fish projects was sufficient to pay for project expenses. Item 5b4 sought to determine whether the projects required external financial support to continue operating and the response had a mean score of 2.653 with standard deviation of 1.520. This meant that respondents were not sure whether projects required external financial support to continue operating. Item 5b5 sought to determine whether the youth were satisfied with the manner the projects were sustaining their lives and the response had a mean score of 2.948 with standard deviation of 1.608. This meant that respondents were not sure whetherthe youth were satisfied with the manner the projects were sustaining their lives.

The general mean for level of economic independence was 3.178 (SD = 1.526) implying that respondents were unsure whether the artificial fish farming projects were

economically viable. Interview indicated that despite some project struggling to remain afloat, one key informant pointed out that;

'……. the path to economic viability is not a straight forward matter as it may appear since some groups are doing fairly well while others are struggling…'

This observation agrees with findings made by Mpofu (2010) who showed successful fish farming is incumbent to mainstreaming economic opportunities that use make use of market intelligence skills to determine their development. What this meant is that economic opportunities is critical for developing.

Item 5c1 sought to determine whether members of youth groupsrelied on fish harvested as part of their diet and results gave a mean score of 4.724 with standard deviation of 1.392. This meant that respondents strongly agreed that youth group members relied on fish harvested as part of their diet. Item 5c2 sought to determine whether fish produced by youth projects was consumed by local households and the response had a mean score of 4.601 with standard deviation of 1.507. This meant that respondents strongly agreed that fish produced by youth projects was consumed by local households. Item 5c3 sought to determine whether community members had increased fish consumption and the response showed a mean score of 4.455 with standard deviation of 1.556. This meant that respondents strongly agreed that community members had increased fish consumption. Item 5c4 sought to determine whether locally produced fish was more affordable than other meat protein sources and the response had a mean score of 2.989 with standard deviation of 1.599. This meant that they were not sure whether locally produced fish was more affordable than other meat protein sources. Item 5c5 sought to determine whether respondents were satisfied that fish was improving nutritional statusof youth and the results showed a mean score of 4.597 and standard deviation of 1.467. This meant that respondents strongly agreed that respondents were satisfied that fish was improving nutritional status of youth.

General mean score for youth dependence on fish for nutrition was4.473 (SD = 1.504) implying that respondents strongly agreed that youth depended on fish for nutrition. The key informants confirmed this view when informants stated that;

'……..*majority of the youths use the fish stocks as part of their diets in theirrespective homes…….'*

Composite mean score for success of artificial fish farming projects was 3.5029(SD = 1.507) implying that it was not clear whether or not artificial fish farming projects were successful. This observation is at variance with what key informants confirmed when they stated that;

'……a few number of projects are quite successful and able to meet their financialobligation whereas others are barely struggling. This makes repayment uncertain especially where they're unable to break-even……"

This finding is similar with what Ngo and Azadi, (2018) established when they demonstrated that application of risk management skills reduces incidences of losses and increase chances of profitability but only on a sound economic and financial sound business environment. This means that success of artificial fish farming projects is incumbent to sound financial and economic management skills which a good number of artificial fish farming projects managed by youth groups in Uasin Gishu county, Kenya lack.

4.3 Risk management skills and success of artificial fish farming projects

The first objective sought to establish the influence of risk management skills on the success of artificial fish farmingprojects inUasin Gishu County, Kenya. The study sought to determine the level of risk management based on the following indicators; frequency of risk mitigation, assessment of risk occurrence and cost of risk mitigation. Views of responses were recorded using the following scale; 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree which is summarized into mean scores and standard deviation as shownin table 4.3.

Table 4.3 Risk management skills

No.	Statements	Mean	SD
	Frequency of risk mitigations		
3a1	The youth group members had necessary risk management skills.	2.392	1.461
3a2	Youth are able to identify the various risks potentially affecting their projects.	2.392	1.366
3a3	Members of youth group have the ability to develop risk mitigation plans	2.306	1.429
3a4	The youth frequently meet to review the various risks affecting their projects	2.437	1.443
3a5	I am satisfied with risk mitigation measures put in place	2.448	1.438
	General mean and SD=	**2.395**	**1.428**
	Assessments of risk occurrence		
3b1	Youth groups are able to assess likelihood of risk occurrence	2.228	1.331
3b2	Youth groups are able to assess the magnitude of the risks identified	2.202	1.418
3b3	Youth groups have ability to establish threats and opportunities created by the risks.	3.213	1.573
3b4	Youth groups are able to forecast the risks before they occur	2.425	1.450
3b5	I am satisfied with the group methods of assessing the types of risks	2.866	1.538
	General mean and SD=	**2.587**	**1.462**
	Cost of risk mitigation		
3c1	Losses incurreddue to inherent risks are fully managed	2.634	1.519
3c2	Project was able to exploit opportunities emanating from positive risks	2.280	1.324
3c3	It takes long for the group members to address any risk suffered	3.522	1.429
3c4	More resources than usual is spent in mitigating inherent risks	2.440	1.438
3c5	I am satisfied with the way losses or costs of risks have been managed.	2.478	1.485
	General mean and SD=	**2.671**	**1.439**
	Composite Mean score and SD=	**2.597**	**1.443**

Table4.3indicatethatoutof268respondentswhoparticipatedinthestudy they allresponded toitemson management skills and success of artificial fish farming projects. Item 3a1 sought to establish whether youth group members had necessary risk management skills and the results showed a mean score of 2.392 with standard deviation of 1.461. This meant that respondents disagreed that youth group members had necessary risk management skills. Item 3a2 sought to establish whether youth were able to identify the various potential risks affecting their projects and the response shown a mean score of 2.392 with standard deviation of 1.366. This meant that respondents disagreed that youth were able to identify the various potential risks affecting their projects. Item 3b3 sought to determine whether members of youth groups had the ability to develop risk mitigation plans and the

results showed a mean score of 2.306 with standard deviation of 1.429. This meant that respondents disagreed that members of youth groups had the ability to develop risk mitigation plans. Item 3a4 sought to determine whether the youth frequently met to review various risks affecting their projects and the results showed a mean score of 2.437 with standard deviation of 1.438. This meant that respondents disagreed that the youth frequently met to review various risks affecting their projects. Item 3a5 sought to determine whether beneficiaries were satisfied with risk mitigation measures put in place and results showed a mean score of 2.448 with standard deviation of 1.428. This implied that respondent's disagreed that beneficiaries were satisfied with risk mitigation measures put in place.

The general mean for frequency for risk mitigation was 2.395(SD =1.428) implying that respondents did not undertake any risk mitigations. This observation was at variance with key informant interview when one Department of Fisheries revealed that;

> *'……initially the youth projects sufferedfrequent impactful risks but after some years of practice and experience they are now able to identify and mitigate them effectively…..'*

This observation was confirmed when the researcher observed weather forecast records in almost all the groups visited and indication that they were keen to forestall any future event that may negatively impact on the fish project. This findings was in agreement with observation made by Ali *et al* (2018) when they showed that fish folk suffer whether related risks which if not forestalled affect productivity and yieldsin ponds. This means that youth groups must be well equipped with risks in order to forestall eventualities that may impact on productivity of their ponds.

Item 3b1 sought to determine whether youth groups were able to assess likelihood of risk occurrence and results showed a mean score of 2.228 with standard deviation of 1.331. This meant that respondents disagreed that youth groups were able to assess likelihood of risk occurrence. Item 3b2 sought to determine whether youth groups were able to assess the magnitude of the risks identified and results showed a mean score of 2.202 with standard deviation of 1.418. This implied that respondents disagreed that youth groups were able to assess the magnitude of the risks identified. Item 3b3 sought to determine whether youth groups had ability to establish threats and opportunities created by the risks and results indicated that respondents disagreed that youth groups had ability to establish threats and opportunities created by the risks. Item 3b4 sought to establish whether youth groups were able to forecast risks before they occurred and results indicated a mean score of 2.425 with standard deviation of 1.450. This meant that respondents disagreed that youth groups were able to forecast risks before they occurred. Item 3b5 sought to determine whether beneficiaries were satisfied with their methods of assessing the risk types and the results indicated a mean score of 2.866 with standard deviation of 1.538. This meant that respondents were unsure whether beneficiaries were satisfied with their methods of assessing the risk types.

The general mean score for assessments of risk occurrence was 2.587(SD = 1.462) implying that the youth groups did not undertake any risk assessment for their project neither did they have the requisite skills for the same.Interview confirmed this observation as key informant stated that;

> *'.....majority of the youth group members are incapable predicting and therefore assessing*
>
> *the likelihood of occurrence of the risks, this in return as negatively affected most project*
>
> *performance….'.*

Tran (2018) supports the findings by stating that it is necessary for the farmers to assess the magnitude of their losses or predict the cost that may suffer if the risk would occur. Generally it showed that the youth lack the risk management skills necessary for identifying and mitigating risks in order to enhance productivity of artificial fish farming projects.

Item 3c1 sought to determine whether losses incurreddue to inherent risks were fully managed and results indicated a mean score of 2.634 with standard deviation of 1.515. This meant that respondents were not sure whether losses incurreddue to inherent risks were fully managed. Item 3c2sought to determine whether project were able to exploit opportunities emanating from positive risks and results indicated a mean score of 2.280 with standard deviation of 1.324. This implied that respondents disagreed that project were able to exploit opportunities emanating from positive risks. Item 3c3 sought to determine whether it took long for the group members to address any risks suffered and the results showed a mean score of 3.522 with standard deviation of 1.429. This meant that respondents disagreed that took long for the group members to address any risks suffered. Item 3c4 sought to determine whether more resources than usual was spent in mitigating inherent risks and results showed a mean score of 2.440 with a mean score of 1.438. This implies that respondents disagreed that more resources than usual was spent in mitigating inherent risks. Item 3c5 sought to determine whether beneficiaries were satisfied with the way losses or costs of risks were managed well are results indicated a mean score of 2.478 with standard deviation of 2.478 with standard deviation of 1.485. This meant that respondents disagreed that beneficiaries were satisfied with the way losses or costs of risks were managed well. This implies that respondents disagreed that beneficiaries were satisfied with the way losses or costs of risks were managed well.

General mean score for the cost of risk mitigation was 2.671(SD = 1.439) implying that it wasn't clear whether cost of risk mitigation was catered for. This observation is corroborated through interviews askey informants affirmedthat;

> *'…..the youths lack the necessary skills and knowledge to evaluate the magnitude of the risks in terms of effect and impact on the project……'.*

The composite mean score for risk management skills was2.597(SD = 1.443) implying that youth groups practicing artificial fish farming projects lacked appropriate skills to evaluate the costs related to projectmanagement risks. This means is that although impact of risks in artificial fish farming projects was acknowledged beneficiaries were ill equipped to evaluate its impact. This observation is supported by Tran (2018) when he established that farmer groups were ill equipped to assess losses or predict the cost incurred suffer the risk incurring production losses. This implies that youth groups with inadequate risk management skills are exposed to uncertainties associated by loss of productivity inartificial fish farming.

4.3 Market intelligence and success of artificial fish farming projects

The second objective sought to establish the extent to which market intelligence influence success of artificial fish farming projects in Uasin Gishu County, Kenya.The study sought to determine the level of market intelligence based on the following indicators; availability of market information, level of market penetration and frequency of price forecast. The responses were recorded using the following scale; 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=StronglyDisagree is summarized into mean scores and standard deviation as shownin table 4.4.

Table 4.4 Market intelligence skills

No.	Statements	Mean	SD
	Availability of market information		
4a1	Youthpossess the requisite market information of their produce.	2.410	1.449
4a2	Market information is accessible to the youth for use	2.444	1.472
4a3	The market is readily available to accept the project fish supply	3.560	1.446
4a4	Youth groups understand forces of supply and demand	3.008	1.591
4a5	I am satisfied with the level of market awareness of the groups	2.459	1.459
	General mean and SD=	**2.776**	**1.483**
	Level of market penetration		
4b1	Youth group members have necessary skills to penetrate the market with their produce.	3.534	1.444
4b2	Market penetration strategies is applied throughout by the project	2.511	1.513
4b3	There is stiff competition for fish product by competitors in the market	3.388	1.506
4b4	Youth groups have experienced losses in their sales of fish products	3.537	1.480
4b5	I am satisfied with the techniques the group is using to penetrate the market	2.560	1.479
	General mean and SD=	**3.106**	**1.484**
	Frequency of price forecast		
4c1	Youth group members are aware of product pricing strategies.	3.321	1.568
4c2	Members frequently convene to review fish product pricing	2.593	1.490
4c3	Fish products have rejected due to prohibitive prices	3.396	1.565
4c4	Fish product prices set by the groups is sufficient to cover production costs	3.657	1.388
4c5	I am satisfied with setting and reviewing of the project prices	3.485	1.518
	General mean and SD=	**3.290**	**1.506**
	Composite Mean score and SD=	**3.057**	**1.491**

Table4.4indicatethatoutof268respondentswhoparticipatedinthestudy they allresponded toitemson market intelligence skills and success of artificial fish farming projects. Item 4a1 sought to determine whether youth groups possessed the requisite market information skills for their produce and the result showed a mean score of 2.410 with standard deviation of 1.449. This meant that respondents disagreed that youth possessed the requisite market information skills for their produce. Item 4a2 sought to determine whether market information was accessible to the youth for use and the result showed a mean score of 2.444 and standard deviation of 1.472. This meant that respondents disagreed that market information was accessible to the youth for use. Item 4a3 sought to determine whether the market was readily available to accept the project fish supply and the result showed a mean score of 3.560 with standard deviation of 1.336. This meant that respondents agreed that the market was readily available to accept the project fish supply. Item 4a4 sought to determine whether youth groups understood forces of supply and demand and the results had a mean score of 2.459 with standard deviation of 1.459. This meant that respondents disagreed that youth groups understood forces of supply and demand. Item 3b5 sought to determine whether beneficiaries were satisfied withthe level of market awareness of youth groups resulting to a mean score of 2.776 with standard deviation of 1.483. This meant that respondents were not sure whether beneficiaries were satisfied withthe level of market awareness of youth groups.

General mean score for availability of market information was 2.776(SD = 1.483) implying that it wasn't clear whether youth groups had access to market information. This observation disagreed with interviews as key informants supports stated that;

'……. *youth groups were trained on market trends for fish products for both*

freshly harvested and preserved fish stocks which means they have adequate knowledge on market information for fish products.…."

records held at the Department of fisheries showed that all youth groups supported under the ESP were variously trained on market information. This implies that although youth groups were trained knowledge acquired didn't translate into practical skills necessary to access competitive markets.

Item 4b1 sought to determine whether youth group members had necessary skills to penetrate the market with their fish produce and results showed a means score of 3.534 with standard deviation of 1.444. This implied that respondents agreed that youth group members had necessary skills to penetrate the market with their fish produce. Item 4b2 sought to determine whether market penetration strategies was applied throughout by the project production lifecycle and results indicated a mean score of 2.511 with standard deviation of 1.513. This meant that respondents disagreed that market penetration strategies was applied throughout by the project production lifecycle. Item 4b3 sought to determine whether there was stiff competition for fish product by competitors in the market and result showed a mean score of 3.388 with standard deviation of 1.506. This implied that respondents were not sure whether there was stiff competition for fish product by competitors in the market. Item 4b4 sought to determine whether youth groups have previously experienced fish products sales losses and results showed a mean score of 3.537 with standard deviation of 1.480. This meant that respondents agreed that youth groups have previously experienced fish products sales losses. Item 4b5 sought to determine whether beneficiaries were satisfied with techniques used in market penetration and the results gave a mean score of 2.560 and standard deviation of 1.479. This indicated that respondents disagreed that beneficiaries were satisfied with techniques used in market penetration.

General mean score for market penetration had a mean score of 3.106(SD = 1.484) implying that it wasn't clear whether the youth groups penetrated the fish market. This observation is supported by interviews in which key informants stated that

'……the youth groups have a wider scope and capability in which they can obtain market

information although they don't seem to exploit these channels the result of which translates

to lack of adequate information that leads to poor sales, lower producer prices, reduced

profitability and eventually lower productivityor even losses in the enterprises……..'

These finding agrees with what Wanjohi (2010) found out when he showed that lack of valuable market information hinders the ability of the fish folks to identify suitable producer prices their performance. This means that market information skills is critical in determining demand and supply for informed decisions.

Item 4c1 sought to determine whether youth group members were aware of product pricing strategies and results gave a mean score of 3.321 with standard deviation of 1.568. This implied that respondents were not sure whetheryouth group members were aware of product pricing strategies. Item 4c2 sought to determine whether group members

frequently convened to review fish product prices and results showed a mean score of 2.593 with standard deviation of 1.490. This meant that respondents disagreed that group members frequently convened to review fish product prices. Item 4c3 sought to determine whether fish products were ever rejected due to their prohibitive prices and the results gave a mean score of 2.396 with a standard deviation of 1.565. This meant that respondents disagreed that fish products were ever rejected due to their prohibitive prices. Item 4c4 sought to determine whether fish product prices set by youth groups was sufficient to cover all production costs and the result gave a mean score of 3.657with a standard deviation of 1.388. This meant that respondent agreed that fish product prices set by youth groups was sufficient to cover all production costs. Item 4c5 sought to determine whether beneficiaries were satisfied with fish prices they reviewed and set and the results gave a mean score of 3.485 and standard deviation of 1.518. This meant that respondents agreed that beneficiaries were satisfied with fish prices they reviewed and set.

General mean score for frequency of price forecast was 3.290(SD = 1.506) implying that it was not clear whether there occurred frequent price forecasts. This observation was is supported by interviews when key informants noted that price forecasts was never undertaken for which it was stated that;

'……..the youth groups need to conduct periodic price forecast in in different targeted

markets in order to identify suitable prices for their fish products……..'

This observation is similar to what Pinstrup-Anderson and Shimolwawa (2006)established when they found that fish mongers are only successful only if they understand market dynamics to enable them take advantages of their sales. This means that market intelligence skills is important for the success of artificial fish farming in Uasin Gishu County Kenya.

Inferential statistical analysis

Statistical assumptions for correlation was undertaken to test normality,linearity and collinearity and heteroscedasticity prior to the analysis of multi-regression model. The regression model was accepted for analysis after tests showed that no multi-collinearity existed between predictor variables and the dependent variable. The model summary is shown in table 4.5.

Table 4.5 Model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.938[a]	.879	.877	.48753

a. Predictors: (Constant), risk management and market intelligence.

Table 4.5indicate that 87.9% of the success of artificial fish farming projects is explained by independent variables (risk management and market intelligence)

Table 4.6 shows finding of the ANOVAresults.

Table 4.6 ANOVA

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	455.055	4	113.764	478.624	.000[b]
	Residual	62.512	263	.238		
	Total	517.567	267			

a. Dependent Variable: success of artificial fish farming projects
b. Predictors: (Constant), risk management skills and marketing intelligence skills.

Table 4.6 shows ANOVA which indicates that the regression model is highly significant, as indicated by the F (4, 263) = 478.624, $p<0.05$. Table 4.8 on coefficients shows the unit contribution of each predictor to dependent variable.

Table 4.6 Coefficients

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.746	.075		9.929	.000
	Risk management skills	-.268	.166	-.282	-1.620	.106
	Market-0okj intelligence skills	.182	.172	.189	1.058	.291

a. Dependent Variable: success of artificial fish farming project

Table 4.6 shows the various unit contributors of predictors on the dependent variable. The generalized mean factoring the unit contributors, errors and constants is shown as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where; Y = Success of artificial fish farming projects

β_0 = Constant Term = 0.746

$\beta_{1=}$ 0.106, $\beta_{2=}$ 0.819,

X_1= Risk management skills

X_2=Market intelligence skills

ε = error term = 0.075

The generalized regression model for the study is therefore presented here below;

$Y = 0.746 - 0.268\ X_1 + 0.182X_2 + 0.075$

The coefficient of risk management skills in the regression model is -0.268. This coefficient represents the mean increase of a unit of success of artificial fish farming projects is a result of -0.268 mean unit increase of risk management skills holding other factors constant. Lastly, the market intelligence skills coefficient in the regression model is 0.182. This coefficient represents the mean increase of a unit of success of artificial fish farming projects as a result of 0.182 mean unit increase of marketing intelligence skills holding other factors constant.

Risk management skills and success of artificial fish farming projects

A paired sample t-test was used to compare the mean scores of risk management skills and mean scores of success of artificial fish farming projects. The findings for the t-test were presented in table 4.7.

Table 4.7 Risk management skills and success of artificial fish farming projects

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	The youth group members have the necessary risk management skills for the projects and the amount of the loan is paid from the resources obtained from the project only.	.0299	.1705	.0104	.0094	.0504	2.866	267	.004

Findings in table 4.7show that the probability value is less than the specified alpha value which means that the observed t-value is significant. A significant difference exists between mean scores of the youth group members have the necessary risk management skills for the projects and mean scores of the amount of the loan is paid from the resources obtained from the project only. Therefore the null hypothesis was rejected and it was concluded that risk management skills have a significant influence on the success of artificial fish farming projects among youth groups' $t(267) = 2.866$, $p<0.05$.

4.11 Marketing intelligence and success of artificial fish farming **projects**

A paired sample t-test was used to compare the mean scores of marketing intelligence skills and mean scores of success of artificial fish farming projects. The findings for the t-test is presented in table 4.8.

Table 4.8Market intelligence and success of artificial fish farming projects

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	The youth's members have the requisite information of the market for their produce and The amount obtained from the projects are sufficient to pay daily expenses	-.119	.3362	.0205	-.1598	-.0789	-5.814	267	.000

Findings from table 4.8 show that the probability value is less than the specified alpha value which means that the observed t-value is significant. A significant difference exists

between mean scores of the youth's members have the requisite information of the market for their fish productsand mean scores of the amount obtained from the projects are sufficient to pay daily expenses. Therefore the null hypothesis was not rejected and it was concluded that market intelligence has no significant influence on the success of artificial fish farming projects among youth groups, t (267) = -5.814, $p<0.05$.

5. Conclusion

The composite mean of 2.597 (SD=1.443) showed that respondents disagreed to have risk management skills in their projects while key informants interview revealed that youths are in dire need of training on risk management. The regression analysis showed that 26.8% of artificial fish farming success was explained by risk management skill. The *t*-statisctic showed that a significant difference exists between mean scores of the youth's members having the management skills to practice artificial fish farming with test results (267) = 2.866, p<0.05. Null hypothesis was rejected and it was concluded that risk management skills have a significant influence on the success of artificial fish farming projects among the youth groups. The composite mean score of 3.178 (SD=.526) showed that it wasn't clear whether market intelligence had influence on artificial fish farming projects. Interview showed that market information on artificial fish farming products is not well developed. Justify neutrally the level of economic independence among the youths in artificial fish farming projects. The regression model analysis showed that 18.2% of artificial fish farming success was explained by marketing intelligence skills. The*t*-statistic showed that a significant difference between mean scores of the youth's members having the requisite information of the market for their produce and mean scores of the amount obtained from the projects is sufficient to pay daily expenses with a test result (267) = -5.814, p<0.05. Therefore the null hypothesis was not rejected and it was concluded that market intelligence has no significant influence on the success of artificial fish farming projects among youth groups, t (267) = -5.814, $p<0.05$. It was concludedrisk management skills is important in enhancing the success of artificial fish farming projects yet it is lacking among the youth. It was also concluded that concluded that market intelligence is essential but not very critical in price forecasting and access to market information. It is recommended that youth groups practicing artificial fish farming need to be trained on financial literacy, risk management and market intelligence. It was also recommended that in order to improve nutritional status and economic conditions of the youth more artificial fish farming ventures need to be introduced among the rural out of school youth. It is also recommended that training in agribusiness prior to commencement of artificial fish farmingprojects is mandatory before project termnation.

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