
Participation of Stakeholders in Aquaculture Value Chain of the West African Agricultural Productivity Programme in Nigeria

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Abstract

The study assessed stakeholder participation in the West African Agricultural Productivity Programme in aquaculture value chain of the Kainji Lake Basin, Nigeria. A two stage sampling procedure was used to select 294 value chain actors across 20 communities. Also, Pie charts, logistic regression analysis, 3 point Likert-type scale rating technique and strategic decision matrix were used to analyse primary data. The determinants of participation in the programme were marital status, extension visits, membership of an association and experience. Furthermore, there were moderate financial requirements (need for loan and equipment) in feed milling ($\bar{x}=2.23$), fish processing ($\bar{x}=2.30$) and wholesale marketing ($\bar{x}=2.2$), while the financial requirement in table-size fish farming was high ($\bar{x}=2.59$). There were moderate development potentials (impacts on income, employment, poverty reduction and food security) in feed milling ($\bar{x}=2.33$), fish processing

(\bar{x} =2.32) and wholesale marketing (\bar{x} =1.99), while the development potential of table-size fish farming was high (\bar{x} =2.55). Future interventions in the value chain should make necessary provisions for the financial needs of each value chain with the adoption of backward-forward integration of women and youths in the value chain.

Keywords: WAAPP, aquaculture, feed milling, fish processing, wholesale marketing

Introduction

Mainstreaming both sexes (male and female) is a topical issue in global domain due to the exclusion of vulnerable groups (mostly women and youths) in development process particularly in developing countries like Nigeria. According to the Food and Agricultural Organization [FAO] (2017), gender mainstreaming is the process of assessing the implications for men and women of any planned action such as legislation, policies or programmes and projects at all levels. It is an analytical tool for programme officers to achieve results by considering the needs of women, girls, boys, youths and men in the design, implementation, monitoring and evaluation of programmes (Swedish International Development Cooperation Agency [SIDA], 2015). Therefore, gender mainstreaming looks at the human implication of any activity, by highlighting the inequalities and power differences existing between men and women and how these differences impact to policies relating to men and women. According to Brugere and Williams (2017), sex-disaggregated data that could be used to track women in aquaculture are inadequate and therefore, making the presence, influence and interests of women in aquaculture invisible. They further stated that sex-disaggregated data collection should be mandated in all areas because gender-blindness limits the entrepreneurial opportunities and job protection of women.

The above observation informed the inclusion of gender in the design and implementation of the West Africa Agricultural Productivity Programme (WAAPP). The strategy of gender mainstreaming in the programme was aimed at inclusion of vulnerable groups (women and youths), achievement of gender equality, equity and empowerment of men, women and youths in the 13 participating countries in the ECOWAS sub-region (WAAPP-Nigeria, 2016). Gender equality is also said to be instrumental to rapid development while gender inequality hinders economic growth and induces poverty. This implies that when women and men have equal access to education, health care, access to resources and employment; the economies of societies grow faster with significant improvement in the welfare of women and children. WAAPP was initiated in 2008 and coordinated by West and Central African Council for Research and Development (CORAF/WECARD) (Stads and Beintema, 2017). It was designed as a tool for increasing productivity in agriculture; a key agricultural policy objective both for ECOWAS and under Pillar IV of CAADP (Stads and Beintema, 2017). WAAPP-Nigeria's mandate under component 2 is to become the center of specialization in aquaculture (Catfish and Tilapia) (Wiebe, Stads,

Beintema, Brooks, Cenacchi, Dunston, Mason-D’Croz, Sulser and Thomas, 2017). In the light of this, research institutes such as the Nigerian Institute of Oceanography and Marine Research (NIOMR), National Institute for Freshwater Fisheries Research (NIFFR) and the Nigerian Stored Products Research Institute (NSPRI) were selected as the National Centres of Specializations (NCoS), by reason of their various national research mandates (WAAPP-Nigeria, 2015).

WAAPP Nigeria, which applied the concept of Adopted Villages, witnessed massive increase in the number of beneficiaries. Based on reports by WAAPP-Nigeria (2016), the project surpassed its initial target of 1.5 million beneficiaries to over two million beneficiaries with more than 700,000 thousand being women. Furthermore, the WAAPP project activities under WAAPP- assisted Value Chain Innovation Platforms (VCIPs) in twenty-four states across Nigeria had about 400, 000 women beneficiaries constituting about 39 % of which 221, 360 women benefited in Aquaculture in 14 states of the federation.

The strategy of gender inclusion by WAAPP in the aquaculture value chain is worth investigating especially when existing literature on aquaculture value chain suggests unequal gender relations in the value chain. Existing power differences in the social and economic context means that women are disadvantaged in access and use of production resources (Paul and Meena, 2016); hence, men tend to dominate value chain functions with high level of capital requirement such as fish farming and feed milling (Nwabeze, Ibeun, Faleke, Omeje, Belonwu, Igene, Ogbonna, Nwanjoku, and Ighoro, 2017; Farm Africa, 2016) while the women occupy nodes such as processing and marketing (Olaoye, Adegbite, Oluwalana, Ashley-Dejo, Adelaja, and Fagbohun, 2015). This makes the activities and benefits unequally distributed along the value chain among men, women and youths. Also, there is need to formulate an appropriate set of strategies for future interventions in the value chain. This is because the aquaculture value chain has differing financial components; in some value chains, the processing segment requires more funding, in others, it is the primary production or the transportation and collection segment which needs more finance, and hence, providing financial resources based on their financial requirements/needs may be an efficient strategy to bring about development.

It is against this background that the study;

- i. assessed stake holder participation in WAAPP finance strategy in aquaculture value chain;
- ii. evaluated the determinants of participation in the programme;
- iii. identified the perceptions of respondents on the financial needs and development potentials of the aquaculture value chain; and
- iv. described the financial intervention strategies to be used in aquaculture value chain.

Methodology

The study was conducted in Kainji Lake Basin, Nigeria. The area is located between Latitudes 9⁰ 50’ and 1⁰55’ North and Longitudes 4⁰ 23’ and 4⁰51’ East. The lake is

the first and the largest man-made lake in Nigeria which is on the south of Niger State and the north of Kebbi State. The Lake provides immense potential and opportunities for the development of aquaculture, with Catfish and Tilapia the most dominant species of fish cultured in the area (Committee for Inland Fisheries and Aquaculture of Africa [CIFAA], (2017). Ever since Catfish (*Clarias angularis*) was successfully bred and produced by NIFFR, aquaculture has become a major revenue generating activity among professional farmers; thus giving rise to the development of other value chains such as feed milling, fish processing and marketing.

The study adopted a two stage sampling procedure. The first stage involved the purposive selection of 20 communities based on the preponderance of aquaculture value chain actors. The communities include; Yauri, Rofia, Mahuta, Kokoli, Zamare, Utonu, Duga, Mashaya, T. Gungawa, Gafara, Wawu, Wara, New busa, Monai, T. A. Danbaba, Musawa, Malale, T/Na'ilo, Shagunu and Cover Dam. In the second stage, proportional sampling was used to select 32 feed millers, 120 table-size fish farmers, 82 processors and 60 whole-sale fish marketers from a population of 36 feed millers, 229 table-size fish farmers, 115 fish processors and 107 whole-sale fish marketers in the area. The proportion used in selection were presented as thus;

Feed millers: Two feed millers were selected from Wara and 15 each from New busa and Monai communities making a total of 32 feed millers.

Table size farmers: 20 fish farmers each from New busa and Monai, 15 from Malale, 10 each from Shagunu and Kokoli and three each from Yauri, Rofia, Mahuta, Zamare, Utonu, Duga, Mashaya, T. Gungawa, Gafara, Wawu, Wara, T. A. Danbaba, Musawa, T/Na'ilo and Cover Dam were selected making a total of 120 table-size fish farmers.

Processors: 10 processors each from New Bussa, Monai and Malale; seven each from T/Nailo, Wara, Shagunu, Kokoli and Gungawa; and three each from Yauri, T.A. Danbaba, Musawa, Cover dam, Rofia, Mahuta and Utonu were selected making a total of 82 fish processors.

Wholesale fish marketers: Six wholesale marketers from Monai, five each from Malale, New Bussa, Kokoli, T.A. Danbaba, Yauri and Wara; and four each from Cover dam, T/Nailo, Shagunu, Mahuta, Gafara and Wawu were selected making a total of 60 wholesale fish marketers.

The sample frames used for the selection were retrieved from registered members of various value chain actors' (Feed millers, fish farmers, processors and wholesale fish marketers) associations in the area. such associations. Also, the respondents comprised of value chain actors who were beneficiaries and non-beneficiaries of WAAPP intervention in adopted villages in the area. Primary data were collected with questionnaires that were administered to value chain actors. The data were presented using pie charts, and 3-point Likert-type rating scale and strategic decision matrix (as used by UNIDO *et al.*, 2010).

Logistic regression model was used to evaluate the determinants of participation in WAAPP intervention in the aquaculture value chain. The model used is specified as thus;

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = Y_i = \beta_0 + \beta_i X_i + U_i \quad 1$$

Where: Y_i = participation in the WAAPP programme (participated = 1; otherwise = 0)
 β_0 = intercept; X_i = vector of explanatory variables which include;
 X_1 = Sex (1 = men, 0 = otherwise); X_2 = Age; X_3 = Marital status (dummy; 1 = married; 0 = single); X_4 = Extension Contact (Number); X_5 = Education (years); X_6 = membership of association (dummy; 1 = yes; 0 = no); X_7 = Experience (years); X_8 = Start off Capital (₦); X_9 = Household size (number); β = regression coefficient; and U = error term.

Strategic decision matrix

UNIDO, CBN and BOI in 2010 adopted an approach to identify the financial needs and development potentials of agricultural value chains. The technique in “Unleashing agricultural development in Nigeria through value chain financing” involves an initial mapping followed by a rigorous situational analysis of various segments of the value chain. Data were collected from key stakeholders on financial needs (these are the **short, medium and long-term financial requirements** existing in the various value chain segments) and development potentials (this refers to the extent to which a particular value chain can contribute to **increased income, employment, poverty reduction and food security at household level**) of each value chain.

A rating of 3 (high), 2 (medium) and 1 (low) was applied, which expresses in relative terms whether certain value chain segments require more or less funding (no threshold value is attached to high, medium and low). The mean of the responses was computed and an index of financial needs and development potential were calculated as specified in the model below;

$$\text{Mean of financial needs} = \sum \frac{\text{mean of responses on financial needs}}{N}; \quad 2$$

$$\text{Mean of development potentials} = \sum \frac{\text{mean of responses on development potentials}}{N} \quad 3$$

Results and Discussion

WAAPP Financial Intervention Strategy in Aquaculture Value Chain

Figure 1-3 shows that the programme extended some improved technologies such as; fast growing fingerlings, quality fish feed, ideal pond size for fish culture and improved smoking kilns to fish farmers and processors in the area. Also, improved crops seeds were distributed to fish farmers for economic diversification. The result shows that 40% of the beneficiaries of fingerlings, fish feed and fish ponds in the programme were men, 26% were women and 34% were youths. The men benefited more than the women in the intervention because there were more men than women and youths involved in aquaculture as confirmed by Ogunmefun and Achike (2017); Akarue and Aregbor (2015) that men are the dominant gender in fish farming. This

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established compliancy with gender policy component of WAAPP as one of the key issues it was set to achieve in 13 ECOWAS region. In this case, gender equity was used to empower more men than women and youths due to the active and financial strength of the men to meet operating costs associated with feeding as well as access to productive assets like ponds.

Furthermore, the result shows that 49% of the beneficiaries of improved variety of crop seeds were men, 30% were youths and 21% were women. This implies that the primary stakeholders (men, women and youths) were considered in the distribution of improved varieties of crop seeds like rice, sorghum and millet in the communities. However, equity was applied to empower more men who are the bread winners and have access to productive asset of land to grow the crops for family, hence women and youths benefited less in the communities. The use of crop seeds as a form of intervention was introduced as a food security measure to the farmers in the aquaculture value chain. This is because most of the people in the adopted communities participating in the WAAPP programme were crop farmers; hence, giving them the crop seeds in addition to the fingerlings and other packages was highly received by the members of the adopted communities. This was done to facilitate adoption and economic diversification of the people in order to improve their livelihood.

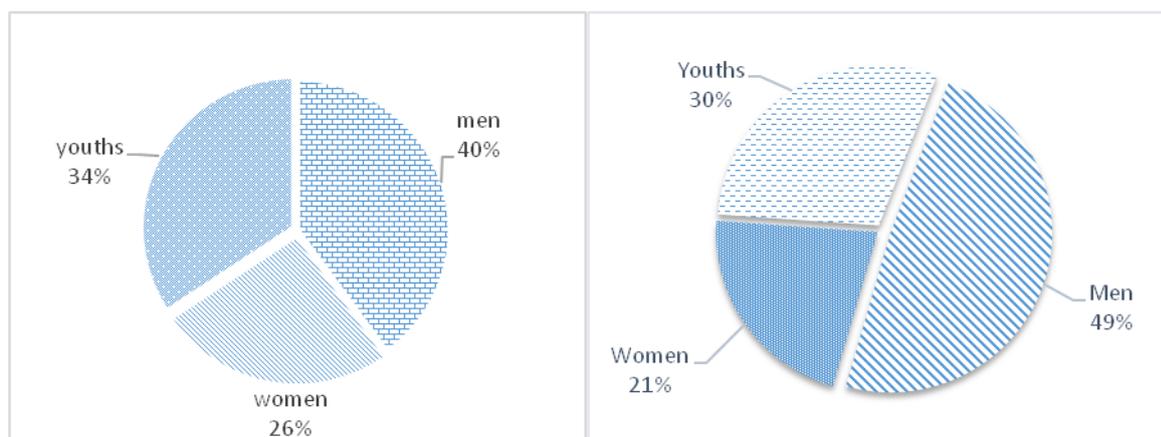


Figure 1: Beneficiaries of Aquaculture inputs; Figure 2: Beneficiaries of Improved variety of crop seeds

Moreover, the result shows that men, women and youths benefited from WAAPP intervention in the fish processing chain. As confirmed, 66% of the beneficiaries of the NIFFR-WAAPP improved smoking kilns were women, 13% were men and 21% were youths. In this case, equity was used to consider women who are the dominant actors in fish processing activity. Generally, the women were the dominant gender in fish processing in the area; although, there is an emergence of the men and youths in fish processing chain of the area. This approach of WAAPP in the processing chain may appear rational; this is because the programme employed the strategy of understanding the concerns and needs of men, women and youths in the chain. Hence, ensuring that the men, women and youths benefit greatly in the value chains they dominate may seem appropriate. Although, gender mainstreaming is geared

towards gender equality (SIDA,2015); however, in cases where gender equality seems unjustifiable, the approach of gender equity can be adopted to ensure that the people concerned are met at the point of their various needs.

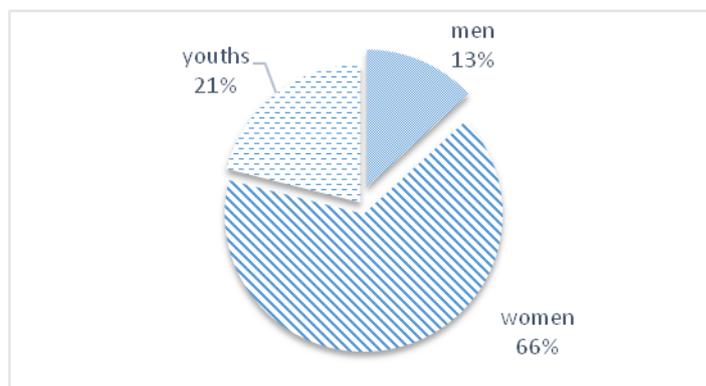


Figure 3: Beneficiaries of smoking kilns

The intervention of WAAPP in aquaculture value chain was not limited to the packages outlined above. Based on documented reports on WAAPP activities in Kainji Lake Basin, there were other activities such as training of women in fish feed formulation and milling and the implementation of Agricultural Research and Outreach Centers (AROC). The AROCs were established to create awareness among secondary school students around the New Bussa area of Kainji Lake Basin on the economic benefits of aquaculture; this was implemented through demonstration on the techniques of fish farming in earthen ponds and proper fish feeding regime. The schools were selected because they were within the 20 KM radius in proximity to the implementing institute (NIFFR); thus satisfying the implementation strategy of WAAPP.

Determinants of Participation in WAAPP Financial Intervention in Aquaculture Value Chain

Table 1 shows that the determinants of participation in WAAPP intervention in the aquaculture value chain. The variables that were statistically significant at 5 % level of significance were marital status, extension visits, membership of association and experience. The result shows that sex was not statistically significant at 5 % level of significance. This result seems plausible as it implies that the programme was not biased in the selection of participants (men, women and youths) in the programme. Although Gambo, Zahran and Sidahmed (2016) established that sex was positive and significant ($p \leq 0.01$), in influencing participation of marginalized and vulnerable farmers in IFAD-community based Agricultural and Rural Development Programme in Katsina State; they justified their result by stating that in areas such as Katsina State where “*purdah*” (women in seclusion) is practiced, women in seclusion do not engage in direct agricultural production because of their religious belief system. Thus, the men tend to participate more in highly labourious activities such as farming; hence, the reason behind the selection of men more than women in the

programme. However, such is not the case with respect to WAAPP in Kainji Lake Basin, even though the “*purdah*” system is practiced in some localities.

The result for marital status was positive and statistically significant at 5% level of significance, implying that the probability of a value chain actor participating in the programme increases with an odd of 2.5386 if a person is married than the odds (0.3939) of those who were single. This shows that the programme implementers selected more married value chain actors as participants. This result is consistent with the findings of Muhammed, Akpoko, Musa, Ajayi and Muhammad (2019) that marital status was positive and a significant factor influencing participation in Survival Farming Intervention Programme in Kogi State. The marginal effect of 0.1906 implies that to every unit increase in the number of participants in the programme, the odds of participation increases by 19 % for participants that are married. This may be quite a de-motivational factor to the single women and youths who have the entrepreneurial drive in the aquaculture value chain. However, it shows that there is need for adjustment in the criteria for selection in future intervention programmes in the aquaculture value chain.

Furthermore, the result for extension visits was positive and statistically significant at 5 % level of significance. This implies that the likelihood of participation in WAAPP increases (1.0774) with an increase in the number of times a value chain actor is visited by an extension agent. Similarly, findings of Abdullahi, Atala, Apkoko and Sanni (2015) shows that the frequency of visits of an extension agent to a farmer increases the probability of participation in an agricultural programme. This is because programme implementers in most cases select actors with good history in terms of warm reception and ease of technology transfer or adoption. The marginal effect (0.015) implies that to every unit increase in the number of extension visit to a value chain actor, there is 1.5% increase in the likelihood that the value chain actor will be selected to participate in the programme.

The variable for membership of an association was positive and statistically significant at 5 % level of significance. This shows that the likelihood of participating in the programme was high for an actor who belongs to an association than the likelihood of those who do not belong to an association. Similar finding was established by Abdullahi *et al.* (2015) that membership of an association was positive and statistically significant in influencing smallholder farmer’s participation in IFAD-Community based agricultural programme in Katsina State. This indicates that farmers who belong to an association tend to be well managed effectively during the programme. This is because, there are rules guiding members of an association which keeps them in check during the entire programme (implementation, monitoring and evaluation). Thus, it becomes easier to manage value chain actors belonging to an association than those who don’t belong.

The variable for experience was negative and statistically significant at 1 % level of significance. This shows that the probability of a value chain actor participating in the programme decreases as the years of experience in the value chain increases. This is a true reflection in the case of WAAPP. The strategy of employing the concept of Adopted Villages (AVs) and AROCs will most likely select participants with fewer

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years of experience in the value chain for empowerment. This is because the concepts of AVs and AROCs geared towards the demonstration of proven technologies for adoption and use by the actors (Nwabeze, Sule, Ifejika, Faleke, Wara, Ndakotsu, and Ajayi, 2015). This implies that beneficiaries were selected not necessarily based on longer years of experience but rather their disposition to new technologies and ability to adopt.

The Wald Chi 2 (9) was statistically significant at 5 % level of significance which means that the estimates of the logistic equation were reliable in correctly influencing the participation of stakeholders in the programme.

Table 1: Socio-economic factors of participation in WAAPP financial intervention in aquaculture value chain

Variables	Odds Ratio	Robust Std. error	Z	dy/dx
Sex	0.9621	0.3228	-0.11	-0.0081
Age	1.0074	0.0156	0.48	0.0015
Marital status	2.5386	1.0023	2.36*	0.1906
Extension visits	1.0774	0.0324	2.48*	0.0158
Education	1.0218	0.0413	0.53	0.0045
Membership of association	2.1888	0.6708	2.56*	0.1700
Experience	0.7962	0.0654	-2.77**	-0.0483
Start-off capital	0.9999	3.0200	0.32	0.0027
Household size	1.0825	0.0705	1.22	0.0168
Wald Chi 2 (9)	21.50			
Pseudo R²	0.1045			
Constant	2.23*			

Source: Computation from field survey, 2020

*=Significant at 0.05;

**=significant at 0.001

Perceptions of Financial Needs and Development Potentials of Aquaculture Value Chain

The perceptions of value chain actors on the financial needs and development potentials of the aquaculture value chain is presented in Table 2. The result of the analysis shows that the mean response on the financials needs of feed millers was $\bar{x}=2.2$, indicating moderate financial requirement even though there was high financial requirement for long term loan ($\bar{x}=2.71$) and equipment or milling machine ($\bar{x}=2.50$). These requirements are necessities to a feed miller before he/she operates a feed milling enterprise. It is based on these requirements that findings of Nwabeze *et al.* (2017) show that one of the major challenges of a feed millers is the lofty cost of operating a feed mill. The development potentials of the feed milling chain showed that the feed milling chain has a moderate development potential ($\bar{x}=2.33$). This means that the contribution of the feed milling industry to income of the feed millers, food security and import substitution is not high when compared to table-size fish farming; even though, the revenue received in the business is enough to meet some

basic needs. However, the result shows that the feed milling chain have high development potentials in terms of poverty reduction ($\bar{x}=2.53$) and employment ($\bar{x}=2.62$). Also, the result shows that there was high ($\bar{x}=2.59$) level of financial requirement and high ($\bar{x}=2.55$) level of potentials for development in table-size fish farming in the area. Table-size fish farming is quite a capital intensive business because of the high financial requirements in feeding and maintaining the fish for up to 6 months before they are harvested for sale (Farm Africa, 2016). For this reason, a farmer will need liquid capital in the form of short term loan to meet the obligations of fish feeding, drugs and other operations in the farm in order to mitigate the possibilities of failure due to high mortality. In addition, the positive impacts of fish farming to incomes, employment, poverty reduction and food security have been well documented. The study by Ifejika Asadu, Enwelu, Sanni, Nwabeze and Omeje (2015) have shown that the youths participate in table-size fish farming because it is perceived to be highly lucrative than other value chains. Also, Omobepade, Adebayo, Amos and Adedokun (2015) reported the positive impact of fish farming on income of the farmers.

Furthermore, the result shows that fish processing had a moderate financial need ($\bar{x}=2.30$) and development potential ($\bar{x}=2.32$). There was high financial requirement in terms of short term loan (2.76); in addition to the high impact of fish processing to poverty reduction ($\bar{x}=2.51$) and food security ($\bar{x}=2.51$). Short term credit facility is necessary to fish processors because they need the capital to buy the fish in fresh form before processing. In wholesale marketing, the result of the analysis shows that there was a moderate financial requirement ($\bar{x}=2.2$) and development potential ($\bar{x}=1.99$). However, the financial requirement for short term loan was high ($\bar{x}=2.51$). Short term loans can be utilized as working capital by the actors in wholesale marketing because it provides them with readily available cash for the business. Since wholesale fish marketing in the area is usually done on weekly basis, the possibility of the actors to recover the borrowed capital within a short term is possible. This is because fish marketing is a viable business which provides livelihood opportunities for men, women and youths in the area.

Various interpretation can be drawn from the table. Policy makers in the fishery value chain may be interested financing value chain components with high development potential based on the perceived impact on income, poverty reduction, food security, employment and import substitution. In this case, table-size fish farming will be the best value chain to select for financing. However, there are value chains which needs moderate finance such as processing and wholesale marketing. This means that any form of financial allocations by donor agencies must recognize that the cost of financing fish processing and wholesale fish marketing is lower than the cost of financing feed milling and aquaculture (fish farming).

Table 2. Perceptions of the Financial Needs and Development Potentials of the Aquaculture Value Chain

Value Chain	Financial Needs	Mean	Average of Mean	Development Potentials	Mean	Average of Mean
Feed Millers	Long term loan	2.72***	2.23**	Impact on income	2.15**	2.33**
	Short term loan	1.72**		Impact on poverty reduction	2.53***	
	Milling machine	2.50**		Impact on employment	2.62***	
	Risk involved in the business	1.97***		Impact on food security	2.40**	
Table size Farmers			2.59***	Impact on import substitution	1.96**	
	Long term loan	2.33**		Impact on income		2.55**
	Short term loan	2.68***		Impact on poverty reduction	2.75***	
	Fingerlings	2.60***		Impact on employment	2.66***	
	Fish feeds	2.50***		Impact on food security	2.71***	
	Pumping machines	2.57***		Impact on import substitution	2.60***	
	Construction of ponds	2.43**			2.01**	
	Drilling of borehole	2.82***				
Risk involved in the business	2.75***		Impact on income			
Processors			2.30**	Impact on poverty reduction		2.32**
	Long term loan	1.87**		Impact on employment		
	Short term loan	2.76***		Impact on food security	2.24**	
	Smoking kilns	2.45**		Impact on import substitution	2.51***	
					2.39**	
Risk involved in the business	2.12**		Impact on income	2.51***		
Wholesale Marketing			2.02**	Impact on poverty reduction	1.97**	1.99**
	Long term loan	1.46*		Impact on employment		
	Short term loan	2.51***		Impact on food security	2.15**	
	Utility vehicles	2.23**		Impact on import substitution	2.10**	
					2.13**	
Risk involved in the business	1.86**			2.13**		
				1.43*		

*** High, ** Moderate and * Low Source: Computation from field survey, 2020

Conclusion and Recommendation

The study established that men, women and youths benefitted from WAAPP intervention in the aquaculture value chain. However, the men benefitted more than the women and youths in fish and crop farming while the women benefitted more than the men and youths in fish processing. An assessment of the financial needs and development potential of the aquaculture value chain shows that the value chain actors perceive that table-size fish farming has a greater financial requirement and development potential than other value chains. Based on the results of the study, it is

recommended that future interventions/programmes in the value chain should make necessary provisions for the financial needs of each value chain with the adoption of backward-forward integration of women and youths in the value chain. This means that a value chain such as feed milling with high financial requirement for long term loan and milling machine, interventions/programmes should make available long term loan and milling machine as a financial tool. Also, women and youths involved in other value chains such as processing and marketing should be integrated into feed milling and fish farming. This will enable them become primary producers and as well bridge sex gaps in value chains with fewer numbers of women and youths.

References

- Abdullahi, A. J., Atala, T. K., Akpoko, J. G. and Sanni, S. A. (2015). Factors influencing smallholder farmers' participation in IFAD-community based Agricultural and Rural Development Project in Katsina State. *Journal of Agricultural Extension*, 19(2): 93–105.
- Akarue, O. B. and Aregbor O. E. (2015). Socio- economic analysis of catfish farming in Uvwie Local Government Area, of Delta State, Nigeria. *International Journal of Innovative Agriculture & Biology Research*, 3(3): 33–43.
- Brugere, C. and Williams, M. (2017). *Profile: Women in Aquaculture*. Retrieved from <https://genderaquafish.org/portfolio/women-in-aquaculture/>
- Committee for Inland Fisheries and Aquaculture of Africa [CIFAA]. (2017). *Status of inland fisheries and aquaculture in Africa* (C IFAA/XVII/2017/4). Banjul, Gambia. Retrieved from <http://www.fao.org/fi/static-media/MeetingDocuments/CIFAA/CIFAA17/4e.pdf>
- Farm Africa. (2016). *Gender impact study of the Kenyan market-led aquaculture programme (KMAP). Report Submitted by ETC East Africa to Farm Africa*. Nairobi, Kenya. Retrieved from <https://www.farmafrica.org/downloads/resources/farm-africas-kmap-gender-impact-study.pdf>
- Food and Agriculture Organization [FAO]. (2017). *Gender Mainstreaming Framework and Strategy CAWA Project, Final report*. Retrieved from <http://www.fao.org/3/i8958en/l8958EN.pdf>
- Gambo, D., Zahran, B. B.H. and Sidahmed, M. B. B. A. (2016). Socio-economic factors influencing the participation of the marginalized and vulnerable farmers in the IFAD – Community based Agriculture and Rural Development Programme in Katsina State, Nigeria. *Journal of Resources Development and Management*, 24: 50–57.
- Ifejika, P. I., Asadu, A. N., Enwelu, I.A., Sanni, A. O., Nwabeze, G. O. and Omeje, J. (2015). Determining youth choice of enterprise in aquaculture production for job creation in Abia State, Nigeria. *Nigerian Journal of Fisheries*, 12(1): 809–914.
- Muhammed, Y., Akpoko, J. G., Musa, W. M., Ajayi, O. J. and Muhammad, H. U. (2019). Factors influencing participation of Cassava farmers in survival farming intervention programme in Kogi State, Nigeria. *Journal of Agricultural Extension*, 23(2): 22–30.

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- Nwabeze, G. O., Ibeun, B. A., Faleke, S., Omeje, J. E., Belonwu, N. E., Igene C. A., Ogonna, K., Nwanjoku, V. A. and Ighoro, A. (2017). Information needs of fish-feed entrepreneurs in Kainji Lake Basin Nigeria. *Journal of Agricultural Extension*, 21(3): 46–55.
- Nwabeze, G. O., Sule, A. M., Ifejika, P. I., Faleke, S. A., Wara, A., Ndakotsu, S. S. and Ajayi, S. (2015). *Promotion of National Institute for Freshwater Fisheries Research technologies in selected Adopted Villages and AROCs in Kainji Lake Basin for increased adoption. 2014/2015 annual report of National Institute for Freshwater Fisheries Research, New Bussa.* 157-161
- Ogunmefun, S. O. and Achike, A. I. (2017). Socioeconomic characteristics and constraints of pond fish farmers in Lagos State, Nigeria. *Agricultural Science Research Journal*, 7(10): 304 – 317.
- Olaoye, O. J., Adegbite, D. A., Oluwalana, E. O., Ashley-Dejo, S. S., Adelaja, O. A., and Fagbohun, A. E. (2015). Economic analysis of fish processing and marketing in Ogun Waterside Local Government, Ogun State, Nigeria. *Nigerian Journal of Animal Production*, 42(2).
- Olaoye, O. J., Odebiyi, O. C. and Abimbola, O. T. (2015). Occupational hazards and injuries associated with fish processing in Nigeria. *Journal of Aquatic Science*, 3(1): 1–5.
- Omobepade, B.P., Adebayo, O. T., Amos, T.T and Adedokun, B. C. (2015). Profitability analysis of aquaculture in Ekiti State, Nigeria. *Nigerian Journal Agric. Food Environ.*, 11(1), 114–119.
- Paul, P. and Meena, B. S. (2016). A study on access to and control over resources: Gender perspective. *International Journal of Science, Environment and Technology*, 5(5): 2982 – 2988.
- Stads, G-J. and Beintema, N. (2017). *West Africa Agricultural Productivity Programme. ASTI Status Report.* Retrieved from <https://www.asti.cgiar.org/sites/default/files/pdf/WAAPP-Report-En2017.pdf>
- Swedish International Development Cooperation Agency [SIDA]. (2015). *Gender mainstreaming* (Edita 2015). Stockholm: sida61852en, urn:nbn:se:Sida-61852en Print. Retrieved from <https://www.sida.se/contentassets/3a820dbd152f4fca98bacde8a8101e15/gender-tool-mainstreaming.pdf>
- WAAPP-NIGERIA. (2015). *Training brochure on aquaculture production and post-harvest technology.* Retrieved from www.coraf.org
- WAAPP-NIGERIA. (2016). *WAAPP–Nigeria empowers over 700,000 women in its three year of existence of first phase of the project: WAAPP-NIGERIA gender report.*

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