International Journal of Global Affairs , Research and Development (IJGARD) Vol.3, No.2, 2025, 192-207
ISSN 2992-2488

FARM PRACTICE IMPROVEMENT NEEDS OF TEACHERS OF AGRICULTURAL SCIENCE IN OPERATING SECONDARY SCHOOL FARMS IN TARABA STATE, NIGERIA

Yaro, A. Ekele, G. E, Shimave, A. G, Lan, M. T
Department of Agricultural Education
Joseph Sarwaun Tarka University, Makurdi, Benue State.
(Corresponding Author Yaro, A yaroanthony0@gmail.com)

ABSTRACT
The study sought to identify the farm practice improvement needs of teachers of Agricultural Science in operating secondary school farms in Taraba State. The study had three specific objectives, three research questions and one hypothesis. Descriptive survey research design was adopted for the study. The population for the study is 1266 which is made up of 1173 teachers of Agricultural Science from 290 public Secondary Schools and 93 extension agents in Taraba Agriculture Development Programme (TADP) in the State. The sample for this study is 303 made up of 93 agricultural extension agents and 210 teachers of Agricultural Science. The sample size was obtained using the Taro Yamane formula. All the 93 extension agents were used for the study while stratified random sampling techniques was adopted to sample 210 teachers for the study. The instrument for data collection was a structured questionnaire titled Farm Practice Needs of Teachers of Agricultural Science Questionnaire (FPNTASQ). The instrument for data collection was faced and content validated by five experts, three from Department of Agricultural Education, one from Department of measurement and evaluation and one from Department of Agricultural Extension and Communication, College of Agriculture, Joseph Sarwuan Tarka University Makurdi. The reliability of the instrument was trial tested on 41 teachers of Agricultural Science and extension agents in Adamawa State. The result yielded an internal consistency of 0.85 and 0.81 for need and performance categories using Cronbach Alpha method. The Data for the study was collected using 303 structured questionnaires. 292 copies representing 97 percent of the instrument was retrieved for analyses. Data for the study was analyzed using mean and improvement need index (INI) to answer research questions. It was found from the study that teachers of Agricultural Science in secondary schools in Taraba State need farm practice improvement in: soil conservation, plant disease control, animal disease control. Based on the findings of the study, it was concluded that Agricultural Science teachers in secondary schools in Taraba State need improvement in the 3 farm practices for operating the school farm. It was therefore recommendations that teachers of Agricultural Science should undergo in-service training in soil conservation to enable them perform to expectation in operating the school farm.

Keyword: Farm Practice, Teachers of Agricultural Science & Secondary School Farms

1. 0 INTRODUCTION

Agriculture is the mainstay of the national economy as it is the bases for harnessing natural resources which is the only source of food production for human consumption. The desire for sufficiency and healthy food production in Nigeria prompted the government to introduced agriculture in the school curriculum. Agricultural Science is the branch of science which deals with growing of crops and rearing of domestic animals for the benefit of man and raw materials for the industries. Ndem (2016) explains that Agricultural Science deals with the production of crops and rearing of farm animals by man for the purpose of providing food, raw materials and shelter. It also involves the science of processing, preservation, storage, marketing and distribution of the agricultural products through the help of the teachers.

Teachers of Agricultural Science teaches the subject with low level of knowledge on farm practices that can enable students acquire knowledge and skills when the objectives of Agricultural Science curriculum is not properly designed, therefore Peter *et al* (2021) enumerated the following as the specific objectives of introducing Agricultural Science at the secondary school curriculum:

i. To stimulate and sustain students interest in agriculture
ii. To provide students the interest to progressively advance in farming.
iii. To advance food production through improvement of agricultural production techniques in students.
iv. To provide occupational entry level skills in agriculture to the interested students.
v. To prepare students adequately for producing and marketing farm commodities efficiently and profitably.

vi. To enable students acquire basic knowledge and practical skills required for future studies in the field of agriculture.

oAlso, the objectives of Agricultural Science curriculum are not only to produce professional and skilled manpower but, also to educate the rural community with the aim of ensuring complete transformation of agricultural production from the subsistence level to commercial agriculture which start from the school farm. Hence, the school farm is an indispensable tool in secondary school agriculture. Alkali, *et al* (2016) noted that in order to make agriculture more meaningful for food sufficiency and sustainability, the school farm was recommended as necessary requirement for translating theory into practice. A school farm is an area especially earmarked for agricultural activities by a school which may be in school or at walking distance to school. It is a farm set up by a school for the purpose of practical teaching and learning of Agricultural Science and its related subjects (Chukwudum & Ogbuchi, 2015). School farm has been described by Pia, *et al* (2015) as an outdoor laboratory specifically designed for imparting agricultural knowledge and managerial skills for students in secondary schools through guided practice. As outlined by Melaiye *et al* (2021) the importance of school farm are as follows: a source of revenue to school; as a store of value; a source of transfer of knowledge; for developing skills in students; to stimulate students' interest in farming; as laboratory for research; for aesthetic; for recreation; for improving background knowledge of students; and for direct agricultural extension services. The above can be achieved when the teachers possess sufficient farm practice skills.

Farm practice refers to all activities conducted by a farmer on a farm to produce agricultural products and which are inherent and necessary to the operation of a farm including, but not limited to, the collection, transportation, distribution, storage and land application of animal wastes; storage, transportation and others. According to Gaedena (2024) farm practices are some of the

methods applied to agriculture; to create food for consumers as well as for safe processing. Farm practice is the method of cultivation of crops to provide food to the entire population. Thus, to ensure that more persons are involved in food production, there is need to make agriculture practicable through the school farm. Teachers of Agriculture in secondary schools therefore need to be competent in farm practices. In the context of this study, the farm practice improvement needed by teachers of Agricultural Science includes: soil conservation techniques, management of plants and animal diseases. All these farm practices are needed by agricultural science teachers for increase productivity of agriculture. The knowledge and skills students gain from teachers of Agricultural Science have the potential to transform the agricultural landscape, ensuring that our soils remain healthy, fertile, and capable of sustaining future generations.

The establishment of school farms in secondary schools has been an indispensable tool in the teaching of Agricultural Science and research. Sadly, school farms are no longer there in most schools due to lack of land space and schools with sufficient land space seem to lack teachers who possess sufficient skill in farm practice needed to impart to the students. Presently, farming hardly plays a part in setting up schools as many schools do not bother to allocate land for this purpose and teachers are employed to teach agriculture without due consideration of their capacity to implement farm practical in the school farm. The consequence of this is that students graduate without possessing farm practice skills expected of them. A focus group interaction with 10 teachers of Agricultural Science in secondary schools revealed that they do not possess sufficient farm practice skills on soil conservation, plant and animal disease control, water control, animal feed production and keeping of farm records to impart to the students in the school farm. Thus, the teachers require re-training to enable them deliver up to expectation in implementing practical in the school farm. Taraba State Government lack direction for providing qualitative agricultural

education at secondary school level by not creating opportunity for training and re-training of the teachers in emerging agricultural practices.

However, there is dearth of information across literature on the areas secondary school teachers of Agricultural Science need improvement in farm practice for running the school farm to impart practical skills to the students. This creates a research gap. This study tends to bridge this gap by identifying the farm practice improvement needs of Agricultural Science teachers for operating the school farm to impart skills to the students.

The main purpose of the study was to determine the farm practice improvement needs of teachers of Agricultural Science in operating school farm in Taraba State. Specifically, the study seeks to identify the:

1. farm practice improvement needs of teachers of Agricultural Science in soil conservation technique for operating secondary school farms.
2. farm practice improvement needs of teachers of Agricultural Science in plant diseases control for operating secondary school farms.
3. farm practice improvement needs of teachers of Agricultural Science in animal disease control for operating secondary school farms.

The following research questions are guided the Study:

1. What are the farm practice improvement needs of teachers of Agricultural Science in soil conservation technique for operating secondary school farms?
2. What are the farm practice improvement needs of teachers of Agricultural Science in plant diseases control for operating secondary school farms?
3. What are the farm practice improvement needs of teachers of Agricultural Science in animal disease control for operating secondary school farms?

The following null hypotheses were postulated and tested at 0.05 level of significance:

1. There is no significant difference between the mean response of teachers and agricultural extension agents on the farm practice improvement needs of teachers of Agricultural Science in soil conservation technique for operating secondary school farms.

2.0 METHODOLOGY

Descriptive survey research design was adopted for this study. This study collected data from teachers of Agriculture Science in Taraba State public secondary schools and agricultural extension agents. The study covered 290 secondary schools in Taraba State. The state was chosen for the study because there are agricultural teachers and agricultural extension agents to provide data for answering the research questions. The population for the study is 1266 made up of 1173 teachers of Agricultural Science from 290 public Secondary Schools in Ten (10 educational zones in Taraba State and 93 agricultural extension agents randomly selected from the four Zones of Taraba Agricultural Development Programs (TADP) in the State. The sample for this study is 303 made up of 93 agricultural extension agents and 210 teachers of Agricultural Science. The sample size was obtained using the Taro Yamane formula. All the 93 extension agents were used for the study while stratified random sampling techniques was adopted to sample 210 teachers to be used for the study. Stratified simple random sampling or Systematic sampling was used to pick respondents within each stratum, which ensures every unit within a stratum has an equal chance for being selected. The instrument for data collection was a structured questionnaire. The questionnaire is titled: Farm Practice Needs of Agricultural Science Teachers Questionnaire (FPNASTQ). The instrument is divided into two categories of need and performance category. The two categories were structured in a 4-point rating scale (HN highly needed=4; MN moderately needed=3; SN slightly needed=2; NN not needed and HP highly performed-4; MP moderately

performed -3; SP slightly performed-2; and NP not performed-1) for need and performance categories respectively. The questionnaire was divided into two sections, A and B. Section A. sought information about the relevant personal characteristics of the respondents while part B has 3 clusters in line with the research questions. Cluster 1 contained 15 items which sought information on Farm Practice Needs in Soil Conservation of school farms, cluster 2 has 15 items that requested for farm practices on plant disease in school farms, and cluster 3 contained 15 items which requested data on farm practices in animal diseases control in school farm. The instrument for data collection was faced and content validated by five experts. three from Department of Agricultural Science and Technology Education, one from Department of Measurement and Evaluation and one from Department of Agricultural Extension and Communication, School of Agriculture, Joseph Sarwuan Tarka University, Makurdi. Each of the validators was given the research questions, the purpose of the study, the research objectives guiding the study and the questionnaire. The opinion of the Validators was used to improve the content of the instrument. A trial testing was carried out on 41 Teachers of Agricultural Science and extension agents who were randomly selected in Secondary Schools and Adamawa agricultural development program in Adamawa State. The Scores of their responses was analyzed using Cronbach Alpha Formula and an internal consistency of 0.85 and 0.81 were obtained for need and performance category respectively. This proves that the instrument is reliable for the study. The reason for choosing Adamawa State is because it shares the same nature of land with Taraba for agricultural activities. Both states are located in north-eastern part of Nigeria and share similar ecological and climatic features.

The data for this study was collected using structured questionnaire which were administered to respondents by the researcher and ten (10) trained research assistance spread in the ten educational

zones in Taraba State and four (4) zones of Taraba Agriculture development program (TADP). Only 292 copies representing 97% of the instrument were retrieved after three days and was analyzed using SPSS, 23 version. Data for the study was analyzed using mean and improvement need index (INI) to answer research questions. For research questions, the performance mean was represented with Xp while the expected or needed mean was represented with Xn. The performance gap (PG) was obtained by subtracting the Xp from Xn. (PG= Xn-Xp).

This could yield zero, negative or positive result. A zero-result means that the extent to which the item is performed is same as the extent to which they are expected or needed which shows that no improvement is needed. A negative result means that the extent to which the item is performed is higher than they are expected or needed, showing that no improvement is needed while a positive result shows that the extent to which the item is performed is below the extent to which they are expected or needed, implying that improvement is needed in such item.

3.0 RESULT AND DISCUSSION

3.1 Results of findings

Research question 1**:** What are the farm practice improvement needs of teachers of Agricultural Science in soil conservation technique for operating secondary school farms in Taraba State, North East, Nigeria?

Table 1: Farm Practice Improvement Needs of Teachers of Agricultural Science in Soil Conservation Technique for Operating Secondary School Farms in Taraba State, North East, Nigeria (N= 92, 200)

SN	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG $(\bar{X}n - xp$	RMK
1	Organic farming technique	3.08	3.06	0.02	IN
2	Soil erosion prevention techniques (gully, rill, sheet erosions)	3.087	3.15	-0.07	INN
3	Macro nutrient management technique	3.13	2.96	0.17	IN
4	Micro nutrient management technique	3.17	3.11	0.06	IN
5	Irrigation water management technique	3.17	3.10	0.07	IN
6	Crop rotation techniques	3.05	3.06	-0.01	INN
7	Cover cropping	3.05	3.19	-0.14	INN
8	Soil testing techniques	3.08	2.93	0.15	IN
9	Sustainable farming techniques	3.20	3.07	0.13	IN
10	Use of latest technologies such as biopolymers, geotextile material, plastics, rubber cover for mulching	3.10	3.05	0.05	IN
11	Use of green manure techniques	3.21	3.26	-0.05	INN
12	Contour farming techniques	3.20	3.2	0.00	INN
13	Conservation tillage techniques	3.25	3.28	-0.03	INN
14	Terracing techniques	3.17	3.22	-0.05	INN
15	Agroforestry techniques	3.21	3.22	-0.01	INN
	Pooled	**3.14**	**3.12**	**0.02**	**IN**

Keys: Xn- mean of need category, Xp-mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

Data presented in Table 1 shows that items 2, 6, 7, 11-15 has their performance gap ranging from 0.01 to 0.14 and are all negative. This means that the teachers performed even better than expected in the items, implying that improvement is not needed in the items. But items 1, 3-5 and 8-10 have their performance gap a ranging from 0.002 to 0.17 and are all positive. This means that the level at which the teachers perform in the items are below the level at which they are needed, implying that improvement is needed in those items. The pooled performance gap of 0.02 implies that in all, teachers need farm practice improvement in soil conservation.

Research question 2: What are the farm practice improvement needs of teachers of Agricultural Science in plant disease control for operating secondary school farms in Taraba State, North East, Nigeria?

HYPOTHESIS 1: There is no significant difference between the mean response of teachers and agricultural extension agents on the farm practice improvement needs of teachers of Agricultural Science in soil conservation technique for operating secondary school farms.

To test the hypothesis above, the mean rating of Teachers of agricultural Science and Extension agent on farm practices improvement needs in soil conservation techniques were analyzed using t-test and presented in Table 2.

Table 2: t-Test Result of the Respondents on the Farm Practice Need of Agricultural Science Teachers in Soil Conservation

STATUS	N	Mean	Std. Deviation	Std. Error Mean	Df	Sig	t-cal	Alpha value	Remark
Ext. Agents	92	3.148547	0.697637	.47061	290	.538	.616	.05	NS
Teachers	200	3.126333	0.686607	.29641					

Keys: N= Number of respondents, Std = Standard deviation, df = degree of freedom, Sig. = P-value; t-cal = t-calculated value; NS = No Significant.

Source: *Field survey, 2024*

The result of the data presented in Table 2 shows that the p-value (sig) is 0.538 (at 290 degree of freedom) which is higher than the alpha value of 0.05. The null hypothesis is therefore accepted. This means that there is no significant difference between the mean response of agricultural extension agents and teachers on the farm practice improvement needs of Agricultural Science teachers in soil conservation.

Table 3: Farm Practice Improvement Needs of Teachers of Agricultural Science in Plant Disease Control for Operating Secondary School Farms in Taraba State, North East, Nigeria (N=92, 200).

SN	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG $(\bar{X}n - \bar{X}p)$	RMK
1	Identification of Common Plant Diseases	3.41	3.36	0.05	IN
2	Use of Disease-Resistant Crop Varieties.	3.57	3.53	0.04	IN
3	Crop Rotation	3.54	3.48	0.06	IN
4	Sanitation of the farm	3.39	3.34	0.05	IN
5	Integrated Pest Management such as biological control, cultural practices, habitat manipulation	3.53	3.52	0.01	IN
6	Application of chemicals like Fungicide and Pesticide	3.55	3.48	0.07	IN
7	Early Detection of Diseases	3.43	3.4	0.03	IN
8	Soil Health Management	3.52	3.42	0.1	IN
9	Quarantine Measures for Disease Control	3.43	3.38	0.05	IN
10	Use of Biological Control Agents	3.44	3.4	0.04	IN
11	Disease-Resistant Rootstock for Grafted Plants	3.52	3.47	0.05	IN
12	Identification of Common Plant Diseases	3.48	3.43	0.05	IN
13	Use of bio technology to limit the yield misfortunes	3.48	3.45	0.03	IN
14	Adoption of disease resistant variety of planting material	3.48	3.48	0.00	INN
15	Diversified cropping system	3.54	3.46	0.08	IN
	Pooled	**3.49**	**3.44**	**0.05**	**IN**

Keys: Xn- mean of need category, Xp-mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

Data presented in Table 3 shows that all the items except item 14 have their performance gap ranging from 0.01 to 0.08 and are all positive. This means that the teachers perform below expectation, implying that improvement is needed. But item 14 has the performance gap as 0.00 which shows that the level at which the teachers perform in the item is equal to the level at which it is needed, implying that improvement is not needed in that item. The pooled performance gap of 0.05 implies that in all, teachers need farm practice improvement in plant disease control.

Research question 3: What are the farm practice improvement needs of teachers of Agricultural Science in animal disease control for operating secondary school farms in Taraba State, North East, Nigeria?

Table 4: Farm Practice Improvement Needs of Teachers of Agricultural Science in Animal Disease Control for Operating Secondary School Farms in Taraba State, North East, Nigeria (N= 92, 200).

SN	ITEM STATEMENT	$\bar{X}_n$	$\bar{X}_p$	PG $(\bar{X}n - \bar{X}p)$	RMK
1	Disease Identification and Diagnosis	3.52	3.48	0.04	IN
2	Quarantine Procedures	3.26	3.29	-0-03	INN
3	Regular Vaccination of animals	3.39	3.38	0-01	IN
4	Biosecurity Measures	3.29	3.35	-0.06	INN
5	Proper Management of feed	3.38	3.4	-0.02	INN
6	Good Sanitation Practices	3.55	3.47	0.08	IN
7	Environmental Management	3.39	3.31	0.08	IN
8	Early Disease Detection/ Control	3.55	3.42	0.13	IN
9	Treatment of Sick Animals	3.45	3.36	0.09	IN
10	Record Keeping and Data Analysis.	3.42	3.36	0.06	IN
11	Use of Disease Resistance Breeds	3.47	3.4	0.07	IN
12	Use of Preventive Medications and Parasitic ides	3.05	3.1	0.04	IN
13	Veterinary Care and Regular Check-ups	2.92	2.85	0.07	IN
14	Education on Zoonotic Disease Prevention	1.75	1.91	-0.16	INN
15	Collaboration with Veterinarians and other Authorities	3.55	3.41	0.14	IN
	POOLED	**3.26**	**3.23**	**0.03**	**IN**

Keys: Xn- mean of need category, Xp-mean of performance category, PG- performance gap, IN- improvement needed, INN- improvement not needed

Data presented in Table 4 shows that all the items except items 2,4,5 and 14 had their PG ranging from 0.04-0.14 and are positive. This means that the level at which the teachers perform in the items is higher that the level at which they are needed. This means that they do not need improvement in those items. But items 2,4,5 and 14 had negative PG. This means that the level at which the items are performed is higher or equal to the level they are needed, meaning that

improvement is not needed in the items. The pooled performance gap of 0.03 implies that in all, teachers need farm practice improvement in animal disease control.

4.0 Discussion of Findings

The findings of the study in research question 1 revealed that teachers of Agricultural Science need farm practice improvement in soil conservation. This finding is in line with Ifeanyieze, Okeme and Dumbiri (2012) who found out that teacher of Agriculture needed improvement in 37 skill items in soil erosion prevention and 30 skill items in soil erosion control measures for effective teaching of soil erosion management to their students. The finding is also in keeping with Fedayuik and Eidericau (2024) who found that there is need for teachers to seek retraining in soil conservation techniques such as bush fallowing, the use of inorganic fertilizers and use of modern biotechnology methods to improve soil fertility. In line with the findings of this study also, Vanwalleghem (2016) found that teachers need improvement in soil conservation practices such as organic farming, contour farming, green manure, crop rotation and others. The effectiveness of each soil conservation strategy at the farm level depended on the number of techniques simultaneously practiced by a farmer, the farm location along the slope, the integration of livestock into farming systems, the farmer's main activity and income level, and more importantly, the farmer knowledge on soil erosion control measures. The findings of the study in hypothesis 1 is in keeping with Ifeanyieze, Okeme and Dumbiri (2012) who found that there is no significant difference in all the hypothesis tested on the skill improvement need of teachers in soil erosion management.

The findings of the study in research question 2 revealed that teachers need farm practice improvement in plant disease control. This finding agrees with Egbe (2021) who found that teachers need retraining in the use of integrated disease control, field disease control and

postharvest disease control. The finding is also in keeping with Thakur *et al*, (2018) who found that farm instructors need to up skill themselves in application of chemicals such as fertilizer, quarantine measures for disease control, use of biotechnology control methods and others.

The findings of the study in research question 3 revealed that teachers need farm practice improvement in animal disease control. This finding agrees with Onipede, Lawal et al (2020). It was found out from the study that teachers of Agricultural Science in senior secondary school in Gombe state needed improvement in 17 technical skills items in cattle production, 13 technical skills in pig production, 14 technical skills in poultry production and 11 technical skills in rabbit production. Ogar (2019) found from the study that teachers need competency improvement in proper management of animal feed, disease detection, treatment of sick animals and others.

The findings of the study are also in keeping with Robertson, (2020) who recommended that teachers need to seek more training in animal disease control measures such as b**i**osecurity, vaccination Programs, housing and facility management, use of resistant breeds and others.

4.1 Conclusion

Based on the findings of the study, it was concluded that:

Teachers of Agricultural Science in secondary school need improvement in farm practice areas for operating the school farm include: Soil conservation, plant disease control and animal disease control,

4.2 Recommendation

Based on the findings of the study the following recommendations were made:

1. Agricultural Science teachers should undergo in-service training in soil conservation for them to perform to expectation in operating the school farm.

2. Farm practice need in plant disease control identified in this study should be used to prepare the in-service training to be organized by the school management in collaboration with State Secondary Education Board for the teachers.
3. The school management should invite qualified veterinary doctors to teach the teachers the animal disease control practices they need improvement as identified in this study.

REFERENCES

Alkali, M., Ikehi, M. & Okoye, R. (2016) Teaching Agricultural Science with Instructional Materials in Secondary Schools; What the standard deviation explains about the mean achievement scores. *Creative Education*, 7, 1929-1934. doi: 10.4236/ce.2016.714195.

Arthur, K, & Malcolm, C.S.(2024). Department of plant Disease, Britannica. www.britannica.com

Aytar, A & Ozsergec, T. (2019). The Effect of Interdisciplinary Science Education on Sustainable Development of 7th Grade Students, *Journal of Education 34*(2), 324-357.

Chukwudum, E.O. & Ogbuehi, U.G. (2015). Effective Utilization of the School Farm as Instructional Initiative for Developing Agricultural interest Among Primary School Children in Nigeria. *Academic Journal of Interdisciplinary Studies*. 2 (6), 7-18. Special Issue –

Emaikwu, S.O. (2019). *Fundamental of Research Methodology and Statistics*. DaturaPublishing Company ltd Kaduna - Nigeria.

Gaedena, M. (2024). Agricultural practices. Available at https://www.vedantu.com/question-answer/what-are-agricultural-practices- define-5b7fdd6be4b084fdbbfc8d1d accessed 12/10/2024

Martha, H.J., Lynne, H., Luzia, R., Jenuy-Ann, L.M.L. T & Robert, W, (2019). Animal heath management practices Among social holder livestock produces in Australlia and their contribution to the Surveillance system. *Front Veterinary Science Journal, Vol 6* https://doi.ord/10.3389/vets2019.00191

Melaiye, O.R., Galadima, A., Ishaku, Chuboh, J.V., Yusuf, A.A & Tabi, I. (2021). Influence of Vocational Agriculture School Farm on Academic performance of Agricultural Students in Secondary Schools in Lau, L.G.A, Taraba State, Nigeria. *African Scholar Journal of Agriculture and Agricultural Technology 21*(1), 125-134. ISSN: 2877-1990.

Micheal, O., Melody, N.M. & Isiwu, E.C. (2016). Influence of School Farm on Teaching of Agricultural Science in Senior Secondary Schools in Ikwuano Local Governemnt Area, Abia State. *Open Access Laboratory Journal*. 3(6). Doi: 10.4236/oalib.1102742

.

Muggler, C.C. (2015). Soil & Education S. Nortoliff (Ed). *Task force soil matters-solutions under foot.* Schwelzerbat Science Publishers, Stuttgart, Germany PP. 147-150,

Ndem, J, U. (2016). *Management of School farm and garden*. Enugu: Cheston Agency Process Limited.

Panagos, P. Borelli, P. Meusburger, K., Alewell, C., Lugato, E & Montanarella, L., (2015). "Estimating the Soil Erosion cover-Management factor at the European Scale". *Land use policy 48*: 33-50. Doi:10.1016/j.landusepol.2015.05.021.

Peter, A.O. Adebola, S.I. & Kehinde, A.A. (2021). Learning by doing instructional strategy and parents education in determining Secondary students attitude in Agricultural Science. Journal of Turkish Science Education, vol. 18 (2), 305 - 319

Pia, S.L., Eila, J. & Sirpa, K.L. (2015). Farm Education of value of learning in an Authentic Learning Environment. *International Journal of Environmental & Science Education 10 (3), 381*-404.https://files:eric.ed.gov/fulltext/EJI069262.pdf

Sewilam, H., Mccormack, O., Mader, M. & Raouf, M.A. (2015). Introducing Education for Sustainable Development into Egyptian Schools. *Journal of Environmental and Sustainable 17*(2), 22!-238.

Vasyl, C. (2018). Erosion of soil Data Analysis (EOSA). Retrieved 15/7/2024.

William, B. Charles, E. & Daute, G.S.(2017). Animal Disease: Encydopaedia Britannia. www.britannica.com/science/animaldisease /additional - into #contributors

World Organization for Animal Health [WOAH], (2018). *OIE Competency Guidelines for Veterinary Paraprofessionals* DOI: http://dx.doi.org/10.20506/PVS-2758