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FEEDING AND HEALTH MANAGEMENT TRAINING NEEDS OF RURAL FARMERS FOR SUSTAINABLE PIG FARMING IN ENUGU STATE

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Abstract: *The study focused on feeding and health management training needs of rural farmers for sustainable pig production in Enugu State. Survey research design was adopted. Three research questions and two null hypotheses tested at 0.05 level of significance guided the study. The population for the study was 170 respondents made up of 117 registered pig farmers and 53 agricultural extension agents. The number was manageable hence, there was no sampling, and structured questionnaire containing 55 items was the instrument for data collection. The reliability of the instrument was determined using Cronbach Alpha reliability coefficient method. A correlation of 0.81 was obtained. A total of 170 copies of questionnaire were distributed, retrieved and analysed using weighted mean and standard deviation to answer the research questions and t-test was used to test the null hypothesis. It was found out that rural farmers highly need training in ability to identify suitable feed sources, formulate a balanced diet using cheap feed ingredients, disinfect pig house before arrival of new pigs, and immunize/vaccinate pigs to prevent diseases among others in Enugu State. The null hypothesis tested showed that there was no significant difference between the mean ratings of pig farmers and agricultural extension agents with respect to the training needs of rural farmers in feeding and health management of pigs for sustainable pig farming in Enugu State. Based on the findings, it was recommended that agricultural extension agents should organize workshops and seminars for rural farmers to improve their knowledge about feeding and health management of pigs and the identified skills should be used by skill acquisition centres for training the rural farmers and other people interested in pig production.*

Keywords: *Pig Farming, Feeding and Health Management, Training, Sustainability.*

Introduction

Pigs are mammals with stocky bodies, flat snouts that can move independently of their heads, small eyes and large ears. They are highly intelligent social animals, and are found all over the world. Pigs are in the Suidae family, which includes eight genera and 16 species (https://www.livescience.com, 2020). Pigs like all Suids, are native to the Eurasian and African continents, ranging from Europe to the pacific islands. (https://en.m.wikipedia.org>wiki2020).

Pigs are normally reared wide world for the production of human food in form of meat (pork, bacon, lard and sausages) (Alaku, 2010). Pigs also supply skin, fat, materials for use as clothing, ingredients for processed for processed foods, cosmetics and medical use.

In addition pigs are kept for their by-products such as manure (faeces) used for the improvement and maintenance of soil fertility, and one used for making bone meal (Alaku, 2010). Pigs by-products are equally important parts of products such as water filters, insulators, rubber, antifreeze, certain plastics, floor waxes, crayons, chalk adhesives, (https://animalsmart.org>products2020). The author added that Lard (fat) from pig abdomen can be used in shaving creams, soaps, make ups, baked goods and other foods.

Pigs and their products have played very great roles in human development. Its potentialities like high litter size, fast growth rate, ability to resist disease, and low capital requirement have made pig enterprise a reliable business (Ugwu, 2019). Pig production has also

been favoured by its ability to convert inedible feeds, forages, certain grain by products obtained from mill, meat by-products, damaged feeds and garbage into valuable nutritious meals. This was why Adesehinwa, Ajola and Mohammed (2006) opined that pigs are good converters of feed for agricultural and industrial uses; edible human food and producers of meats which differs from that of other farm animals in texture, flavour and nutritive properties.

Pig farming is the raising and breeding of domestic pigs as livestock and is a branch of animal husbandry (Wikipedia: https://en.m.wikipedia.org>wiki). In Enugu State which is the study area, most of the pigs are reared in rural areas by farmers. Rural farmers are those people that live in the rural areas (communities) doing all sorts of farming activities to earn their living. Evans (2015) defined rural farmers as those involved in farming and carrying out other related farming activities in the village. Such activities as cultivating food crops, rearing other livestock, fishing and hunting among others depends on the seasonal and natural conditions to carry on their farming activities. This implies that if these rural farmers are trained in pig farming, they will be equipped with the skills needed in pig production for sustainability of pig production in Enugu State.

Training is action of teaching a person a particular skill or learning the skills one needs to do a particular job or activity. Training constitute a basic concept in human resource development. It is concerned with developing a particular skill to a desired standard. (https://www.youarticlelibrary.com>...2020). Training can also be seen as teaching or developing in one self or others any skill and knowledge or fitness that relate to specific useful competencies. https://simple.m.wikipedia>wiki2020). This is implies that training has specific goals of improving ones capability, capacity, productivity and performance. Training needs of rural farmers in Nigeria especially Enugu State are diverse and vary from one community (rural area) to the other. This is why Dervan (2008) defined training need as the systematic gathering of data to find out where there are gaps in the existing skills, knowledge and attitude of an employee (farmer). When such gaps are identified, training equips the recipients (farmer) with skills to pursue new livelihoods and apply technology to their needs (food and agriculture organization) (FAO, 2015). In supporting FAO (2015), https://2020projectmanagement.com) outlined the importance of training as:

- allowing one to strengthen those skills that each employee needs to improve, bringing all employees (farmers) to a higher level so that they all have similar skills and knowledge.
- Reducing any weak links within the company who rely heavily on others to complete basic word tasks.

In Enugu State, rural farmers need to be trained so as to adopt practicing skills in pig farming. These training are given to rural farmers by the agricultural extension agents.

Agricultural extension agents are usually technically trained personnel who are equipped with agricultural skills. Extension agents are trained in the dissemination of improved farming methods and techniques which improves production efficiency and enhance income generation of farmers (Nwosu, 2018). The rules of extension agents are to disseminate new ideas, innovations, and knowledge to farmers especially in areas such as feeding, breeding, health management, housing and marketing as in pig farming. Extension agents disseminate information to rural farmers by various methods such as farm visits. Home visits, home and office calls, personal letters, result demonstration, group discussions, agricultural shows, radio, television newspapers, banners, hand bills, general meetings, posters, workshops, seminars (Nwosu, 2018). Madukwe (2011) opined that an extension worker may use two or more methods to make teaching more effective. This is because the result of all are to bring about desirable changes in human behaviour. This implies that the rural farmers need to be trained with the combination of appropriate extension teaching methods in health management and feeding of pigs to bring about these desirable changes in rural farmers for sustainability in pig farming.

Feeding is the process by which organisms, typically animals obtain food. Hornby (2015) defines feeding as the act of giving food to an animal. Feeds given to pigs should meet the animal's needs for maintenance, growth and reproduction. Good pig feed should contain sufficient energy, protein, minerals and vitamins. Examples of pig feeds include rice bran, broken rice, maize, soya-beans, cassava, vegetables, distillers, residues, wheat, bone meal, sweet potato and palm kernel cake. Food and agricultural organization (FAO, 2017) in supporting Hornby added meat meal, fish meal, blood meal, tallow, minerals, vitamins, salt and limestone. FAO further stated that pig diets can also be supplemented with fresh fruits. FAO, went further to state that when feeding pigs, it is important to consider the nutritional requirements as there is no such thing as a "standard" diet. They therefore stated that the pig's nutritional requirement for optimal and healthy growth change and are influenced by factors such as age and body weight, genetic potential of the pigs; housing environment, physiological state of the pigs; feed ingredients and water. It can then be deduced that good feeding help to maintain good health.

Health is absence of any disease or impairment. The world health organization (WHO, 2020) defined health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. This implies that health is the state of being free from illness or injury. This is why health care management measures to be followed in a pig farm are one of the most important factors and if not followed properly, a farmer may incur a heavy loss. Health management (measures) is a strategy designed to control, reduce or prevent specific diseases (Ugwu, 2019). Health check, vaccination, deworming and bath treatment will help the pig to withstand infection. According to Vikaspedia (2020), pigs can be infected with a number of internal parasites, skin infections and other bacterial and viral diseases, which in turn will result in poor growth and even death of pigs. The author itemized the general symptoms of illness in pigs as dullness, loss of appetite, declination to move or sluggish movement, rough body coat, constipation, diarrhoea, dull eyes, dull skin and hair, separation of itself form the rest.

Hunter (2007) highlighted some of the causes of animal diseases to include external and internal parasites, poor housing conditions and overcrowding, poisoning and allergic disorders, poor nutrition, poor health status of the animal, and poor sanitation. In supporting Hunter (2007), Iwena (2008) listed pig diseases as African swine fever or bug chlora; foot and mouth diseases; brucellosis, pneumonia, anthrax, piglet diarrhea, etc and parasites to include round worm, thread worm, tape worm, tick nites, lice, etc. In order to prevent and control the above named diseases and parasites, FAO (2009) stated the following as measures for preventing and controlling diseases and parasites of pigs: quarantine, immunization and vaccination, selection of resistant species for breeding, medication, culling, weaning piglets at the appropriate time, deworming, spraying, dipping or painting and consultation with the veterinarian. Training rural farmers with the above health management practices in pig farming is vital in equipping them with skills for sustainable pig farming in Enugu State.

Sustainability is the ability of something to be maintained at a certain rate or level. Hornby (2015) defines sustainability as something that can continue or be continued for a long time. This implies that since pigs are omnivores and can eat fish meal, soybean meal, blood meat, fresh fruits and vegetables, kitchen wastes and energy foods such as maize, wheat, rice, oats, barley, soyhum, cassava, sweet potato and cereal brains, its continuity is possible because pigs are good converters of feed into meat (pork) and other important by products. As a result, pig farmers need to be trained in feeding and health management in pig farming for sustainability. In the context of this study, sustainability in pig farming is the ability of pig farming to exist constantly using natural products and energy in a way that does not harm the environment.

However, in Enugu State, the researcher has observed that pig farming constitutes the livelihood of rural poor belonging to the lowest socio-economic strata and they have no means to undertake scientific

pig farming with improved foundation, stock, proper housing, feeding and health management. If adequate training are given to these rural farmers on the feeding and health management practices of pigs, it will help updates their knowledge and skill in pig farming. When the knowledge of the rural farmer are updated through training, it will make pig farming a self-sufficient and viable enterprise for sustainable food (pig products) supply in Enugu State and Nigeria in general. But if the rural farmers are not trained in feeding and health management in pig farming, there will be low productions and low supply of pig products which will also lead to low supply of protein foods to the populace and raw materials to industries. Therefore the need arose to determine the feeding and health management training needs of rural farmers for sustainable pig farming Enugu State.

Specifically the study sought to determine the training needs of rural farmers in:

1. Feeding of pigs for sustainable pig farming in Enugu State.
2. Health management of pigs for sustainable pig farming in Enugu State.
3. The methods that can be adopted by extension agents in training rural farmers for sustainable pig farming in Enugu State.

Research Questions

The following research questions guided the study:

1. What are the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State?
2. What are the training needs of rural farmers in health management of pigs for sustainable pig farming in Enugu State?
3. What are the extension teaching methods that can be adopted by extension agents disseminating information to rural farmers for sustainable pig farming in Enugu State?

Hypotheses

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

Ho_1: A significant difference do not exist in the mean ratings of the responses of agricultural extension agents and farmers regarding the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State?

Ho_2: A significant difference do not exist in the mean ratings of the responses of agricultural extension agents and pig farmers regarding the training needs of rural farmers in health management of pigs for sustainable pig farming in Enugu State?

Ho_3: A significant difference do not exist between the mean ratings of the responses of agricultural extension agents and pig farmers regarding the extension teaching methods that can be adopted by agricultural extension agents in disseminating information to rural farmers for sustainable pig farming in Enugu State?

Research Method

The descriptive survey research was adopted for the study. This research design was used because the study collected data from agricultural extension workers and pig farmers in the study area. The area of study was Enugu State which comprised six agricultural zones namely Ababni, Awgu, Enugu, Enugu-Ezike, Obollow-Afor and Udi. The population for the study comprised 170 respondents made up of 117 registered pig farmers and 53 extension agents from Enugu State Agricultural Development Programme (ENADEP, 2020). The entire population size was manageable, therefore no sampling was made:

A self-structured questionnaire were used as instrument for data collection. The questionnaire contained a total of 37 structured training needs of farmers in feeding and health management of pigs and 18 extension teaching methods generated from an extensive review of literature and information from pig farmers and extension workers. Each training needs and extension teaching methods had a four-point scale of Very Highly Needed (VHN)/Strongly, Agree – 4, Highly Needed (HN)/Agree – 3, Moderately Needed (MIN)/Disagree – 2 and Not Needed (NN)/Strongly Disagree – 1.

The instrument was subjected to face validation by three experts, one expert from the department of Animal Science, one from Technology and Vocational Education and one from Science and Computer Education, all in Enugu State University of science and Technology, Enugu. They validated the instrument to ensure the appropriateness of the measuring instrument and that the instrument was structured to address the purpose of the study (Uzoagulu, 2011). The comments of the validators were used to modify the final instrument used for data collection. The reliability of the instrument was determined by using Cronbach Alpha reliability method to determine the internal consistency of the instrument. The clusters yielded a coefficient of 0.81.

A total of 170 copies were administered to the respondents with the help of three research assistants. The questionnaires were retrieved after completion by the researcher and the assistants immediately thus giving a hundred percent return rate.

The data collected was analysed using weighted mean with standard deviation to answer the research questions. The hypotheses were tested at 0.05 level of significance using t-test. The t-test was used because the researcher made use of two groups – agricultural extension agents and pig farmers. The decision was based on the upper and lower limits of the mean, thus:

Highly Needed/Strongly Agree	3.50 – 4.00
Needed/Agree	2.50 – 3.49
Moderately Needed/Disagree	1.50 – 2.49
Not Needed/Strongly Disagree	1.00 – 1.49

The null hypothesis was rejected if the t-calculated was less than the t-critical, but accepted if the t-calculated exceeds the t-critical.

Result

The result obtained from the data analysed are presented in tables below according to the research questions and hypotheses that guided the study.

Research Question 1

What are the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State?

Table 1

Mean ratings and standard deviation of respondents on the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State

S/N	The areas rural farmers need training in feeding of pigs are ability to:	Pig Farmers N=117		Extension Agents N=53		Overall		Decision
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	**G**M	GSD	
1.	Identify suitable feed sources for pigs	3.21	0.84	3.21	0.95	3.21	0.90	N
2.	Identify alternative sources for pig feed	3.70	0.58	3.64	0.59	3.67	0.59	HN
3	Select suitable and quality cheap material for feed formulation	3.22	0.94	3.62	0.66	3.42	0.80	N
4	Formulate a balanced diet using cheap feed ingredients available	3.00	0.98	3.15	0.91	3.08	0.95	N
5	Determine the right measure to use in feeding pigs once a day	3.84	0.43	3.92	0.27	3.88	0.35	HN
6	Provide good drinking water regularly	3.83	0.44	3.96	0.19	3.90	0.32	HN
7	Supplement their major diet with vegetables	3.79	0.96	3.81	0.44	3.80	0.45	HN

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	kitchen waste and man's food							
8	Wet pig feed for both palatability and weight gain	3.32	0.86	3.89	0.38	3.61	0.62	HN
9	Feed pigs according to the purpose for which the individual animal are kept	3.91	0.10	3.98	0.14	3.99	0.12	HN
10	Flush gifts/sows two weeks to breeding time	3.28	0.87	3.43	0.77	3.36	0.82	N
11	Feed 1.8 to 2% of their body weight during the first and second trimesters and steam them during the last trimester.	3.11	0.95	3.16	0.94	3.19	0.95	N
12	Feed young breeding stock first 72 hours after birth	3.14	0.89	3.4	0.9	3.78	0.79	N
13	Expose the piglets to creep feed as early as three weeks after birth	3.28	0.87	3.77	0.51	3.53	0.69	N
14	Change feed stiffs gradually	3.44	0.78	3.85	0.41	3.65	0.60	HN
15	Feed less protein to fattening pigs	3.00	1.03	3.08	0.90	3.04	0.97	HN
16	Feed colostrum early after birth to avoid piglet mortality	3.71	0.49	3.92	0.33	3.86	0.41	N
17	Feed 2.7kg of wheat or rice bran at farrowing time.	3.74	0.46	3.40	0.74	3.57	0.60	HN
18	Waste and clean the feeding and water troughs before each day's feeding	3.69	0.62	3.45	0.70	3.57	0.66	HN
19	Inject iron to piglets 2-3 days after farrowing	2.97	0.84	3.08	1.07	3.03	0.96	N
	Grand Cluster Mean	**3.44**	**0.71**	**3.57**	**0.16**	**3.51**	**0.66**	**HN**

The table presented in Table 1 shows that the items denoted by item 2, 5, 6, 7, 8, 9, 13, 14, 16, 17 and 18 were identified as areas rural farmers need training in feeding pigs to a high extent. They had mean ratings of 3.67, 3.88, 3.90, 3.80, 3.61, 3.53, 3.65, 3.86, 3.57, 3.57. Other items had mean ratings ranging from 3.03 – 3.42 indicating that these items, equally need rural farmers to be trained in feeding of pigs. A grand mean of 3.51 and standard deviation of 0.66 indicates that rural farmers highly need to be trained in these areas for sustainable pig farming in Enugu State.

Hypothesis 1

A significant difference do not exist in the mean ratings of the responses of agricultural extension agents and farmers regarding the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State?

Table 2.

Summary of t-test analysis of mean ratings of pig farmers and agricultural extension agents regarding the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State?

Variables	N	$\bar{X}_1$	SD	df	t-cal.	t-crit	Decision
Pig farmers	117	3.44	0.71	168	1.22	1.96	NS
Agricultural extension agents	53	3.57	0.61				

The t-test in table 2 shows the calculated t-value is 1.22 at 168 degree of freedom and at 0.05 level of significance. Since the t-calculated is less than t-critical value of 1.96, the null hypothesis is not rejected. The

implication is that there is no significant difference between the mean ratings of pig farmers and agricultural extension agents on the training needs of rural farmer sin feeding pigs for sustainable pig farming in Enugu State.

Research Question 2

What are the training needs of rural farmers in health management of pigs for sustainable pig farming in Enugu State?

Table 3

Mean ratings and standard deviation of respondents on training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State

S/N	Rural farmers need training in health management of pigs on the ability to:	Pig Farmers N=117		Extension Agents N=53		Overall		Decision
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	**GM**	SD	
1.	Disinfect pig house before arrival of pigs	3.79	0.58	3.98	0.14	3.89	0.36	HN
2.	Maintain adequate sanitation	3.83	0.44	3.91	0.35	3.87	3.40	N
3.	Quarantine new animals	3.14	0.96	3.57	0.60	3.36	0.78	HN
4.	Immunize/vaccinate pigs to prevent diseases	3.91	0.35	3.94	0.23	3.93	0.29	HN
5.	Identify and cull sick pigs	3.95	0.22	3.91	0.35	3.95	0.23	HN
6.	Select resistant species for breeding	3.77	0.58	3.85	0.53	3.81	0.56	HN
7.	Treat sick pigs with medication	3.74	0.61	3.94	0.23	3.84	0.42	HN
8.	Protect the pigs from adverse weather condition	3.99	0.1	3.96	0.19	3.98	0.15	HN
9.	Deworm the pigs at least 3 times a year	3.93	0.28	3.87	0.44	3.90	0.36	HN
10.	Control external parasites by spraying, drenching or dipping.	3.77	0.58	3.91	0.35	3.84	0.47	HN
11.	Keep sick animal in separate pens for treatment	3.20	0.96	3.16	0.94	3.18	0.95	N
12.	Clip and treat navel cords of baby pigs	3.98	0.13	3.92	0.33	3.92	0.23	HN
13.	Clip needle teeth on baby pigs shortly after birth	3.75	0.64	3.87	0.39	3.81	0.52	HN
14.	Insect iron to piglets to prevent anaemia	3.21	0.84	3.45	0.70	3.33	0.75	N
15.	Disinfect sows as well as farrowing pegs 3 – 4 days before farrowing	3.22	0.94	3.62	0.66	3.42	0.80	N
16.	Feed sows extra feed from days 100 of gestation until farming	3.74	0.46	3.81	0.44	3.78	0.45	HN
17.	Seek the advice of veterinary doctors for treatment	3.50	0.85	3.85	0.53	3.68	0.69	HN
18.	Reduce quality of food to sow gradually before weaning	3.79	0.49	3.77	0.51	3.78	0.50	HN
	Grand Cluster value	**3.68**	**0.56**	**3.79**	**0.44**	**3.74**	**0.50**	**HN**

The data presented in table 3 above shows that the items denoted by item 3, 11, 14 and 15 were identified as needed by the respondents. Their means range from 3.14 to 3.22 while the rest 14 items were identified as highly needed items for the rural farmers to be trained for health management of pigs for sustainability in Enugu State. They had mean ratings ranging from 3.74 to. 3.99. With a grand mean of 3.74 for all the items, it indicates that all these items are highly needed by the rural farmers to be trained. The table also shows that

the grand cluster standard deviation is 0.50 indicating that the respondents are close to one another in their responses.

Hypothesis 2

A significant difference do not exist in the mean ratings of the responses of agricultural extension agents and pig farmers regarding the training needs of rural farmers in heath management of pigs for sustainable pig farming in Enugu State?

Table 4

Summary of t-test analysis of ratings of pig farmers and agricultural extension agents regarding the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State

Variables	N	$\bar{X}_1$	SD	df	t-cal.	t-crit	Decision
Pig farmers	117	3.68	0.56	168	1.38	1.96	NS
Agricultural extension agents	53	3.79	0.44				

The t-test analysis in table 4 shows that the calculated t-value is 1.38 at 168 df and 0.05 level of significance. Since t-calculated is less than t-critical value of 1.96, the null hypothesis is not rejected. Therefore, there is no significant difference in the mean responses of pig farmers and agricultural extension agents on the training needs of rural farmers in health management of pigs for sustainable pig farming in Enugu State.

Research Question 3

What are the extension teaching methods that can be adopted by agricultural extension agents in disseminating information to rural farmer for sustainable pig farming in Enugu State?

Table 5

Mean ratings and standard deviation of respondents of rural farmers and agricultural extension agents on extension methods that can be adopted by agricultural extension agents in disseminating information to rural farmers for sustainable pig farming in Enugu State

S/N	**The extension teaching methods that could be adopted by agricultural extension agents are:**	Pig Farmers N=117		Extension Agents N=53		Overall		Decision
		$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	**GM**	SD	
1.	Farm visits	3.91	0.35	3.91	0.35	3.91	0.35	SA
2.	Home visits	3.97	0.15	3.94	0.23	3.96	0.20	SA
3	Conferences, discussions and meeting	3.14	0.96	3.45	0.89	3.30	0.93	A
4	Hand bills/leaflets	3.20	0.96	3.23	0.95	3.23	0.96	A
5	Workshops	3.77	0.58	3.13	0.47	3.80	0.53	SA
6	Seminars	3.62	0.64	3.68	0.69	3.65	0.66	SA
7	Posters	3.35	0.92	3.57	0.60	3.46	0.76	A
8	Radio	3.75	0.22	3.91	0.35	3.93	0.29	SA
9	Television	3.75	0.64	3.91	0.35	3.83	0.50	SA
10	Agricultural shows	3.85	0.46	3.87	0.39	3.86	0.43	SA

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11	Result demonstrations	3.98	0.13	3.94	1.23	3.96	0.18	SA
12	Office calls	3.79	0.01	3.08	0.90	3.94	1.0	A
13	Use of banners	3.79	0.57	3.85	0.53	3.82	0.55	SA
14	General meetings	3.77	1.03	3.09	1.07	3.93	1.05	A
15	Personal letters	3.15	0.94	3.13	1.03	3.55	0.99	SA
16	Telephone calls	3.70	0.65	3.74	0.71	3.72	0.68	SA
17	Method demonstration	3.87	0.99	3.15	1.04	3.99	1.51	A
18	Internet	3.55	0.85	3.38	0.02	3.47	0.94	A
	Grand Cluster value	**3.50**	0.68	3.59	0.65	3.55	0.67	SA

The data result of data analysis shows that the mean ratings of the respondents on the extension teaching methods ranges from 3.55 60. 3.96 for items 15, 4, 16, 5, 13, 9, 10, 1, 2 and 11 indicating strongly agree. Other items had their mean ratings from 2.93 to 3.47 indicating agree. These items are 14, 12, 17, 4, 3, 7, and 18. With a grand cluster mean of 3.55 for all the items it indicates that the respondents strongly agree that these are the extension teaching methods that could be adopted in training rural farmers with respect to these items. The low standard deviations ranging from 0.20 – 1.51 indicates that the respondents have consensus opinion in their responses.

Hypothesis 3

A significant difference do not exist between the mean ratings of the responses of agricultural extension agents and pig farmers regarding the extension teaching method that can be adopted by agricultural extension agents in disseminating information to rural farmers for sustainable pig farming in Enugu State?

Table 6

Summary of t-test analysis of mean rating of pig farmers and agricultural extension agents regarding the extension teaching methods to be adopted in training rural farmers for sustainable pig farming in Enugu State

Variables	N	$\bar{X}_1$	SD	df	t-cal.	t-crit	Decision
Pig farmers	117	3.50	0.56	168	0.82	1.96	NS
Agricultural extension agents	53	3.59	0.65				

The result of the t-test analysis in table 6 shows that the calculated t-value is 0.82 at 168 df and at 0.05 level of significance. Since t-calculated is less than the t-critical value of 1.96, the null hypotheses was not rejected. Therefore, there is no significant difference in the mean responses of pig farmers and agricultural extension agents on the extension teaching methods to be adopted in training rural farmers in feeding and health management of pigs for sustainable pig farming.

Findings

The following findings were made based on the result of the data analysed.

1. Rural farmers highly need training in feeding pigs for sustainable pig farming in Enugu State.
2. A significant difference did not exist between the mean ratings of pig farmers and agricultural extension agents on the training needs of rural farmers in feeding pigs for sustainable pig farming in Enugu State.
3. Rural farmers highly need to be trained in health management of pigs for sustainable pig farming in Enugu State.
4. There was no significant difference in the mean responses of pig farmers and agricultural extension agent son the training needs of rural

farmers in health management of pigs for sustainable pig farming in Enugu State.

5. Pig farmers and agricultural extension agents strongly agreed on the extension teaching methods that could be adopted for training rural farmers for sustainability in pig farming.
6. A significant difference did not exist between the mean ratings of pig farmers and agricultural extension agents on the extension teaching methods that could be adopted in training rural farmers for sustainability in pig production.

Discussion

The result of the study according to research question one showed that the rural farmers highly need training in feeding pig for sustainability. These items had a grand mean of 3.51 and standard deviation of 0.66. The items include identifying suitable feed sources for pigs, selecting suitable and quality cheap material for feed formulation, formulating a balanced diet using cheap feed ingredients available; determining the right measure to use in feeding pigs once a day, providing good drinking water regularly, supplementing their major diet with vegetables, kitchen wastes and man's food among others. The implication of this is that rural farmers in the study area are not knowledgeable in the right feed or method of feeding pigs. This finding is in line with FAO (2017) that stated that when feeding pigs it is important to consider the nutritional requirements of the animal. Hornby (2015) also opined that feeds given to pigs should meet the animals needs for maintenance, growth and reproduction. This was why https://thepigsiste.con>articles>how(2020) gave examples of pig feeds to include rice bran, maize, soya-beans, cassava, broken vegetables and distillers residues in support of FAO (2017) that listed pig feeds as fish meal, blood meal, tallows, mineral, vitamin, salt, limestone and equally fresh fruits as supplement. The authors stated this because they maintained that pigs nutritional requirement for optimal and healthy growth change and are influenced by factors such as age, body weight, genetic potential, housing, environment, and physiological state of the pig, feed ingredients and water. This finding is also in line with Carol & Krider (2008) who noted that changes in feed stuffs should be made as gradually as possible over a period of a week or more and to make sure that pigs have access to adequate water. The authors further added that pig feed should be wetted or pelleted because of its advantages of both palatability and weight gain. Therefore, if the rural farmers are trained on how to feed pigs, it will help to meet the animal's needs for maintenance, growth and reproduction.

The hypothesis tested on the training needs of rural farmers in feeding of pigs showed that there is no significant difference in the mean ratings of rural farmers and agricultural extension agents regarding the training needs of rural farmers, in feeding pigs for sustainable pig farming in Enugu State. The non-significant difference showed that the respondents were not influenced with respect to the response to these items.

Further, the result of the study with respect to research question two indicated that the rural farmers needed training on all the eighteen (18) items identified. These items are disinfect the pig house before the arrival of pigs, maintain adequate sanitation, quarantine new animals, immunize/vaccinate pigs to prevent disease, identify and cull sick pigs, select resistant species for breeding, treat sick pigs with medication, control external parasites by spraying, drenching or dipping, keep sick animals in separate pens for treatment among others. These findings are in line with FAO (2009) that stated the following measures for preventing and controlling diseases and parasites of pigs: quarantining, immunization and vaccination, selection of resistant species for breeding, medications, culling, weaning piglets at the appropriate time, deworming, spraying, dipping and consultation with a veterinarian.

These findings are also in line with Hunter (2007) that opined that some of the curses of animal diseases include external and internal parasites, poor housing conditions, overcrowding, poisoning, allergic disorders, poor nutrition, poor health status of the animals and poor sanitation. Osinem (2008) in line with Hunter (2007) opined that in order to maintain good health, pigs should be treated to prevent anaemia, using

dipping to treat lice, cleaning and disinfecting all hogs facilities and equipment between group, administering approved vaccines and getting the veterinary staff to check the animals as they show signs of a disease. This implies that if the rural farmers are trained to adopt these measures in treating their pigs it will help in sustaining the production of pigs.

The hypothesis tested on the training needs of rural farmers on the health management of pigs showed no significant difference in the mean ratings of the responses of agricultural extension agents and pig farmers regarding the training needs of rural, farmers in health management of pigs for sustainable pig farming in Enugu State. The non-significant difference may be that most pig farmers in the study area have adopted health management skills communicated to them by agricultural extension agents.

Moreso, the study also revealed that the pig farmers and agricultural extension agents strongly agreed on the extension teaching methods that could be used to train rural farmers in feeding and health management of rural farmers for sustainable pig production in Enugu State. The items are farm visit home visit, workshop, seminars, use of posters, radio, television, agricultural shows, use of banners, telephone calls among others. This is in line with Nwosu (2008) that opined that agricultural extension agents disseminate information to rural farmers by various methods such as farm visits, home visits, result demonstrations, radio, agricultural shows, television etc. This implies that of the agricultural extension agents can disseminate information to these rural farmers with any of this methods or a combination of two methods to make teaching more effective. This was why Madukwe (2011) was of the view that an extension agent may use two or more methods to make teaching more effective because the result of all teaching is to bring about desirable changes in human study, the desirable change sought is the rural farmers to adopt the techniques in feeding and health management of pigs for sustainable pig production.

The hypothesis tested on the significant difference between the mean ratings of the responses of agricultural extension agents and pig farmers regarding the extension teaching methods that could be adopted by agricultural extension agents in disseminating information to rural farmers showed no significance difference. This may be that the profession or status of the respondent has no influence to the teaching methods that could be adopted by agricultural extension agents for disseminating information.

Conclusion

Pigs and their products have played very great roles in human development as source of food and raw materials for industries. Today most people in the study area consume pig meat (pork) which is cheaper and serves as white meat than beef. But it is only few farmers that are in pig production despite its values. In order to increase the number of farmers in pig production, it is necessary that rural farmers are given adequate training in feeding and health management of pigs by the agricultural extension agents. This is because when these rural farmers are given the training necessary in feeding and health management of pigs it will bring about desirable change in the ways these farmers feed and manage the health of these pigs. Hence, when there is change in ways of feeding and health management of pigs, it will bring about increased and sustainable pig production which will help in making pig meat (pork) cheaper than other sources of meat.

Recommendations

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

1. Agricultural extension agents should organize workshops and seminars for rural farmers to improve their knowledge about the feeding and health management of pigs.
2. Farm and home visits should be conducted by the agricultural extension workers to the rural farmers to supervise them on feeding and health management of pigs.
3. The identified skills should be used in skill acquisition centres for training the rural farmers and other people who are interested in pig production.

4. Agricultural extension agents should encourage rural farmers to form cooperative societies which will help them source for fund to boost their production.

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