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Effective Evaluation of Agricultural Science Curriculum in Secondary Schools in Taraba State

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Abstract: *The study of agriculture in Nigerian secondary schools is faced with myriads of challenges. The main aim of the study was to examine effective evaluation of agricultural science curriculum in secondary schools in Benue State. Three hundred and thirty two (332) agricultural science teachers were used for the study. The study found out that, content of the secondary school agriculture curriculum has significant marginal effect on guaranteed effective skills acquisition. Agricultural science teachers' perception about the content of the agricultural science curriculum is adequate. Instructional facilities are available and adequate for the implementation of the agricultural science curriculum. Teachers' perception of the implementation approaches designed for the agricultural science curriculum is adequate. The study concludes that, teaching of agricultural science subjects in secondary schools has not been encouraging. Government and agency responsible for teacher development should put in place an action plan to enhance the capacity of teachers in the use of ICT driven pedagogy, modern classroom practices and assessment techniques. School supervisors should monitor the teachers output and ensure that all areas of the curriculum, including contents requiring computations, are adequately covered. Teachers should adopt demonstration and project methods instead of story methods in teaching of pre-vocational subjects. The situation therefore calls for the retraining of all agricultural science teachers in the State, through seminars and workshops and provision of infrastructure to reposition science teaching in the State.*

Key words: *agricultural science curriculum, effective evaluation, secondary school*

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1. Introduction

Despite the importance of agriculture such as food, clothing, homes, even human traditions and values all come from agriculture (Ronald, 1999). The study of agriculture in Nigerian secondary schools is faced with myriads of challenges. Onuekwusi and Okorie (2008) reported low students' performance in agriculture science in Nigeria in the recent years and attributed this low performance to number of factors which among others are: lack of adequately trained youths in agriculture to take up farming as a career (Olusanya, 1990; Olaitan & Uwadiae, 1993). In the National Policy on Education, Agriculture is one of the subjects offered in Junior and Senior Secondary Schools, as a pre-vocational elective and vocational elective respectively (Federal Republic of Nigeria, 2013). The curriculum content of the senior school level was structured to focus on three major areas: production (food production), projection (agronomy and forestry) and economics (agricultural economics and farm management). 'Guided Discovery' a method that lays emphasis on learning by doing was recommended in the curriculum to enable the students explore and harness the agricultural resources within their local environment. This will help students in food production and other agricultural products for themselves and their community (Nigerian Educational Research and Development Council [NERDC], 2012).

In view of the importance of agriculture to a nation, Nigeria adopted the teaching and learning of the subject at all levels of education. As provided in the National Curriculum for senior secondary school (FME, 2008), Agricultural Education is designed to lay a solid foundation for vocational agriculture that is proposed to train individuals to acquire relevant occupation skills, that will make them to be productive farmers. The teaching of Agricultural Science education in Nigeria secondary schools was first initiated in 1967. The curriculum in agriculture was jointly developed by the Nigerian Educational Research Development Council (NERDC) and West Africa Examination Council (WAEC). The main objectives of introducing the teaching of agricultural science include: 1. encouragement of students in the use of their hands; 2. the appreciation for the dignity of labour; 3. familiarity with biological processes and thereby instilling rationality in the students; 4. increasing self-sufficiency and self reliance in food production students to produce part of their food needs and improve their diet and thus minimize the cost of feeding in their secondary schools.

The number of years agricultural science is taught as a school subject varies from one school to the other depending on the administration of the school as well as the availability of teachers. Agricultural Science as one of the WAEC subject is taught theoretically and practically. The school farm or garden is often used as a means of providing practical experience for the students. The relevance of the current senior secondary vocational agriculture curriculum has raised divergent views from different stakeholders. Ochu and Umunnagbu (2005) opined that secondary school agricultural programmes are suitable for developing the right caliber of middle level manpower for the agricultural subsector of the economy. This finding however indicated an improvement over findings in the earlier reports made by Ivowi (1983) and Zahradeen (1990) who variously reported skills content deficiency. Granted that the curriculum is suitable and appropriate all that remains would be an enabling environment for full expression of intended objectives (Amadi, Orikpe & Osinem, 2007). This observation agrees with the views of Agwubuike (1985) that “the curriculum is adequate but what remained a significant shortcoming are the resources for its implementation. Ajalla (1985) in a study on The Educational resources for effective teaching of vocational agriculture in secondary schools” revealed that the nation is witnessing unprecedented high-level youth unemployment even with great number of students that offered agriculture in the school certificate examinations.

Nwabuisi (2003) reported dearth of instructional resources for teaching agriculture at vocational level in the secondary schools. Harping on the various limitations of the curriculum, Uwadiae (2003) observes that most schools have been unable to teach for the acquisition of occupational skills rather than knowledge needed to pass prescribed examinations. This has been blamed on absence of enabling environments due to poor infrastructural facilities in school.

Agricultural education has received a new emphasis considering the intent and purpose for its introduction. Some novelties in the new order required that teachers with special skills and competencies be mobilized to be in the vanguard of implementing the curriculum (Okorie, 2007). The 6-3-3-4-education model was conceived to re-orientate and reorganizes our value system in the world or work. Consequently, non-acquisition of requisite occupational skills in identified areas would inadvertently result in the production of ill-equipped labour force. This old underemployed, hence the new wave of emphasis on job oriented education.

The introduction of agricultural science curriculum in secondary schools makes a lot of demands teachers as stakeholders. The effectiveness of any teaching is relatively a function of teaching styles, methods and strategies which were employed in the process. Quite regrettably, there is dearth of professionally qualified teachers of agriculture in the school system. Nwabuisi (2002) in a study on resources for teaching and learning agriculture science in Lagos State Junior secondary schools reported a low teacher/student ratio of 1:60. In a later study conducted in Taraba state, Amadi (2010) also reported a low teacher/student ratio of 1:158, which is just a marginal improvement on Nwabuisi's. Though as reported by Amadi, (2010) there are more qualified teachers of agriculture these days, the imbalance stems from the population explosion since every student is expected to offer the subject. Amadi's (2001) study further revealed more importantly that the skill content of the agricultural programme for the senior secondary is too comprehensive to lend itself to meaningful coverage within the time space of three years. Olaitan (2006) maintains that in a bid to cover the prescribed content, the teachers teach at a tremendous speed, which negates proper articulation by students. Further, Olaitan (2006) points that it does seem that host communities of some secondary schools as stakeholders do not realize or appreciate the magnitude of their responsibilities towards the teaching and learning of agriculture.

1.1. Research Questions

i. How would the content of secondary school agriculture curriculum be implemented to guarantee effective skills acquisition?
ii. How do the agricultural science teachers perceive the content of the agricultural science curriculum?
iii. To what extent are the instructional facilities available and adequate for the implementation of the agricultural science curriculum?
iv. What are the teachers' perception of the implementation approaches designed for the agricultural science curriculum?

1.2. Objectives of the Study

The main aim of the study was to examine effective evaluation of agricultural science curriculum in secondary schools in Taraba State. The specific objectives however are to:

i. evaluate the content of secondary school agriculture curriculum implementation for guaranteed effective skills acquisition;
ii. assess agricultural science teachers perception about the content of the agricultural science curriculum;
iii. examine the extent to which instructional facilities are available and adequate for implementation of agricultural science curriculum; and
iv. analyze teachers' perception of the implementation approaches designed for the agricultural science curriculum

1.3. Research Hypotheses

$H0_1$: The content of the secondary school agriculture curriculum do not have significant marginal effect on guaranteed effective skills acquisition

$H0_2$: Agricultural science teachers' perception about the content of the agricultural science curriculum is not adequate

$H0_3$: Instructional facilities are not available and adequate for the implementation of the agricultural science curriculum

H0$_4$: Teachers' perception of the implementation approaches designed for the agricultural science curriculum is not adequate

2. Methodology

2.1. Population of the Study

The population for this study comprised all teachers of agricultural science in all the 289 secondary schools in Taraba state offering agriculture science. The population is estimated to be 1,938 (Taraba state Secondary Education Management Board (TSEMB), 2011).

2.2. Sampling Size Determination

Respondents (teachers of agricultural science) were chosen for the study through the use of Yamene (1967) sample size determination technique. This technique was used because: a) the population of the research is finite, b) probability procedure can be used, and c) the data is assumed to be randomly distributed. The method used is indicated below – Mathematically derived Yamane formula: $n = \frac{N}{1+N(e)^2}$

Where, n = required responses/sample size; $(e)^2$ = error limit; N = population size

Placing information in the formula at 95% confidence level and an error limit of 5% result in the following:

$$n = \frac{1,938}{1+1,938\,(0.05)^2}\,;\; n = \frac{1,938}{1+1,938\,(0.0025)}\,;\; n \approx 331.565;\; n = 332$$

Three hundred and thirty two (332) agricultural science teachers were, therefore the lowest acceptable number of responses to maintain a 95% confidence level and a 5% error level for the study.

2.3. Method of Data Collection

Primary data was used for the study. Primary data via questionnaire was administered to the respondents and serve as our source of data collection.

2.4. Administration of Instrument

The instrument for the study was research questionnaire. In-dept interview was also structured to throw more light on the subject matter. The questionnaire was distributed by the researcher together with the aid of enumerators.

2.5. Validity and Reliability of the Instrument

3.5.1. Validity of instrument

A pilot test of 5 experts was conducted. The input variable factors and items used for this study were subjected to exploratory factor analysis to investigate whether the constructs as described in the literature fits the factors derived from the factor analysis. Factor analysis indicates that the KMO (Kaiser-Meyer-Olkin) measure for the study's 20 independent variable items is 0.849 with Barlett's Test of Sphericity (BTS) value to be 1258.53 at a level of significance p=0.000. From Table 1, the independent variable factor with Eigenvalue, 5.297; is greater than one (1.000) and accounts for 68.44 percent of the total variance for the study. Our KMO result in this analysis surpasses the threshold value of 0.50 as recommended by Hair, Anderson, Tatham, and Black (1995). Therefore, we are confident that our sample and data are adequate for this study. Our result has strong *construct validity*, because the various variables were tested for correlation and it was found out that there was a high degree of measures between the measures of the same construct, indicating that correlation exists between them. Thus, the critical components in this study had *content validity* because an extensive review of the literature was conducted in selecting the 20 measurement items.

Table 1: Component factor analysis for agricultural science curriculum (n=5)

Agricultural Science Curriculum Variables and items	Factor 1	Factor 2	Factor 3	Factor 4
Skill and acquisition				
SA1	0.559			
SA2	0.734			
SA3	0.741			
SA4	0.552			
SA5	0.762			
Perception on agricultural science curriculum				
PA1		0.512		
PA2		0.645		
PA3		0.559		
PA4		0.831		
PA5		0.596		
Instructional facilities				
IF1			0.672	
IF2			0.531	
IF3			0.504	
IF4			0.927	
IF5			0.641	
Implementation approaches				
IA1				0.740
IA2				0.572
IA3				0.552
IA4				0.720
IA5				0.611

Source: Research instrument – SPSS Version 21 for Windows

Notes: KMO measure of sampling adequacy = 0.853; total variance explained = 58.085 per cent, Barlett's Test of Sphericity (BTS) = 1402.0, Eigen value = 4.066

3.5.2. Reliability of instrument using Cronbach Alpha test of reliability

Cronbach Coefficient Analysis was used to identify the items to be removed before the field study proper. Reliability is the stability, dependability, accuracy and predictability of a measuring instrument. It is also the accuracy or precision of a measuring instrument. The 4 variables are useful and will not be dropped from the research, because overall Chronbach Alpha (r) will increase if the 20 items contained in the variables were to be individually removed from the overall input factor values. The study shows the effect on overall Cronbach Alpha if a variable item is to be deleted from the computation. Thus, our variables are highly consistent internally. Correlation would be weak for item analysis purposes if r < 0.3; if such a situation occurs, then that item should be removed and not form a composite score for the variable in question. However, all variable items for this study appear to be useful and contribute to the overall reliability. Thus, this indicates that the reliability test-retest (n=5) are dependable (accurate) and further supports literature – a measuring instrument gives similar, close or the same result when different measures under the same conditions use it (Cronbach, 1951).

Table 2: Cronbach alpha scale descriptions agricultural science curriculum (n=10)

Variables and items	**Total sample**	
	Cronbach Alpha (α)	Cronbach Alpha (α)
Agricultural Science Curriculum Variables and items	**0.773**	
Skill and acquisition	**0.793**	
SA1		0.492
SA2		0.592
SA3		0.693
SA4		0.835
SA5		0.663
Perception on agricultural science curriculum	**0.894**	
PA1		0.684
PA2		0.753
PA3		0.754
PA4		0.930

PA5		0.834
Instructional facilities	**0.695**	
IF1		0.511
IF2		0.745
IF3		0.610
IF4		0.682
IF5		0.662
Implementation approaches	**0.733**	
IA1		0.761
IA2		0.837
IA3		0.522
IA4		0.795
IA5		0.577

Source: Research instrument, SPSS Version 21 for Windows

Notes: KMO measure of sampling adequacy = 0.853; total variance explained = 58.085 per cent, Barlett's Test of Sphericity (BTS) = 1402.0, Eigen value = 4.066

3.6. Method of Data Collection

Primary data was used for the study. Questionnaire was administered to the respondents to collect data. The survey methodology was used to obtain general overall information.

3.7. Measurement of Variables

The agricultural science curriculum in secondary schools variables and items was measured using a five-point Liker-like scale ranging from one (lowest score) to five (highest score). The variables were measured using a five point likert-like scale with the following magnitudes, i.e. Strongly disagree = 1, Disagree = 2, Undecided = 3, Agree = 4, Strongly agree = 5.

3.8. Model Specification

The logit model was used to estimate the determinants of agricultural science curriculum in secondary schools (Adams and Richard, 1995). The Logit model was of four types and defined. Logit model is an example of models with qualitative dependent variables. Specification of Logit model can be represented as: $(Yi) = \frac{1}{1+e^{-a+Bxi}} = \frac{e^{-a+Bxi}}{1+e^{-a+Bxi}}$ …(eqn.1)

Thus, the four models for this study are represented below:

$$1L_i = \left(\frac{P1I_i}{1-P1I_i}\right) = \beta_0 + \beta_1 SA1 + \beta_2 SA2 + \beta_3 SA3 + \beta_4 SA4 + \beta_5 SA5 + e_i \qquad \text{…(Model 1)}$$

$$2L_i = \left(\frac{P2I_i}{1-P2I_i}\right) = \beta_0 + \beta_1 PA1 + \beta_2 PA2 + \beta_3 PA3 + \beta_4 PA4 + \beta_5 PA5 + e_i \qquad \text{…(Model 2)}$$

$$3L_i = \left(\frac{P3I_i}{1-P3I_i}\right) = \beta_0 + \beta_1 IF1 + \beta_2 IF2 + \beta_3 IF3 + \beta_4 IF4 + \beta_5 IF5 + e_i \qquad \text{…(Model 3)}$$

$$4L_i = \left(\frac{P4I_i}{1-P4I_i}\right) = \beta_0 + \beta_1 IA1 + \beta_2 IA2 + \beta_3 IA3 + \beta_4 IA4 + \beta_5 IA5 + e_i \qquad \text{…(Model 4)}$$

Where, Li = Logit or log of odds ratio; P1Ii =guaranteed effective skill acquisition; 1 – P1Ii = ineffective skill acquisition; P2Ii =content of agricultural science curriculum is adequate; 1 – P2Ii = content of agricultural science curriculum is inadequate; P3Ii =implementation of agricultural science curriculum is available and adequate; 1 – P3Ii = implementation of agricultural science curriculum is inavailable and inadequate; P4Ii =implementation approaches for agricultural science curriculum is adequate; 1 – P4Ii = implementation approaches for agricultural science curriculum is inadequate; SA1=Curriculum should be arranged in modular packages; SA2=Team teaching based on specialization should be adopted; SA3=Curriculum should be compartmentalized; SA4=Every practical lesson should be preceded by its theoretical lesson; SA5=Tasks implied in skill lesson must be analyzed preparatory to the actual teaching; PA1=agricultural science curriculum is readily available to all agric-teachers; PA2=familiar with the contents and objectives of the curriculum; PA3=The contents are adequate to meet objectives; PA4=The major themes are adequate for the objectives; PA5=The spiral approach of presentation of the curriculum is appropriate; IF1=Farm space such as fish pond, orchard and agric laboratory; IF2=Farm tools such as hoe & cutlass; IF3=Farm equipment/machinery such as sprayers, tractor, gunter chain, theodolite, compass etc; IF4=Ruminant animal such as goat and sheep; IF5=Non-ruminant such as rabbit, pig and poultry birds; IA1=Guided discovery as recommended at senior school levels is appropriate; IA2=Agricultural science encourage students to explore agricultural resources; IA3=The agricultural science class hours is sufficient for subject teaching and practical; IA4=Process and techniques of evaluation in the curriculum for students' performance is adequate; IA5=Activities in the curriculum designed to enhance psychomotor skills development is appropriate; β_0 = Constant; β_1 and β_2=Parameters to be estimated (a prior expectations are $\beta_1, \beta_2, \beta_3 \ldots > 0$); e = Error term

3.9. Methods of Data Analysis

The data for the study was collected and analyzed using computer software. STATA 8 statistical packages for Windows was used to compute the estimates for the four specific objectives. STATA is a good computer software foe estimating logit model; the dependent variable is binary or dichotomous in nature, i.e. either 0 or 1.

4. Results and Findings

4.1. Secondary school agriculture curriculum and guaranteed effective skills acquisition

In the output below, we first see the iteration log, indicating how quickly the model converged. The log likelihood (-108.08106) can be used in comparisons of nested models, but we won't show an example of that here. Also, we see that all 332 observations in our data set were used in the analysis (fewer observations would have been used if any of our variables had missing values). The likelihood ratio chi-square of 4.42 with a p-value of 0.1098 tells us that our model as a whole does not fit significantly better than an empty model (i.e., a model with no predictors). In the Table below, we see the coefficients, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. Most variables, **SA1, SA2, SA4** and **SA5** are statistically significant. The logistic regression coefficients give the change in the log odds of the outcome for a one unit increase in the predictor variable. For every one unit change in **secondary school agriculture curriculum**, the log odds of **skill acquisition** increases. The alternative hypothesis (**H0$_1$**) was accepted, which states that, *"the content of the secondary school agriculture curriculum have significant marginal effect on guaranteed effective skills acquisition."*

Table 3: Secondary school agriculture curriculum and guaranteed effective skills acquisition

skill acquisition	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
SA1	0.8814681	0.5269471	1.67*	0.094	-0.1513292	1.914265
SA2	-1.393964	.7411445	-1.88*	0.060	-2.846581	.0586521
SA3	-.2700941	1.053118	-0.26	0.798	-2.334167	1.793979
SA4	1.184944	.5663964	2.09*	0.036	.0748275	2.29506
SA5	3.566081	1.055971	3.38**	0.001	1.496417	5.635746
_cons	-1.692806	0.7727061	-2.19	0.028	-3.207283	-0.1783302

Note: Number of obs =332; LR chi2(2) = 4.42; Prob > chi2 = 0.1098; Log likelihood = -108.08106; Pseudo R2 = 0.0200; *,** = significant at 10% and 1% respectively; SA1=Curriculum should be arranged in modular packages; SA2=Team teaching based on specialization should be adopted; SA3=Curriculum should be compartmentalized; SA4=Every practical lesson should be preceded by its theoretical lesson; SA5=Tasks implied in skill lesson must be analyzed preparatory to the actual teaching

Source: STATA 8

This study agrees with the study of Kiadese (2011) which revealed a relatively low teaching effectiveness among prevocational subject teachers. This results is in consonance with the findings of (Agbatogun, 2006; Brewer, 2007; Scriven, 2008; Adetayo, 2008) that teaching effectiveness of teachers is relatively low and counter productive to students achievement. Agbatogun further reported that, teachers in recent time lack knowledge of modern teaching and strategic assessment technique. In similar vein Adetayo asserted that Nigerian teachers cannot utilize modern pedagogy that is technology driven. The low teaching effectiveness of teachers can be said to have been responsible for students' poor performance in school subjects in various public examinations conducted for students in Nigeria. The students under achievement are alarming, most especially in the prevocational subjects.

4.2. Agricultural science teachers' perception and agricultural science curriculum

The iteration log below, indicates how quickly the model converged. The log likelihood (-101.94541) can be used in comparisons of nested models, but we won't show an example of that here. All 332 observations in our data set were used in the analysis. The likelihood ratio chi-square of 16.69 with a p-value of 0.0002 tells us that our model as a whole does fit significantly better than an empty model (i.e., a model with no predictors). In the Table below, we see the coefficients, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. Most variables, PA1, PA2, PA3 and PA4 are statistically significant. The logistic regression coefficients give the change in the log odds of the outcome for a one unit increase in the predictor variable. For every one unit change in agricultural science teachers, the log odds of agricultural science curriculum increases. The null hypothesis was rejected and the alternative hypothesis (**$H1_2$**) was accepted, which states that, "*agricultural science teachers' perception about the content of the agricultural science curriculum is adequate*."

Table 4: Agricultural science teachers' perception and agricultural science curriculum

agric sci. curr.	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
PA1	0.0001174	0.000031	3.78**	0.000	0.0000566	0.0001783
PA2	0.0002013	0.0000941	2.14*	0.032	0.0000169	0.000385
PA3	3.059802	1.322788	2.31*	0.021	.4671845	5.6524
PA4	1.764977	.826878	2.13*	0.033	.1443255	3.385628
PA5	.9217208	.572469	1.61	0.107	-.2002978	2.043739
_cons	-2.745728	0.709922	-3.87	0.000	-4.137149	-1.354306

Note: Number of obs =332; LR chi2(2) = 16.69; Prob > chi2 = 0.0002; Log likelihood = -101.94541; Pseudo R2 = 0.0757; *,** = significant at 10% and 1%; PA1=agricultural science curriculum is readily available to all agric-teachers; PA2=familiar with the contents and objectives of the curriculum; PA3=The contents are adequate to meet objectives; PA4=The major themes are adequate for the objectives; PA5=The spiral approach of presentation of the curriculum is appropriate

Source: STATA 8

Our finding agrees with the work of Famiwole, Odu, Popoola and Ayodele (2014) which stipulate that students were found to be faced with poor mathematical problem solving skills in Agricultural Science. Skill, according to Hull (1992), was defined as manual dexterity acquired through the repetitive performance of an operation. According to Hornby (1980), skills involve the ability to do something expertly well. Aderogba (2011) expressed skills as the possession of expertise needed to perform a particular job or tasks and in essence, it ought to consist of habit that ensures adaptation. Olaitan (2010) posits that although students might have studied Mathematics in school as a subject, teachers of Agricultural Science or Agricultural Education should not overlook the teaching of the application of Mathematics to Agriculture. According to him, Mathematics is very important in calculating the area of the school farm, yield of crop per hectare, profit or loss accruing from farm enterprise, amount of feed needed per head of animal per unit body weight gain, amount of work done by tractor to ascertain efficiency, the bulk density of soil, soil PH, soil analysis experiments and rate of fertilizer application among others.

4.3. Instructional facilities and implementation of the agricultural science curriculum

The iteration log below, indicates how quickly the model converged. The log likelihood (-46.120714) can be used in comparisons of nested models, but we won't show an example of that here. All 332 observations in our data set were used in the analysis. The likelihood ratio chi-square of 57.26 with a p-value of 0.0000 tells us that our model as a whole does fit significantly better than an empty model (i.e., a model with no predictors). In the Table below, we see the coefficients, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. The IF1, IF3, IF4 and IF4 variables are statistically significant. The logistic regression coefficients give the change in the log odds of the outcome for a one unit increase in the predictor variable. The null hypothesis was rejected and the alternative hypothesis (**H1$_3$**) was accepted, which states that, "*instructional facilities are available and adequate for the implementation of the agricultural science curriculum.*"

Table 5: Instructional facilities and implementation of the agricultural science curriculum

agri. sci.curri.	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
IF1	2.039382	.716156	2.85**	0.004	.6357424	3.443022
IF2	.9658191	.6182741	1.56	0.118	-.2459759	2.177614
IF3	1.523487	.8159713	1.87*	0.062	-.0757875	3.122761
IF4	2.147725	.646939	3.32**	0.001	.8797475	3.415702
IF5	1.754515	.6420014	2.73**	0.006	.4962156	3.012815
_cons	-13.72517	4.913372	-2.79	0.005	-23.3552	-4.095136

Note: Number of obs = 332; LR chi2(10) = 57.26; Prob > chi2 = 0.0000; Log likelihood = -46.120714; Pseudo R2 = 0.3830; *,** = significant at 10% and 5% respectively; IF1=Farm space such as fish pond, orchard and agric laboratory; IF2=Farm tools such as hoe & cutlass; IF3=Farm equipment/machinery such as sprayers, tractor, gunter chain, theodolite, compass etc; IF4=Ruminant animal such as goat and sheep; IF5=Non-ruminant such as rabbit, pig and poultry birds

Source: STATA 8

This study is in tandem with work of Ndem and Akubue (2016) which emphasized that, 92% of the teachers were qualified, the school administrations co-operates in teaching of pre-vocational subjects, instructional materials were available for teaching of pre-vocational subjects. In contradiction, Ewa (2012) noticed that in many secondary schools in Afikpo education zone of Ebonyi State, Nigeria, many biology teachers are used to teach agricultural science at the secondary schools, this he said has contributed to mass failure of students in agricultural science in the senior secondary school examination. The poor performance of students in senior secondary school examinations has made it impossible for many students to gain admission into the higher institutions to study vocational courses. This, situation has led to low enrolments of candidates in vocational agriculture and home economics and related courses in the higher institution and has invariably affected the number of graduates needed to teach vocational subjects at the secondary schools. If this situation is allowed unchecked, it will lead to non-achievement of the vocational education objectives at the secondary schools.

4.4. Teachers' perception and agricultural science curriculum

The iteration log below, indicates how quickly the model converged. The log likelihood (-54.585535) can be used in comparisons of nested models, but we won't show an example of that here. All 332 observations in our data set were used in the analysis. The likelihood ratio chi-square of 40.33 with a p-value of 0.0000 tells us that our model as a whole does fit significantly better than an empty model (i.e., a model with no predictors). In the Table below, we see the coefficients, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. The teachers' perception of the implementation approaches variables of: **IA1, IA2, IA4** and **IA5** are statistically significant. The logistic regression coefficients give the change in the log odds of the outcome for a one unit increase in the predictor variable. The null hypothesis was rejected and the alternative hypothesis (**$H1_4$**) was accepted, which states that, *"teachers' perception of the implementation approaches designed for the agricultural science curriculum is adequate."*

Table 6: Teachers' perception and agricultural science curriculum

agri. sci.curri.	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
IA1	1.069446	.3064297	3.49***	0.000	.4688545	1.670037
IA2	1.608624	.5786026	2.78**	0.005	.4745834	2.742664
IA3	.7436604	.5175171	1.44	0.151	-1.757975	.2706545
IA4	1.138514	.5184247	2.20*	0.028	-2.154608	-.1224201
IA5	1.111901	.3910193	2.84**	0.004	.3455173	1.878285

_cons | -7.582617 3.525314 -2.15 0.031 -14.49211 -.6731285

Note: Number of obs = 332; LR chi2(6) = 40.33; Prob > chi2 = 0.0000; Log likelihood = -54.585535; Pseudo R2 = 0.2697; *,**,*** = significant at 10%, 5% and 1% respectively; IA1=Guided discovery as recommended at senior school levels is appropriate; IA2=Agricultural science encourage students to explore agricultural resources; IA3=The agricultural science class hours is sufficient for subject teaching and practical; IA4=Process and techniques of evaluation in the curriculum for students' performance is adequate; IA5=Activities in the curriculum designed to enhance psychomotor skills development is appropriate

Source: STATA 8

Findings from the study of Akanmu, Olorundare and Uphai (2016) showed that 86% of the teachers perceived the agricultural science curriculum content were suitable for students' performance, the instructional facilities for agricultural science teaching in schools are not adequately available and agricultural science curriculum implementation was confronted with several challenges. Student performance in agricultural science was poor as about 51% had credit pass in the administered test and 49% failed the test. However, Oluwadaisi (2010) also found that, even though instructional facilities are available to an extent, they are insufficient to meet the curriculum objectives in Agricultural science.

5. Conclusion

The teaching of agricultural science subjects in secondary schools has not been encouraging. The work focused on the availability of instructional materials, academic qualifications of teachers, cooperation of the school administration and teaching methods adopted by the teachers. The result of the study showed that instructional materials were available, school administrations co-operated, teachers were highly qualified and the teachers adopted demonstration, project, field trip and assignment which are ideal for teaching of agricultural science programme. The findings of this study indicate that so many things are wrong with the teaching of the sciences in Taraba State. Apart from the poor state of infrastructure which has negatively influenced the teaching of science in the State, the agricultural science teachers themselves are not well positioned to teach agricultural science effectively. Their deficiencies range from the use of inappropriate teaching methods for teaching agricultural sciences, through lack of commitment and dedication to inaccurate assessment of students learning outcome in agricultural science. The problem of poor teaching of sciences in our schools can therefore be hinged on the dearth of resources for teaching science, large class sizes of agricultural science students, very few qualified science teachers and competency problems' arising from the poor training of agricultural science teachers. The existence of these problems is known to influence effective teaching and learning of agricultural science.

.6. Recommendation

i. Government and agency responsible for teacher development should put in place an action plan to enhance the capacity of teachers in the use of ICT driven pedagogy, modern classroom practices and assessment techniques; while the technical teacher training scheme should be resuscitated. This will position the country towards the realization of vision 2020 through prevocational education

ii. School supervisors should monitor the teachers output and ensure that all areas of the curriculum, including contents requiring computations, are adequately covered
iii. Teachers should adopt demonstration and project methods instead of story methods in teaching of pre-vocational subjects
iv. Stakeholders should adequately provide instructional facilities, ensure their adequacy and also supervise their judicious utilization
v. The situation therefore calls for the retraining of all agricultural science teachers in the State, through seminars and workshops and provision of infrastructure to reposition science teaching in the State. This will enable teachers teach science in line with national standards and aspire to catch up with international specifications

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