

## Livestock production as an integral of home garden in Nigeria

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### Abstract

*Globally, hunger and poverty are major challenges with number of household malnourished increasing daily. Conscious integration of the home gardens strategy into peri-urban and urban development can help to achieve food security. In this regard, a total of 412 questionnaires were administered to home garden owners around the National Horticultural Research Institute (NIHORT) in Ibadan (Southwest Nigeria), Mbato (Southeast Nigeria), Bagauda (Northwest Nigeria) and Dadinkowa (Northeast Nigeria). In all, 366 (88.8%) questionnaires were found suitable for analysis. The data collected was analyzed using descriptive statistical analytical tools. Majority of people involved in the practice of home gardening were male (78%) and young <50 years (53%), implying that they were capable of handling more tedious activities than the female and the elderly respectively. Land and house ownership were found to be the most important factor in home gardening. Goat (77.1%), sheep (58.7%) and local fowl (49.7%) were the dominant livestock in the areas investigated. Most of the livestock were fed with household waste and crop residues which ought to have caused great problem through microbial build up, while the animal wastes were usually incorporated into the soil to serve as soil amendments. Some of the livestock owners were also mindful of zoonosis.*

**Keywords:** animal husbandry, household, waste utilization, urban agriculture, food security

### Introduction

Home gardening refers to the cultivation of a small portion of land which may be around the household or within walking distance from the family home (Dilrukshi *et al.*, 2013). It is an essential part of life as it is generally practiced by all tribes in Nigeria and all African countries. Gardening is considered by many people to be a recreational activity; it involves participation of family members living together. Homegarden is either practiced as a mixed cropping system or mixed farming system. In a mixed farming system, the livestock serves as a supplementary source of protein and income for families and also a strategy of livelihood diversification (Das and Das, 2005; Ffolliot, 2005; Kebebew *et al.*, 2011). It offers an effective way to recycle waste, conserve bio-cultural activity, product diversification, non-market value of products and service (Kumar and Nair, 2004). The plant and

animal components of home garden intermingle. The contribution of animal-integrated homegarden practices is well appreciated throughout the world (Kebebew *et al.*, 2011). The primary emphasis of homegardens is food production for household consumption (Ndaeyo, 2007; Lulandala, 2010) compared with subsistence agriculture, home garden animals provide added benefits by generating income from the marketing of diverse products which will sustain the household food supply throughout the year (Fernandes *et al.*, 1984).

Globally, hunger and poverty are major challenges of the present day. As the world population expands, food problem has become increasingly severe especially animal protein, with the number of those malnourished increasing daily. The contribution of livestock integrated into homegarden practices is well appreciated

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throughout the world (Kebebew *et al.*, 2011). Africa's rate of population growth does not commensurate with the rate of food production (Bishaw and Abdelkadir, 2003). Thus, Olajide-Taiwo *et al.* (2010) reported that many low income earners in urban center of many African countries are food insecure, despite the fact that there are policy goals addressing food insecurity. This can be reversed through conscious integration of the home gardens strategy into peri-urban and urban development (Krishnal *et al.*, 2012). In Nigeria, livestock production technologies have to be adopted in home gardens to achieve 60% improvement in livelihood of poor citizenries based on projection by 2020 (Olajide Taiwo *et al.*, 2010). Hence, there is need to fully adopt livestock production ideals in all home garden to boost livelihood of low income earner households in Nigeria (Olajide-Taiwo *et al.*, 2010). Emphasis is on home gardens as a good source of food production for household. Therefore, livestock production in home garden will make fresh livestock products such as milk, eggs, meat as well as fish available to the household. It has been established that keeping animals provide employment, food and source of income to rural farmers (Njuki, 2001). Livestock products from home garden in Nigeria include the animals themselves (sheep, goat, pigs, rabbit, poultry etc.) and the products that are derived from them such as meat, milk, cheese, eggs and manure among others. These products are either consumed by members of household or sold in a marketplace to generate additional income. The objective of this study was to determine the livestock production as an integral part of home garden in Nigeria.

### **Materials and methods**

Respondents were sourced from 10Km radius around NIHORT neighborhood at Ibadan headquarters. Ibadan is in Oyo State,

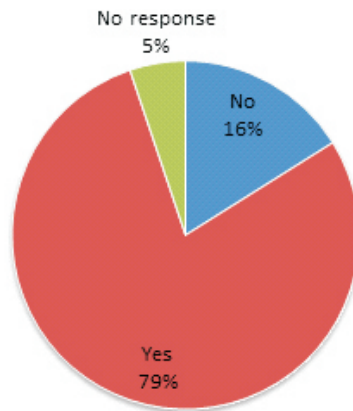
Nigeria., The NIHORT station is covering 350ha, 3°54'E, 7°30'N, 213m above sea level and sub stations; Sudan savanna zone Dadnkowa (Dadinkowa in Gombe state. 126ha), Bagauda (Bagauda in the Sahel savannah zone of Kano, Kano state covering 310ha) and Mbato (around humid forest zone of Okigwe in Imo State Nigeria, covering 810ha, 5.483°N, 7.55°). The garden owners were contacted through the Community Development Council (CDC) and Community Development Area (CDA) leaders in headquarter, contact farmers at Mbato station in Imo state. The location of the Institute headquarter is in the urban centre while the substations falls within the peri-urban areas. Respondents were invited to a central location in their respective communities. Data were collected by means of structured interview schedule to determine the level of animal husbandry in home garden in the chosen locality. A total of 412 questionnaires were administered to home garden owners. While 366 (88.8%) of the instrument were found suitable for analysis. Data were analyzed using descriptive statistics.

### **Result and discussion**

National Horticultural Research Institute (NIHORT) Nigeria is the institute saddled with horticultural mandate in Nigeria, developing innovations in horticultural sector of the country. Awareness is an essential ingredient needed in the process of adoption of innovation from any institution, 79% of the respondents were aware of NIHORT as a Research Institute, while 16% had not heard of NIHORT (Figure 1). This high level of awareness could be attributed to the nearness of the community to the Institute and the community development efforts of NIHORT around the institute's neighborhood. It may also be an indication that technologies developed in the NIHORT are harnessed by the immediate communities of the institute. Agricultural

research findings are of great significance when target audience is well informed of

new innovations (Fagboola *et al.*, 2011) which eventually lead to adoption.

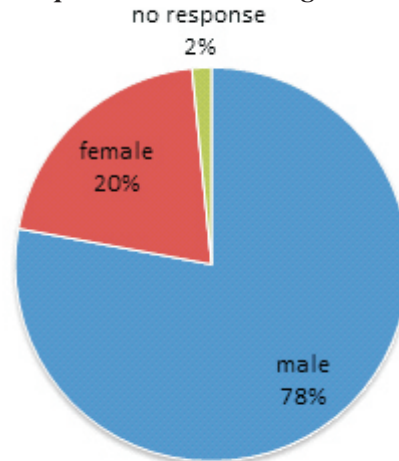


**Figure 1. Awareness of NIHORT among respondents**

The practice of home garden in the study areas was male dominated (78%) as shown in Figure 2. Oyelami *et al.* (2017) reported that livestock handling is mostly done by male in Southwestern Nigeria probably because of its demand for physical strength. This was contrary to the report of Udofia (2010) that showed women dominance in the management of home garden which animal husbandry is a part in Akwa Ibom State in South-south/eastern Nigeria. The difference in gender involvement is location specific which might be due to norms and values of different part of the country. The northern gender practice comes in between the southwest and the south-south-south/eastern pattern of gender involvement in agriculture (Adekanye, 1984). However, this study covered different part of the country together. Hence, male participate more in handling livestock raised in homestead. The results (Table 1) also indicated that a large

percentage of the respondents were still in active years of life and were between ages 30 – 39 (26.2%). This implies that they were capable of handling tedious home garden activities (Udofia, 2010). However, respondents between the ages 40 – 49 (17.2%) were the lowest in number. Majority of the farmers had formal education at various levels; 15.3% had university education; 21.3% had post-secondary education but not university; 40.4% were educated up to secondary school while 58% attained primary education. In Nigeria, it could be deduced that the educated ones would be more innovative than the uneducated ones due to their ability to reach information quickly, acquire agricultural developmental skills to build up their enterprise through risk bearing for income generation (Adeleye *et al.*, 2016; Institute for Agricultural Research, 2001). The level of education will assist in adoption of new farming and processing techniques (Adams, 2002).

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**Figure 2. Sex of respondents**

A large percentage of the respondents (44.5%) had their primary occupation as farming possibly due to the location of the substations in the peri-urban area, while a number of them (26.2%) were civil servants. This group of people utilized their time after office hour to tender and maintain their garden as the percentage of traders (17.8%) were lower. This might be because of the time required by their trade while other occupation makes up to 9.3%. The highest percentage of garden owners that raised livestock was found in the northern part of the country. This might be due to the environmental condition and preference for livestock rearing by the northerner.

Availability of cultivable land top the list of factors considered by gardeners before establishment of their home garden (Mitchell and Hanstad, 2004). Other factors considered include availability of water and other input such as capital, stocks, technical know-how etc.) to be considered.

Majority of the garden owners lived in a bungalow (59%). About 81% of the garden owners owned their houses (Table 3) and so were able to practice gardening in their

homes. Therefore, it can be said that landlord restriction affects the practice of gardening by peri-urban or urban dwellers. Greater proportion of the respondents (67.5) fenced their houses which enabled them to restrict the movement of their animals within the confinement of their vegetable garden. Olajide\_Taiwo *et al.* (2010) reported that livestock and crop components are usually separated by barbed-wire fencing in some home gardens to protect the growing plants. This is frequently the strategy when mixed farming is practiced in the home garden. Fencing of animal section helps to prevent the exposure of animals to theft and could also prevent animals from free range.

The ratio to the house to garden varied from 1:2 – 1:5 with 1:2 had a larger percentage of 35.2 (Table 2). This was followed by 22.1% of the farmers whose house to garden ration was 1:3. However, only 4.6% was of other ratio. This could be an indicator that house owners appreciate home garden. Majority (67.5 %) of the garden owners fenced their houses which will help secure the garden. Majority (37.4 and 35.2%) of the respondents' house plot size lied between 1 – 2 plots.

**Table 1: Personal characteristics of home garden owners**

	Personal characteristics	Frequency	Percent
Age	<30	35	9.6
	30-39	96	26.2
	40-49	63	17.2
	50-59	84	23.0
	>59	71	19.4
	Missing	17	4.6
	Total	366	100.0
Tribe	Igbo	108	29.5
	Hausa	141	35.8
	Yoruba	68	18.6
	others	48	13.1
	Missing	1	3
	Total	366	100
Education	none	20	5.5
	primary	58	15.8
	secondary	148	40.4
	Post-secondary but not university	78	21.3
	university /post graduate	56	15.3
	Missing	6	1.6
	Total	360	100
Occupation	civil servant	96	26.2
	trading	65	17.8
	farming	163	44.5
	Others	34	9.3
	Missing	8	2.2
	Total	366	100

*Source:* Field Survey 2017, N=366

**Table 2: Housing attributes of home garden owner**

Housing	Housing attributes	Frequency	Percent
House Type	Bungalow	216	59.0
	storey building	60	16.4
	Hut	49	13.4
	Others	31	8.5
	Missing	10	2.7
	Total	366	100.0
Ownership of house	Rented	39	10.7
	Owned	297	81.1
	Missing	30	8.2
	Total	366	100.0
Size of house plot	0.5plot	47	12.8
	1plot	137	37.4
	2plot	129	35.2
	others	50	13.7
	Missing	3	0.8
	Total	366	100.0
Ratio of house to garden	1:2	129	35.2
	1:3	81	22.1
	1:4	58	15.8
	1:5	70	19.1
	others	17	4.6
	Missing	11	3.0
	Total	366	100.0
Is the house fenced	no	103	28.1
	yes	247	67.5
	Missing	16	4.4
	Total	366	100.0

*Source:* Field Survey, 2017, N= 366

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In the present study, the goats were reared by larger population of respondents (Table 3). About 77.1% and 68.7% of respondents raised goats and sheep their home garden in the urban and peri-urban respectively. Goat is the most commonly raised animal in homes in Nigeria, Oyelami *et al.* (2017) reported that 94.9% of rural dwellers in southern Nigeria were involved in goat rearing. Negligible fraction of respondents that raised livestock in their homestead practiced extensive management system which means that they did not provide basic needs (feed, shelter and medication) for the animals. This is contrary to the findings of Adeshinwa and Okunlola (2000) who reported extensive system as the most common system of production in South Western Nigeria. The contrary opinion over time may be due to level of insecurity in the present time, education of garden owners, civilization in the study area and fear of loss of animals. Intensive system is characterized by high productivity as it reduces losses due to accidents, diseases and theft. Local fowl/indigenous chicken (49.7%) was mostly raised among respondent that raised livestock compared with 30.7 and 14.2% that raised broiler and layer in their garden. In Nigeria, the Federal Department of Livestock and Pest Control Services Resources (1992) reported that 83%, 5% and 12% of the 82million of chicken are raised from traditional village, traditional urban and commercial farms respectively in Nigeria. Recently reported an estimated 180 million domestic (exotic and indigenous) chickens were being raised in Nigeria by Sahel, 2015. Another recent survey intimate Nigerians about how highly promising indigenous chicken are in home garden because of adaptability to the environment and high disease resistance ability (Bassey *et al.*, 2016; Oluyemi and Robert, 1988). Studies from Indonesia and India where 53% and 70% of their chicken production comes from local chicken

population, the local chicken supplies about 18-20% of India annual egg production of about 30,000 million (Padhi (as cited in Branckaert *et al.*, 2000). Duck (23.5%) and turkey (18.4%) production are also of interest to some home garden keeper while quail and pig are least raised among home gardener captured in this study. Micro livestock like rabbit, grass cutter, snail and bees have not gained much ground in home garden. However, the few that raised them provides basic management necessity for them. Few (5.0%) of the respondents provide intensive, 6% provide semi-intensive while 2.2% provide extensive systems respectively for their animals.

The system of agricultural production in the area was predominantly a mixture of crop livestock system with respondents cultivating cereal crops as well as keeping animals side by side. This is a system that has been well reported by several authors (Hassan 2003; Sanni *et al.*, 2004). Analysis of the sheep management system in the area indicated that the respondents kept their sheep under semi-intensive system of management. The observations of Odeyinka *et al.* (2009) in Ekiti state, Nigeria, concerning the system of management in Ekiti in relatively small sizes of flocks as seen in the present study can be explained by the management system practiced in the study areas which is predominantly extensive or semi intensive in nature (Shittu *et al.*, 2008).

About 52.7% of respondent have livestock in their home garden and 40.4% procure animal from open market (Table 4). House hold waste and non-economic yield from crops (crop residues) which ought to have cause great problem through microbial build up are fed to livestock in home garden and are converted to economic yield in the garden like meat, fish, egg and milk. This is in line with the report of Adegoke and Abioye (2016) that the drive to solve the problem of competition for food between

**Table 3: Type of livestock management systems provided by garden owners in Nigeria**

	Intensive	Semi-intensive	Extensive	Not applicable
<b>Ruminant</b>				
Cattle	22(12.3%)	22 (12.3%)	6 (3.4%)	129(72.1%)
Sheep	49(27.4%)	49(27.4%)	7(3.9%)	74(41.3%)
Goat	83(46.4%)	48(26.8%)	7(3.9%)	41(22.9%)
<b>Monogastric</b>				
Local fowl	33(18.4%)	37(20.7%)	19(10.6%)	90(50.3%)
Broiler	45(25.1%)	8(4.5%)	2(1.1%)	124(69.3%)
Layer	19(10.6%)	5(2.8%)	1(0.6%)	154(86.0%)
Duck	22(12.3%)	20(11.2%)	3(1.7%)	134(74.9%)
Turkey	23(12.8%)	10(5.6%)	4(2.2%)	142(79.3%)
Guinea fowl	10(5.6%)	8(4.5%)	4(2.2%)	157(87.7%)
Quail	3(1.7%)	0(0.0%)	0(0.0%)	176(98.3%)
Pig	1(.6%)	0(0.0%)	2(1.1%)	176(98.3%)
<b>Micro livestock</b>				
Rabbit	8(5.0%)	1(.6%)	4(2.2%)	165(92.2%)
Grass cutter	4(2.2%)	0(0.0%)	0(0.0%)	175(97.8%)
Snail	6(3.4%)	1(.6%)	0(0.0%)	172(96.1%)
Bee	2(1.1%)	0(0.0%)	2(1.1%)	175(97.8%)

Source: Field Survey 2017, N=179

**Table 4: Livestock management in home garden**

Attributes	Frequency	percentage
<b>Livestock production</b>		
No	147	40.2
Yes	193	52.7
No response	26	7.2
<b>Source of livestock in the garden</b>		
Government	30	8.2
Research institute	31	8.5
My garden	71	19.4
Open market	148	40.4
Friends	18	4.9
Relative	4	1.1
Others	7	1.9
No response	57	15.6
<b>Source of animal feed</b>		
Household waste	120	32.8
Crop residue	104	28.4
Agro industrial by-product	62	16.9
Government	2	0.5
Free range	6	1.6
Other	8	2.2
No response	64	17.5
<b>Animal waste disposal</b>		
Incorporation of waste into the soil	269	73.5
Waste collector	15	4.1
Dumping at the refuse dump	14	3.8
Others	7	1.9
No response	61	16.6
<b>Awareness of disease that can be transfer from animal to man and vice versa</b>		
No	105	28.7
Yes	205	56.0
No response	56	15.3

Source: Field survey 2017, N=366

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human and livestock made livestock rearing to shift attention from conventional feedstuff to crop residue. Animal products and by-products from the home garden would improve the plain of nutrition of the household and as well serve as liquid cash. Oyelami *et al.* (2017) reported that livestock production in mixed farming represent the major means by which large portion of vegetation can be converted to economic products. Most (73.5%) respondents incorporate animal waste into the soil. Large proportions (56%) of the respondents were aware that diseases can be transferred from animal to human and vice versa, this condition is known as zoonosis.

### **Conclusion**

The study showed that livestock is an integral part of home garden in Nigeria as it helps to convert household waste and crop residue into useful animal protein for human consumption. Fencing is a major component of animal husbandry around homestead. Garden owners have access to fresh and timely food such as fruit, vegetable, food crops, meat, milk as well as their products. Encouraging home garden will help to achieve food and nutrition security as well as sufficiency among peri-urban and urban dwellers.

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***Received: 14<sup>th</sup> August, 2018***

***Accepted: 20<sup>th</sup> February, 2019***