

## Effect of Students Industrial Work Experience Scheme on Fish Farming in Ogun State, Nigeria

<sup>1</sup>Olaoye, O. J., <sup>2</sup>Ojebiyi, W. G., <sup>3</sup>Mathew, C. T., <sup>3</sup>Nwekoyo, V. E.

<sup>1</sup>Agricultural Media Resources and Extension Center, Federal University of Agriculture, Abeokuta

<sup>2</sup>Department of Agricultural Extension and Rural Development, Federal University of Agriculture, Abeokuta

<sup>3</sup>Department of Aquaculture and Fisheries Management, Federal University of Agriculture, Abeokuta

E-mail: olaoyej@funaab.edu.ng; +2348030609566

**Abstract:** This study assessed the effect of Students Industrial Work Experience Scheme (SIWES) on fish farming in Ogun State, Nigeria by interviewing 55 beneficiaries and 65 non-beneficiaries of SIWES through the with-and without approach. Data were collected with the use of interview guide and analysed same using frequency, percentage, mean, standard deviation and t-test analytical tool. Results reveal that beneficiaries of SIWES had higher number of ponds (mean =  $14.16 \pm 2.31$ ), higher stocking density ( $2936.36 \pm 902.951$  fish), larger farm size ( $6.66 \pm 4.62$  plots) and higher annual income (N6.78 $\pm$ 1.89 million) than the non-beneficiaries who had an average of  $7.59 \pm 5.70$  ponds, stocking density of  $2416.67 \pm 967.087$  fish, farm size of  $4.21 \pm 2.18$  plots and annual income of N2.54 $\pm$ 0.35 million. The t-test analyses revealed that significant differences existed in the number of workforce ( $t=2.619$ ,  $p=0.010$ ), number of ponds ( $t=2.407$ ,  $p=0.018$ ) and annual income ( $t=2.755$ ,  $p=0.007$ ) of the SIWES attached and non-SIWES attached fish farms in Ogun State. We concluded that SIWES had positive effect on fish farming in Ogun State and therefore recommended that all fish farms should be encouraged to accept SIWES students on their farms as this will improve their productivity through reduced unit cost of production, increased income and ultimately increased profit.

**Keywords:** Fish farming, Increased income, Fish ponds, Protein-deficiency, SIWES beneficiaries

## INTRODUCTION

Students Industrial Work Experience Scheme (SIWES) is a skill acquisition scheme aimed at providing students of higher institutions of learning—universities, polytechnics, and colleges with practical on-the-job training (James, 2015). It allows the students to utilize their acquired theoretical knowledge in the context of real life work situations at industrial and commercial establishments. It is a cooperative effort as it involves the industries, institutions of learning and coordinating agencies—Nigeria Universities Commission (NUC), National Board for Technical Education (NBTE) and National Commission for Colleges of Education (NCCE) in Nigeria, under the management of the Industrial Trust Fund (ITF), established in 1974 by the federal government (Ugwuanyi *et al.*, 2010).

Concerned university students are scheduled to undergo 6 months of industrial attachment at the 3<sup>rd</sup> or 4<sup>th</sup> year of their courses during the period of their degree programme, while students of polytechnics and colleges are to undergo SIWES programme for 4 months in the 1<sup>st</sup> or 2<sup>nd</sup> year (James, 2015). The overall goal is to build youths who are equipped with necessary practical skills that will be useful for them after graduation to meet the standard skills required in an industrial and commercial sector (NUC, nd). The acquired skills could also be used in the establishment of personal businesses. It is however surprising that numerous Nigerian graduates that underwent the scheme are unemployed. Reasons adduced for this ugly situation by employers of labour include the fact that the graduates do not have the kind of skills that are needed in the industrial

sector (Mafe, 2010; Akerejola, 2008). Also, most of the unemployed graduates could not translate both the theoretical and practical knowledge into use as entrepreneurs and employers of labour.

Aquaculture is the fastest growing food commodity in the world and is expected to have an important role in food security in the nearest future (Chris, 2013). Fish farming is one of the areas where students are sent for industrial attachment in order to expose them to work methods and techniques in handling equipment and machinery that may not be available in their institutions (ITF, 2004) with a view to increasing the immediate and long-term fish production in the country. The need to increase fish supply from aquaculture cannot be overemphasised now that the country is among the protein-deficient nations (Akegbejo-Samsons, 1997).

Fish farms had benefitted from SIWES through reduced cost of labour and extension service delivery organised by SIWES. This is because; the fish farms are not mandated to pay the SIWES attached students as they were being paid by the Nigerian government. Therefore, the fish farms could get as many students as needed without paying any amount or by just giving them as little incentives as they deem fit. The students could then perform any tasks as assigned to them while gaining work situation experiences from the fish farms. The students could further benefit the farms through suggestions of creative ideas that could improve the farms' productivity. There have also been collaborations between fish farms, higher institutions of learning, and SIWES officials on means to increase fish productivity. Through these collaborative efforts, fish farms had benefitted from

research results of the institutions of learning. Despite these benefits to the students and fish farms, there is little or no empirical studies to determine the effectiveness of SIWES on either the students or even the employers.

It is therefore imperative to examine the impact of SIWES on fish farming in Ogun state, Nigeria with the specific objectives were to describe the socioeconomic characteristics of the fish farmers, determine the production characteristics and identify the factors affecting fish farming in Ogun State, Nigeria. The hypothesis of the study stated in null form is that "there is no significant difference in the production parameters of SIWES attached and non-SIWES attached fish farms.

## METHODOLOGY

The study was conducted in Ogun State in south-western Nigeria. The state has a total population of 3,728,098 in 2006 (Olaoye *et al.*, 2007). The state is located in the rainforest vegetation belt of Nigeria within longitude 2°45' and 3° 55' E and latitudes 7° 01' N and 7°8' N in the tropics. It is bounded in the west by Benin Republic, in the south by Lagos state and Atlantic Ocean, in the east by Ondo State, and in the north by Oyo State. It covers a land area of 16,409.28 km<sup>2</sup>, less than two percent of the country's landmass (Olaoye *et al.*, 2007). The rainy season starts around the middle of March and continues until late October. The dry season starts in November and lasts until February in most locations in the state. The main occupations of the people in the state are: agriculture, fishing, clothing, textiles and civil service. The state was divided into four agricultural extension zones namely: Abeokuta, Ilaro, Ijebu-Ode and Ikenne (OGADEP, 2005).

A multistage sampling procedure was adopted in this study to sample one hundred and twenty fish farms in Ogun State. The first stage involved the random selection of two (Ijebu-Ode and Abeokuta) out of the four agricultural extension zones in Ogun state. This was followed by the purposive selection of one extension block from each of the selected extension zones. The final stage was the selection of all the fish farms in the two extension zones but not all the fish farms could be accessed. Also, some fish farms declined to participate in the study but a total of 120 fish farmers responded to the research instrument. About 55 out of the 120 fish farmers had SIWES students attached to them, while 65 were non-beneficiaries of SIWES.

Primary data were collected with the aid of pre-validated interview guide designed for the purpose of this study. The interview guide consists of three sections which are on the socioeconomic characteristics of the fish farmers, production

characteristics and factors affecting fish farming in Ogun State.

Impact was determined using the with-and-without approach whereby the annual income, production output, labour cost, number of workforce, number of ponds, stocking density and farm size of the SIWES attached and non-SIWES attached fish farms were compared.

Data were subjected to descriptive statistics such as frequency count, percentage, mean and standard deviation. Student's t-test was used as inferential tool to test the hypothesis of the study at 1% and 5% levels of significance.

## RESULTS AND DISCUSSION

### Socioeconomic characteristics of fish farmers

Table 1 reveals that 90.1% and 89.2 of the beneficiaries and non-beneficiaries of SIWES respectively, were male implying that fish farming was dominated by male persons thereby supporting reports from earlier studies (Adewuyi *et al.*, 2010; Deji and Koledoye, 2013) conducted in Ogun and other south-western states which noted male dominance in fish farming. More than half (50.9%) of the beneficiaries were aged 41-50 years, while 40.0% of the non-beneficiaries were within the same age range. Less than one-third (30.9% and 29.2%) of the beneficiaries and non-beneficiaries were respectively between 31 and 40 years. The mean ages were 44.51±8.95 years and 45.77±9.29 years for beneficiaries and non-beneficiaries, respectively indicating that the fish farmers were still productively active. This is in tandem with similar findings of other researchers (Adebayo and Daramola, 2013; Sikiruet *et al.*, 2009; Agbebi, 2012) who found that people within the active work force are adventurous, economically active and industrious and the implication of this is that there is a brighter future for the production of fish which could facilitate the sustainable development of the aquaculture sector.

Almost all of the beneficiaries (94.5%) and non-beneficiaries (92.3%) were married. This implies that fish farming in Ogun state has been dominated by married persons and agrees with earlier researches (Apata, 2012; Olaoye *et al.*, 2013) which reported that married persons were highly involved in fish farming within Southwest, Nigeria. It has been noted that marriage attached additional social responsibilities and commitments on individuals who are married. Hence, being married could be both a cause and effect for a person's motivation in fish farming because married fish farmers could be given assistance in terms of labour, soft loans and managerial services by their spouse(s), children and other family members such as in-laws. This could explain Ekong (2003)'s position that marriage is

highly cherished in the Nigerian society. Responsibilities and commitments that come with marriage could also explain a person's involvement in fish farming.

Table 1 further reveals that while the least form of education among the beneficiary fish farmers was secondary education (40.0%), some of the non-beneficiary fish farmers had no education (3.1%) and highest of primary education (10.8%) and only about 43.1% of them equally had secondary and tertiary educations. This implies a generally high level of education among the fish farmers but that It was also deduced that the fish farmers generally had considerably high level of education which implies that fish farming could be sustainably developed as most of the fish farmers already had the prerequisite as fish farming required some level of technical and scientific knowledge that only educated persons could understand (Ashley-Dejoet *al.*, 2013). Olaoye (2010) also noted that education is an important tool in a person's decision making process.

Also, 72.7% and 27.3% of the beneficiary fish farmers had respectively 1-5 and 6-10 persons per household, while 63.1%, 29.2 and 7.7% of the non-beneficiary fish farmers respectively had 1-5, 6-10 and 11-15 persons per household. The mean household sizes were 5.11±1.72 and 6.55±2.53 persons for beneficiary and non-beneficiary fish farmers, respectively. This is an indication that non-beneficiaries of SIWES had larger household sizes than the beneficiaries and this could explain why the

beneficiaries of SIWES requested for additional hands from SIWES as trainees because according to some researchers (Adebayo, 2012; Daramola and Adebayo, 2013), large family size could serve as source of free and cheap labor.

Majority (89.1% and 81.5%) of the beneficiary and non-beneficiary fish farmers, respectively had fish farming as their primary occupation, while more than half (56.4%) and 36.9% of the beneficiaries and non-beneficiaries had no other occupations. This could imply that fish farming has been a profitable enterprise through which the fish farmers used as a good source of livelihood (Adewuyiet *al.*, 2010; Tiamiyuet *al.*, 2015). It also indicated that more of the beneficiaries than non-beneficiaries had no other occupations and this could explain why the SIWES attached farms were requesting for SIWES students as a way of increasing the productivity as they concentrated their energy and resources on the proper management of their only venture because a person's occupation is a valid means through which the person acquires self-satisfaction (Olaoyeet *al.*, 2013).

Also, majority (85.5% and 75.4%) of the beneficiaries and non-beneficiaries, respectively had 1-10 years of fish farming experience with mean fish farming experiences of 7.49±5.83 and 8.18±6.84 years for beneficiaries and non-beneficiaries, respectively. Olasunkanmi (2012) also reported that the highest proportion of the fish farmers in Osun state had 1-10 years of fish farming experience.

**Table 1: Socioeconomic characteristics of SIWES attached and non-SIWES attached fish farmers**

Socioeconomic variables		Beneficiaries (n = 55)		Non-beneficiaries (n = 65)	
Variables	Response categories	Frequency	%	Frequency	%
Sex	Male	50	90.1	58	89.2
	Female	5	9.1	7	10.8
Age (years)	21-30	3	5.5	2	3.1
	31-40	17	30.9	19	29.2
	41-50	28	50.9	26	40.0
	1-60	7	12.7	15	23.1
	>60	0	0.0	4	6.2
	Mean±SD		44.51±8.95		45.77±9.29
Marital status	Single	3	5.5	4	6.2
	Married	52	94.5	60	92.3
	Divorced	0	0.0	1	1.5
Educational level	No formal education	0	0.0	2	3.1
	Primary education	0	0.0	7	10.8
	Secondary education	22	40.0	28	43.1
	Tertiary education	33	60.0	28	43.1
Household size (persons)	1-5	40	72.7	41	63.1
	6-10	15	27.3	19	29.2
	11-15	0	0.0	5	7.7
	Mean±SD		5.11±1.72		6.55±2.53
Primary	Fish farming	49	89.1	53	81.5

occupation	Trading	0	0.0	4	6.2
	Civil service	4	7.3	3	4.6
	Others	2	3.6	5	7.7
Other	None	31	56.4	24	36.9
occupations*	Fish farming	6	10.9	12	18.5
	Trading	12	21.8	18	27.7
	Civil service	5	9.1	4	6.2
	Artisans	17	30.9	19	29.2
Fish farming experience (years)	1-10	47	85.5	49	75.4
	11-20	7	12.7	13	20.0
	21-30	1	18.2	3	4.6
	Mean±SD	7.49±5.83		8.18±6.84	

\*variables with multiple responses

Source: Field survey (2016)

### Production characteristics of beneficiary and non-beneficiary farmers

As shown in Table 2, almost all of the beneficiary (90.9%) and non-beneficiary (89.2%) fish farmers spent less than N50,000 per annum on labour with mean annual labour costs of N47,727±12,082 and N34,846±2,355 expended by beneficiaries and non-beneficiaries of SIWES, respectively. With respect to number of work force, 69.1% and 81.5% of the beneficiary and non-beneficiary fish farmers, respectively employed the service of at most 5 persons, while 6-10 and 11-15 persons were equally employed by 10.9% of the beneficiaries of SIWES. Also, 9.1% of the beneficiary fish farmers had more than 15 employees on their farms, while 12.3% and 6.2% of the non-SIWES attached fish farms had 6-10 and 11-15 employees, respectively with none of them having more than 15 employees. The mean workforce of the farms was 8.40±3.49 and 3.91±3.22 persons for beneficiaries and non-beneficiaries, respectively.

Table 2 further shows that 81.8% and 98.5% of the beneficiaries and non-beneficiaries operated on 1-6 plots of land for their fish farming activities. The mean farm sizes indicate that non-beneficiary fish farmers had 4.21±2.18 plots of land, while the beneficiary fish farmers operated on 6.66±4.62 plots of land. The highest proportions of the beneficiaries (69.1%) and non-beneficiaries (87.7%) operated 1-10 ponds. None of the non-beneficiaries operated on more than 20 ponds, while 18.2% of the beneficiaries made use of more than 20 ponds for their fish farming activities. The beneficiary fish farmers operated on an average of 14.16±2.31 ponds, while 7.59±5.70 ponds were in operation by the non-beneficiary fish farmers.

These findings are indications that both categories of fish farmers operated on small number of ponds 1-10 ponds on small farm sizes of 1-6 plots. This agrees with Adebayo and Daramola (2013)'s research report which found that majority of the fish farmers in Ibadan, a metropolis in Oyo State had 1-5 units of ponds. However, the mean values indicate that SIWES attached farms had larger farm sizes than the non-SIWES attached farms. The mean number of ponds also implied that the SIWES attached farms had almost twice the number of ponds operated by the non-beneficiary of SIWES.

More than three-fifths (63.6%) and about half (50.8%) of the SIWES attached farms and non-SIWES attached farms respectively stocked 2001-4000 fishes respectively during a production cycle. The mean stocking densities for SIWES and non-SIWES attached farms were 2936.36±902.951 fishes and 2416.67±967.087 fishes respectively implying that the SIWES attached farms stocked more fishes than the no-SIWES attached farms which could be as a result of the larger farm sizes and higher number of ponds in operation on the SIWES attached farms. More than 70 percent of the SIWES attached fish farms realized between N1 and 10 million annually while 64.6% of the non-SIWES attached fish farms realized same amount. The mean annual income was N6.78±1.89 million and N2.54±0.35 million respectively for SIWES attached and non-SIWES attached fish farms indicating that SIWES attached fish farms realized higher income than the non-SIWES attached farms. This is attributed to the larger farm sizes, higher number of ponds, and larger stocking densities that characterized the SIWES fish farms.

**Table 2: Production characteristics of the beneficiary and non-beneficiary fish farmers**

Production parameters	Categories	Beneficiaries		Non-beneficiaries	
		Frequency	%	Frequency	%
Production output per kg	1.0-1.9	39	70.9	52	80.0
	2.0-2.9	12	21.8	8	12.3
	≥3.0	4	7.3	5	7.7
Labor cost (N thousand)	Mean±SD	1.72±0.46		1.69±0.45	
	≤50	50	90.9	58	89.2
	51- 100	3	5.5	7	10.8
	>100	2	3.6	0	0.0
Number of workforce	Mean±SD	47.727±12.082		34.846±2.355	
	≤5	38	69.1	53	81.5
	6-10	6	10.9	8	12.3
	11-15	6	10.9	4	6.2
	>15	5	9.1	0	0.0
Farm size (plots)	Mean±SD	8.40±3.49		3.91±3.22	
	1-6	45	81.8	64	98.5
	7-12	5	9.1	1	1.5
	13-18	1	1.8	0	0.0
	>18	4	7.3	0	0.0
Number of ponds	Mean±SD	6.66±4.62		4.21±2.18	
	1-10	38	69.1	57	87.7
	11-20	7	12.7	8	12.3
	>20	10	18.2	0	0.0
Stocking density (N million)	Mean±SD	14.16±2.31		7.59±5.70	
	≤2000	15	27.3	33	50.8
	2001-4000	35	63.6	29	44.6
	4001-6000	5	9.1	3	4.6
Annual income (N million)	Mean±SD	2936.36±902.951		2416.67±967.087	
	<1	8	14.5	23	35.4
	1-10	40	72.7	42	64.6
	>10	7	12.7	0	0.0
	Mean±SD	6.78±1.89		2.54±0.35	

Source: Field survey, 2016

**Factors affecting fish farming in Ogun State**

As shown in Table 3, the mean values indicate that majority of the fish farmers considered high inflation rate in the economy (2.17) as the most severe factors affecting fish farming in Ogun State. This was followed by high cost of feeding (2.12), high investment cost (1.98), and poor quality of fish seed (1.93) which ranked second, third and fourth

respectively. These results are in tandem with that of Olaoje (2010) who identified high cost of feeding as a constraint to fish farming in Ogun State. High cost of fish feed and market price fluctuation were also identified by other researchers (Adebayo and Daramola, 2013; Olasunkanmi, 2012) as severe constraints to fish production in south-western states of Nigeria.

**Table 3: Factors affecting fish farming in Ogun State**

Factors affecting fish production	Level of severity				Mean	Rank
	Very serious	Serious	Not a problem	I don't know		
Lack of appropriate land or site	4 (3.3)*	24 (19.8)	86 (71.1)	7 (5.8)	1.21	10 <sup>th</sup>
Old age	4 (3.3)	20 (16.5)	88 (72.7)	9 (7.4)	1.16	11 <sup>th</sup>
Lack of sufficient fund	22(18.2)	49 (40.5)	41 (33.9)	9(7.4)	1.69	6 <sup>th</sup>
Poaching	22 (18.2)	41 (33.9)	52 (43.0)	6 (5.0)	1.65	7 <sup>th</sup>
Lack of technical know-how	17 (14.0)	46 (38.0)	51 (42.1)	7 (5.8)	1.60	9 <sup>th</sup>
Disease and predation	45 (37.2)	56 (46.3)	15 (12.4)	5 (4.1)	1.92	5 <sup>th</sup>
High inflation rate in the economy	45 (37.2)	56 (46.3)	15 (12.4)	5 (4.1)	2.17	1 <sup>st</sup>

High cost of investment	29 (24.0)	65 (53.7)	22 (18.2)	5 (4.1)	1.98	3 <sup>rd</sup>
Poor marketing channel	25 (20.7)	33 (27.3)	56 (46.3)	7(5.8)	1.63	8 <sup>th</sup>
Poor quality fish seed	33(27.3)	51(42.1)	33(27.3)	4(3.3)	1.93	4 <sup>th</sup>
High cost of feeding	37(30.6)	64(52.9)	17(14.0)	3(2.5)	2.12	2 <sup>nd</sup>

\*Figures in parentheses are percentages

Source: Field survey, 2016

### Differences in the production parameters of beneficiary and non-beneficiary fish farmers in Ogun State

As shown in Table 4, t-test result reveals that there were significant differences in the number of workers (t= 2.619, p=0.010), number of ponds (t= 2.407, p=0.018) and annual income (t= 2.755, p=0.007) of the SIWES attached and non-SIWES

attached fish farms in Ogun State. Table 4 however shows that there was no significant differences in the production output (t = 0.336, p=0.737) and labor cost (t = 1.811, p=0.073) among the beneficiaries and non-beneficiaries. This implied that SIWES attached farms had higher number of workers, operated higher number of ponds and realized more income than the non-SIWES attached fish farms.

**Table 4: Test of differences in the production parameters of the beneficiary and non-beneficiary fish farmers in Ogun State**

Production parameters	Farmer's type	Mean	Standard deviation	Mean difference	t-value	df	p-value
Labour cost (N)	Beneficiaries	47727.34	12,082.686	12881.04	1.811	119	0.073
	Non-beneficiaries	34846.30	2,355.330				
Income (N)	Beneficiaries	6777272.73	1888415.69	4234696.97	2.755	119	0.007*
	Non-beneficiaries	2542575.76	351898.128				
Number of ponds	Beneficiaries	14.16	21.308	6.573	2.407	119	0.018**
	Non-beneficiaries	7.59	5.697				
Number of workforce	Beneficiaries	8.40	13.486	4.491	2.619	119	0.010*
	Non-beneficiaries	3.91	3.224				

\*means significant at 0.01 level of significance while \*\*means significant at 0.05 level of significance, df = degree of freedom.

Source: Field survey, 2016

### CONCLUSION AND RECOMMENDATIONS

SIWES has been found to have positive impacts on fish farming in Ogun State as it yielded as SIWES attached fish farms operated higher number of ponds, larger farm sizes and higher stocking density, while also earning higher income annually than the non-SIWES attached farms. To ensure the sustainable supply of fish to Nigerians especially from Ogun State through increased productivity, there is the need to overcome the challenges confronting fish farming in the State. It is therefore recommended that all the fish farmers in Ogun state should be encouraged to accept SIWES students on their farms as this will improve their productivity through reduced unit cost of production, increased income and ultimately increased profit.

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