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TECHNICAL KNOW-HOW REQUIRED BY STUDENTS OF COLLEGES OF EDUCATION IN GRASSCUTTER (THRYONOMYS SWINDERIANUS) PRODUCTION FOR INCOME GENERATION IN NASARAWA STATE, NIGERIA

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ABSTRACT
The study identified the technical know-how required by students of Colleges of Education in grasscutter, also known as cane rat (Thryonomys swinderianus) production for income generation in College of Education Akwanga and College of Education Technical, Keana, Nasarawa State, Nigeria. Four specific objectives, four research questions and four null hypotheses, tested at 0.05 level of significance, guided the study. The study adopted the descriptive survey research design. The population of 168 comprised of 127 registered agricultural extension agents and 41 Agricultural Education lecturers from the two Colleges of Education in Nasarawa State. There was no sampling because the population was manageable. The instrument for the collection was a structured questionnaire titled: Technical Know-how in Grasscutter Production for Income Generation Questionnaire (TGPIGQ), developed by the researcher. It was face-validated by five experts and trial-tested on 35 respondents comprising 22 agricultural extension agents and 13 wildlife lecturers in Benue State University, Makurdi. The Cronbach Alpha method was used to determine the internal consistency of the TGPIGQ, which yielded a reliability coefficient of .975. Mean and standard deviation were used to answer the research questions, while the t-test was used to test the null hypotheses. The study revealed the technical know-how required in planning, housing, health management practices, and feeding the grasscutter. There was no significant difference between the mean responses of extension agents and lecturers on planning, health management practices and feeding, but there was a significant difference between their mean responses on housing. It was recommended, among others, that the identified technical know-how be developed into modules to enhance skill acquisition.

Keywords: Technical know-how, Colleges of Education students, grasscutter, production, income generation

Introduction

This study focused on *Thryonomys swinderianus* or giant grasscutter production, an enterprise that requires human capital, which is regarded as more important than physical capital in production today. The giant grasscutter has a thick body measuring 40 to 60 cm, in addition to a 20 to 25 cm tail. Its average weight ranges from 2 to 4 kg in females and 3 to 6 kg in males. Its fur colour may be brown, reddish or grey, depending on the habitat ((Nwosu, 2017). It is a monogastric herbivore that is easy to feed and a good converter of fibre into protein. Aluko, F. A., Salako, A. E., Ngere, L. O., & Awojobi, H. A. (2014). Tanabe, Onodera, Nakatsukasa, Kunimatsu & Nakaya (2020), reported that its vegetarian diet is digested by microbial action in the caecum, they will also, as the name suggests, feed on the crops in cane plantation, making them a significant pest. It produces two litters a year, each of 2 to 6 young (Jori, Mensah & Adjanohoun, 1995). Al-Mustapha *et al*. (2020) noted that the diet of the giant grasscutter in captivity consists of 80% *Pennisetum purpureum* and *Panicum maximum* supplemented with a mixture of maize, wheat and mineral salts. Technical know-how, according to Ugwuoke and Ifeanyieze (2012), is the ability to do something well, measured against a standard, especially an ability acquired through experience or training. According to Obiweluozo, Onwurah, Oraelosi, Uzodinma & Dike (2021), technical know-how is the essential knowledge and skill obtainable in a profession, which professionals in the field must possess and be able to demonstrate at an optimal level of acquisition and functioning.

According to Ugwoke, Onu, Agboeze and Asogwa (2013), experimental and demonstration methods, which are essential in skill development, are not frequently used in an educational system bedevilled by poor teaching and learning facilities, such as that of Nigeria. This is in line with Rasak, Ake, Oye and Ganiyu (2018), who noted that poor, inadequate, un-qualitative and un-availability of facilities and equipment in carrying out agricultural activities and teaching, due to lack of proper planning in policy formulation and implementation had a negative effect on the quality of products of educational institutions, especially Colleges of Education.

According to Age (2015), a farmer first gets to know about an innovation, gathers information about it and then makes a mental application of the new practice to his or her own situation. Agricultural Education, according to Obiora, Ojogbane, Chukwurah and Eze (2021), is a process of imparting knowledge, skills and attitudes in agriculture to learners at any educational level, including Colleges of Education. Students of Colleges of Education, in the view of Ugwuoke and Ifeanyieze (2012), are learners engaged in a three-year education programme designed to equip them with the skills, values, attitudes and related knowledge in the production, processing and marketing of agricultural and related products. Ekele, Odus and Essien (2020) noted that the programme equips students with technical know-how in instruction and in the technical areas of agriculture to enable them to impart the same to learners in schools upon graduation.

According to Obiora, Ojogbane, Chukwurah and Eze (2021), extension workers are the important link between research organisations and farmers. Giant grasscutter farming provides substantial income to farmers. The National Research Council (NRC, 1991) noted that grasscutter farming is profitable because of the animal's social acceptability, meat quality, inexpensive food sources, amenability to captive rearing, good litter size and short generation interval. Grasscutter meat fetches higher prices than the meat of domestic animals. However, grasscutter could be a good source of animal protein and of high biological value, and that a grasscutter can sell for between two thousand five hundred and ten thousand naira (₦2,500 -

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₦10,000) from those that sells them by the road side at the village and local market, depending on size and season. Owen (2012) reported that grasscutter farming offers profitable opportunities for enhancing livelihoods and income generation in rural and urban areas of the country. Dabogrogo (2013) reported that well-managed grasscutter farms can contribute substantially to local economies and generate enough profit for grasscutter farmers, including agricultural graduates.

Nevertheless, Osinem and Nwoji (2010) noted that there were growing concerns among agricultural industrialists that graduates of higher education lacked the competencies or technical know-how needed for employment in agricultural industries.

Statement of the problem

Many Agricultural Education graduates today are without jobs because they search for white-collar jobs that are not readily available to the average Nigerian youth. This keeps them unemployed for long periods, even when they possess the required skills. There is, therefore, a need for these students to engage in giant grasscutter (*Thryonomys swinderianus*) production for income generation, so that they can be self-employed and earn a living with little starting capital upon graduation. The future of the people especially the youth, are exposed to a lot of indicators of poverty as a result of unemployment opportunities in Nasarawa State. Many are jobless and so there is social insecurity in the land, as many would not afford the basic necessity of life. However, the specific technical know-how that students of Colleges of Education require for grasscutter production in Nasarawa State has not been identified. This is the gap the study sought to fill.

Objectives of the study

The main purpose of the study was to identify the technical know-how required by students of Colleges of Education in grasscutter production for income generation in Nasarawa State. Specifically, the study sought to identify the technical know-how required in:

1. planning for grasscutter production enterprise;
2. housing of grasscutter;
3. health management practices of grasscutter; and
4. feeding grasscutter

Research questions

The following research questions guided the study:

1. What technical know-how is required by Colleges of Education students in planning for grasscutter production enterprise?
2. What technical know-how is required by Colleges of Education students in housing of grasscutter?
3. What technical know-how is required by Colleges of Education students in health management practices of grasscutter?
4. What technical know-how is required by Colleges of Education students in feeding of grasscutter?

Research hypotheses

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

1. There is no significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on planning for grasscutter production enterprise.
2. There is no significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on housing of grasscutter.

3. There is no significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on health management practices of grasscutter.
4. There is no significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on feeding and marketing of the processed grasscutter meat and its products.

Methodology

The study adopted the descriptive survey research design. The population of the study was 168 respondents, comprising 41 Agricultural Education lecturers from the two Colleges of Education in Nasarawa State (25 from College of Education Akwanga and 16 from College of Education Technical, Keana) and 127 registered agricultural extension agents across the state. Since the population was manageable, the entire population was studied without sampling. The instrument for data collection was a structured questionnaire titled Technical Know-how in Grasscutter Production for income generation Questionnaire (TGPIGQ), developed by the researchers. The questionnaire items were anchored on a four-point rating scale of Highly Required (HR), Averagely Required (AR), Slightly Required (SR) and Not Required (NR), with corresponding numerical values of 4, 3, 2 and 1 respectively. The instrument was face-validated by five experts and trial-tested on 35 respondents (22 agricultural extension agents and 13 wildlife lecturers) in Benue State University, Makurdi; the Cronbach Alpha method yielded a reliability coefficient of .975. The instrument for data collection were administered to the respondents by the researcher and two research assistants, that is familiar with the study area and were duly trained on what to do. The researcher and the research assistants adopted an on the spot administration and collection of the questionnaire. This was done by visiting the lecturers and extension agents in their respective Colleges of Education each and stations to administer the questionnaire to the respondents. The researcher adopts this method in order to avoid missing copies of the questionnaire. This was ensured that the actual respondents, for whom the questionnaire is meant, are indeed the ones who responded to. Also, it ensures that the researcher/research assistants are available to explain any point that the respondents may not understand very well. The researcher administered and retrieved the questionnaire from the respondents at College of Education Akwanga and College of Education Technical, Keana, with the help of two research assistants. A total of one hundred and sixty-eight (168) copies of the questionnaire was administered and retrieved for data analysis. Data collected were analysed using mean and standard deviation to answer the research questions, while the t-test was used to test the null hypotheses at 0.05 level of significance. The decision mean was 2.50: any item with a mean of 2.50 and above was regarded as required technical know-how for grasscutter production, while any item with a mean below 2.50 was regarded as not required. A null hypothesis was rejected where the p-value was less than 0.05 and was not rejected otherwise.

Results

The results are presented below according to the research questions and hypotheses.

Research Question 1: What technical know-how is required by Colleges of Education students in planning for grasscutter production enterprise?

Table 1: Technical Know-how Required by Colleges of Education Students in Planning Grasscutter Production Enterprise

S/N	Items on Planning	$\bar{x}_1$	SD_1	$\bar{x}_2$	SD_2	$\bar{x}_g$	SD_g	Remarks
1	Set objectives for running grasscutter production	3.34	.53	3.20	.82	3.27	.59	Required
2	Identify sources of funds	3.43	.63	3.14	.76	3.29	.69	Required
3	Identify sources of grasscutter stock, e.g. from the wild	3.34	.73	3.15	.76	3.25	.75	Required
4	Identify sources of inputs such as feed	3.48	.59	3.29	.75	3.38	.67	Required
5	Decide on the system of production, such as family or commercial	3.46	.59	3.20	.71	3.33	.65	Required
6	Decide on a suitable location for the farm	3.41	.63	3.32	.67	3.36	.65	Required
7	Decide the number to start with	3.39	.66	3.39	.68	3.39	.67	Required
8	Purchase Thryonomys swinderianus from a trusted source	3.34	.73	3.42	.68	3.34	.70	Required
9	Draw up an activity schedule to cover grasscutter production stages	3.48	.68	3.31	.67	3.39	.70	Required
10	Decide on the extent of market coverage	3.31	.68	3.18	.75	3.24	.71	Required

N = number of respondents, $\bar{X}_1$=mean of Colleges of Education Lecturers, SD_1 = standard deviation of Colleges of Education lecturers, $\bar{x}_2$ = mean of agricultural extension agents, SD_2 = standard deviation of agricultural extension agents, $\bar{x}_g$ = grand mean of respondents, SD_g = grand standard deviation of respondents

Table 1 reveals that all the ten (10) items on planning had grand mean values ranging from 3.24 to 3.39, which are above the cut-off point of 2.50. This implies that all the ten items are required in grasscutter production enterprise. The table also shows that the grand standard deviations of the items ranged from .59 to .71.

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Research Question 2: What technical know-how is required by Colleges of Education students in housing of grasscutter**?**

Table 2: Technical Know-how Required by Colleges of Education Students in Housing of Grasscutter

S/N	Item Statements on Housing	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Remarks
1	Identify suitable housing design	3.56	.54	3.30	.63	3.43	.58	Required
2	Identify materials for constructing cages	3.46	.55	3.26	.62	3.36	.58	Required
3	Construct grasscutter housing using materials such as mud, wire mesh and wood	3.58	.54	3.33	.67	3.45	.60	Required
4	Determine the dimensions of the grasscutter house	3.39	.62	3.39	.73	3.39	.67	Required
5	Locate the grasscutter house and fence it	3.34	.61	3.21	.73	3.27	.67	Required
6	Construct cages of proper dimensions	3.41	.66	3.26	.67	3.33	.66	Required
7	Provide a round hutch for the female and male grasscutter	3.34	.65	3.24	.66	3.29	.65	Required
8	Identify relevant records to keep for grasscutter production enterprise	3.29	.67	3.30	.72	3.29	.69	Required
9	Protect the grasscutter from predators	3.26	.59	3.33	.73	3.29	.66	Required

N = number of respondents, $\bar{X}_1$=mean of Colleges of Education Lecturers, SD_1 = standard deviation of Colleges of Education lecturers, $\bar{x}_2$ = mean of agricultural extension agents, SD_2 = standard deviation of agricultural extension agents, $\bar{x}_g$ = grand mean of respondents, SD_g = grand standard deviation of respondents.

Table 2 reveals that all the nine (9) items on housing had grand mean values ranging from 3.27 to 3.45, which are above the cut-off point of 2.50. This implies that all the nine items are required in grasscutter production. The grand standard deviations of the items ranged from .58 to .69.

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Research Question 3: What technical know-how is required by Colleges of Education students in health management practices of grasscutter?

Table 3: Technical Know-how Required by Colleges of Education Students in Health Management Practices of Grasscutter

S/N	Technical Know-how in Health Management	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Remarks
1	Remove unused feed regularly	3.21	.68	3.39	.64	3.30	.66	Required
2	Remove waste regularly to avoid contamination	3.53	.55	3.33	.71	3.43	.63	Required
3	Wash the feeding and drinking troughs twice a week	3.36	.38	3.28	.70	3.32	.54	Required
4	Inspect the grasscutter daily to detect early signs of sickness or disease	3.53	.50	3.27	.72	3.40	.61	Required
5	Cull those that bully the young at the second kindling	3.29	.60	3.34	.72	3.32	.66	Required
6	Take basic hygiene measures to reduce potential losses to diseases	3.39	.58	3.46	.65	3.42	.61	Required
7	Sterilise the grasscutter pen	3.46	.67	3.25	.63	3.36	.65	Required
8	Cull sick ones from the colony	3.17	.62	3.33	.67	3.25	.64	Required
9	Keep feed away from rodents by making the feed store rodent-proof	3.12	.71	3.24	.67	3.18	.69	Required
10	Give mineral supplements every two weeks	3.14	.69	3.27	.69	3.20	.69	Required
11	Record any deficiency observed in the pen	3.24	.53	3.29	.65	3.26	.59	Required

N = number of respondents, $\bar{X}_1$ = mean of Colleges of Education Lecturers, SD_1 = standard deviation of Colleges of Education lecturers, $\bar{x}_2$ = mean of agricultural extension agents, SD_2 = standard deviation of agricultural extension agents, $\bar{x}_g$ = grand mean of respondents, SD_g = grand standard deviation of respondents.

Results in Table 3 reveal that all the 11 items on health management practices had grand mean values ranging from 3.18 to 3.43, which are above the cut-off point of 2.50. This implies that all the 11 items are required by Colleges of Education students in grasscutter production enterprise. The table also shows that the grand standard deviations of the items ranged from .54 to .69, indicating that the respondents were close to the mean and to one another in their responses on the technical know-how required by Colleges of Education students in health management practices for grasscutter production in Nasarawa State.

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Research Question 4: What technical know-how is required by Colleges of Education students in feeding of the grasscutter?

Table 4: Technical Know-how Required by Colleges of Education Students in Feeding Grasscutter

S/N	Item Statements on Feeding	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_g$	SD_g	Remarks
1	Identify local feedstuffs used for feeding grasscutter, such as Pennisetum purpureum and Panicum maximum stems and leaves	3.53	.55	3.34	.64	3.43	.59	Required
2	Collect and wash green forage before feeding it twice daily (morning and evening)	3.26	.63	3.52	.56	3.39	.59	Required
3	Provide feeds/supplements, snail shell, and calcined bones.	3.48	.59	3.40	.64	3.44	.61	Required
4	Provide adequate feed	3.29	.55	3.41	.62	3.35	.58	Required
5	Provide feeding in the hutch	3.56	.50	3.36	.65	3.46	.57	Required
6	Provide drinking trough or bowl in the hutch	3.41	.49	3.33	.64	3.37	.56	Required
7	Provide enough clean drinking water in a bowl	3.53	.50	3.21	.68	3.37	.59	Required

N = number of respondents, $\bar{X}_1$=mean of Colleges of Education Lecturers, SD_1 = standard deviation of Colleges of Education lecturers, $\bar{x}_2$ = mean of agricultural extension agents, SD_2 = standard deviation of agricultural extension agents, $\bar{x}_g$ = grand mean of respondents, SD_g = grand standard deviation of respondents.

Table 4 reveals that all the seven (7) items on feeding and marketing of the processed grasscutter meat had grand mean values ranging from 3.35 to 3.46, which are above the cut-off point of 2.50. The grand standard deviations of the items ranged from .56 to .61.

Hypothesis 1

To test null hypothesis 1, the mean ratings of Agricultural Education lecturers and agricultural extension agents were analysed using t-test and presented in Table 5.

Table 5: t-test of Responses of Agricultural Education Lecturers and Agricultural Extension Agents on Technical Know-how Required by Colleges of Education Students in Planning for Grasscutter Production Enterprise

Status	N	Mean	Std. Deviation	Df	t-cal	Sig.	Remarks
Colleges of Education Lecturers	41	3.3415	.52961				
				166	1.00	.318	NS
Agricultural Extension Agents	127	3.2047	.81978				

*N = number of respondents, Std = standard deviation, df = degrees of freedom, t-cal = **t-calculated**, Sig. = p-value; p > 0.05, NS = not significant.*

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Table 5 shows a p-value of .380, which is greater than the alpha value of .05. Therefore, the null hypothesis of no significant difference between the mean responses of the two groups of respondents on planning was not rejected.

Hypothesis 2: To test null hypothesis 2, the mean ratings of Agricultural Education lecturers and agricultural extension agents were analysed using the t-test and presented in Table 6.

Table 6: t-test of Responses of Agricultural Education Lecturers and Agricultural Extension Agents on Technical Know-how Required by Colleges of Education Students in Housing of Grasscutter

Status	N	Mean	Std. Deviation	df	t-cal	Sig.	Remarks
College of Education Lecturers	41	3.5610	.54994				
				166	1.85	.066	NS
Agricultural Extension Agents	127	3.3071	.70198				

*N = number of respondents, Std = standard deviation, df = degrees of freedom, t-cal = **t-calculated**, Sig. = p-value; p < 0.05, S = significant.*

Table 6 shows a p-value of .066, which is greater than the alpha value of .05. Therefore, the null hypothesis of no significant difference between the mean responses of the two groups of respondents on housing was rejected.

Hypothesis 3: There is no significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on the technical know-how required by Colleges of Education students in health management practices of grasscutter production enterprise.

To test hypothesis 3, the mean ratings of Agricultural Education lecturers and agricultural extension agents were analysed using the t-test and presented in Table 7.

Table 7: t-test of Responses of Agricultural Education Lecturers and Agricultural Extension Agents on Technical Know-how Required by Colleges of Education Students in Health Management Practices of Grasscutter Production Enterprise

Status	N	Mean	Std. Deviation	Df	t-cal	Sig.	Remarks
College of Education Lecturers	41	3.2195	.68964				
				166	1.48	.107	NS
Agricultural Extension Agents	127	3.3937	.64436				

*N = number of respondents, Std = standard deviation, df = degrees of freedom, t-cal = **t-calculated**, Sig. = p-value; p > 0.05, NS = not significant.*

Table 7 shows a p-value of .107, which is greater than the alpha value of .05. Therefore, the null hypothesis of no significant difference between the mean responses of the two groups of respondents on the technical know-how required by Colleges of Education students in health management practices of grasscutter enterprise was not rejected. This implies that the respondents did not differ in their opinions on the technical know-how required by Colleges of Education students in health management practices of grasscutter enterprise.

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Hypothesis 4

There is no significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on the technical know-how required by Colleges of Education students in feeding and marketing of the processed grasscutter meat and its products.

To test hypothesis 4, the mean ratings of Agricultural Education lecturers and agricultural extension agents were analysed using the t-test and presented in Table 8.

Table 8: t-test of Responses of Agricultural Education Lecturers and Agricultural Extension Agents on Technical Know-how Required by Colleges of Education Students in Feeding and Marketing of the Processed Grasscutter Meat and its Products

Status	N	Mean	Std. Deviation	Df	t-cal	Sig.	Remarks
College of Education Lecturers	41	3.5366	.55216				
				166	1.692	.092	NS
Agricultural Extension Agents	127	3.3465	.64707				

*N = number of respondents, Std = standard deviation, df = degrees of freedom, t-cal = **t**-calculated, Sig. = p-value; p > 0.05, NS = not significant.*

Table 8 shows a p-value of .092, which is greater than the alpha value of .05. This indicates that there was no statistically significant difference between the mean responses of Agricultural Education lecturers and agricultural extension agents on the technical know-how required by Colleges of Education students in feeding the grasscutter. Therefore, the null hypothesis was not rejected. This implies that the respondents did not differ in their opinions on the technical know-how required in this area.

Discussion of findings

The findings of the study revealed that ten (10) technical know-how items on planning were required by students of Colleges of Education for the production of grasscutter (*Thryonomys swinderianus*) for income generation in Nasarawa State. This implies that grasscutter production cannot be effective without proper planning. The findings also showed nine (9) technical know-how items on housing, the study is in collaboration with Ogba and Ndem (2016) who identified occupational skills required by secondary school graduate for breeding of Giant African Land Snails (GALS) to include; identify the type of pen environments (cage, house, tank), Skills of successful placing base layer of coarse gravel of about 20mm. depth on the floor of the house, Skill of putting humus soil on top of the floor, Skill of keeping the soil moist not wet for GALS and so on. and eleven (11) items on health management practices of grasscutter (*Thryonomys swinderianus*) production were required, which means that these areas play a key role in grasscutter production. The study also revealed that seven (7) technical know-how items were required by students of Colleges of Education in feeding grasscutter, as the study relates to that of

Ogba and Ndem (2016) who found that 5 skills are needed by secondary school graduates for breeding and rearing of giant African Land Snail (GALS). Also in the submission of Ugosor, Ochu and Agbulu, (2015) who carried out a study on identification of breeding skills required by farmers in Rabbit production for income generation, by identifying breeding skills as the studies are hinged on the same subject matter which is on identification of skills required by farmers in rabbit production and technical know-how in grasscutter production for income generation.

In summary, the study identified the technical know-how required by students of Colleges of Education in grasscutter (*Thryonomys swinderianus*) production for income generation upon graduation in Akwanga and Keana LGAs of Nasarawa State, Nigeria.

Specifically, it identified the technical know-how required in planning, housing, health management practices, and feeding grasscutter. Four research questions and four null hypotheses guided the study.

Conclusion

Grasscutter production is an area of agriculture that has been neglected by many people, even though the animal is economical and easy to raise. The study concluded that students of Colleges of Education require technical know-how in planning for grasscutter production, housing, health management practices, and feeding and marketing of grasscutter meat and its products for income generation upon graduation. Agricultural Education lecturers and agricultural extension agents in Nasarawa State did not differ in their opinions on the technical know-how required in planning, health management practices, and feeding and marketing, but they differed on housing. If students acquire this knowledge during their programme in the above areas, grasscutter production can become a dependable source of income for them after graduation.

Recommendations

1. Government at all levels (Federal, State and Local) should formulate policies and execute projects and programmes that can encourage farmers and graduates to adopt new and improved skills required by College graduates in the production of Grasscutter for income generation. This would facilitate and uplift the socioeconomic standard of graduates, youths as a whole and ensure sustainable Grasscutter production in the study area.
2. There should be community awareness of the process and benefits of domesticating wild animals of this nature for income generation and sustainability, and grasscutter production should be included in the curriculum for review and practice.
3. The identified technical know-how should be developed into training modules for students of Colleges of Education to enhance their skill acquisition in grasscutter production.

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