Since 2001 ajfand
AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT
SCHOLARLY, PEER REVIEWED
Volume 25 No. 2
February 2025
PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST
ISSN 1684 5374

Afr. J. Food Agric. Nutr. Dev. 2024; 25(2): 25769-25784 https://doi.org/10.18697/ajfand.139.23310

Date	Submitted	Accepted	Published
	17th March 2023	13th December 2024	4th March 2025

THE CONTRIBUTION OF PERI-URBAN LIVESTOCK PRODUCTION ON THE FOOD SECURITY OF FARMERS IN BOTLENG, DELMAS, SOUTH AFRICA

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Volume 25 No. 2
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ISSN 1684 5374

ABSTRACT

This study explored the food security status of peri-urban livestock farmers in the township of Botleng, Delmas, South Africa, and sought to determine whether livestock production has contributed to the food security of farming households in the area. The specific objectives were to determine: (i) the demographic and socio-economic characteristics of farmers in the township of Botleng, Delmas, South Africa, (ii) the food security status of farmers in the area, (iii) the contribution of peri-urban livestock farming to food accessibility of farmers in the area, and (iv) other contributions acquired through livestock production in the study area outside of those which affect food security. Primary data were collected from 108 farmers who were randomly selected and were subsequently interviewed through the administration of a questionnaire, which contained the standard Household Food Insecurity Access Scale (HFIAS). Demographic and socio-economic information was collected to better understand the dynamics of the livestock farmers in the area. The HFIAS is a standardized questionnaire, used to acquire household food security information and give an idea of the food security status of a household. A descriptive analysis was performed, and the results showed that the area only had black farmers, the majority of which were elderly males. It was further found that 86.1% of the households were food secure and that 99.1% of the households showed that livestock production contributed financially to the household. Furthermore, of those that indicated that they received income from livestock sales, 99.07% of them indicated that the money they received was used to buy food, amongst other things. This showed that livestock production contributed to food security in the households of the farmers through increasing food access. It was recommended that livestock production be encouraged in more households especially among youth and women and that capacity building of farmers is essential, especially in enhancing their earning potentials in livestock farming.

Key words: Food security, Livestock farmers, Food security status, Peri-urban South Africa

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INTRODUCTION

The global financial crisis and ensuing increase in fuel and food prices have led to an increase in struggling modern society and urban agriculture has been uniquely placed to assist regarding these challenges. Therefore, this has led to different research being conducted on food security and its dynamics. Interest has particularly risen in the African continent as it has one of the highest numbers of food insecure households along with others such as Asia, Latin America and The Caribbean. With the occurrence of COVID-19 pandemic, in the recent years of 2020 to 2021, this has made an already dire situation even worse on a global scale [1]. It is evident that more research has to be conducted on food security as modern society is in need of possible solutions to address food insecurity problems. In sub-Saharan Africa, many cities have seen an influx of people with 11.3% increase in 2010 and an expected urban population increase of 20.2% by 2050 [2]. Several studies have reported problems related to the coming together of two elements: cities growing at a fast pace and food and nutrition insecurity resulting from increased urbanization [3]. Other studies have found that poverty is on the rise in the urban areas of African cities, with food and nutrition insecurity being indicators of urban poverty [4]. It was found that people experiencing severe levels of food insecurity, where a person is without food for a day or more, comprised 9.2% of the world population or slightly more than 700 million people in 2018 [5]. In Africa, 27.4% of the population was said to be severely food insecure, almost four times higher than other regions [6]. Food insecurity is said to be growing, particularly in sub-Saharan Africa. In the years 2014-2016, food insecurity increased by approximately 3% [6]. In southern Africa, the prevalence of undernourishment rose from 6.5% in 2005 to 8.0% in 2017 [5].

It has been stated that households and/or populations involved in agricultural activities such as livestock production, should have reduced levels of vulnerability to hunger in urban and rural areas that are food insecure [7], with livestock production believed to assist in this. Animal production systems are separated into four parts: landless systems, integrated farming, rangeland and intensive production, with each system contributing to food security [8]. These systems have been observed in different areas, from the rural agricultural systems of Mongolia and Tibetan China, the mixed crop and livestock systems which encompass billions across most poor developing countries, the dairy herders that do not have land, milkers in India that make effort to ensure their neighbors have regular access to these high quality protein sources in their diets, to the intensive and sometimes commercialized production systems that provide low value byproducts to impoverished urban residents especially in China. Each system contributes to the food security of the vulnerable poor [9].

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It has been stated that livestock has received little attention from research and development initiatives from local governments and therefore comprehensive information on livestock as pertaining to food security has been limited [10]. There is a lack of information as to how specifically livestock farming contributes to food security in peri-urban settings. Therefore, it is necessary to identify appropriate strategies to promote urban livestock production to other vulnerable groups who have not yet participated in this activity. As a first step, participatory analysis of vulnerable groups is required to identify the potential contributions that urban livestock production can make to their livelihoods. This research aimed at addressing this knowledge gap, on how effective livestock farming is in contributing to food security of those who practice it in urban settings.

MATERIALS AND METHODS

The research design chosen was a quantitative survey method as the study needed to answer the research questions through responses from farmers who had households from the area. A database of farmers that were involved in livestock production in the area was provided by the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) and it was determined that the area had 150 livestock farmers. The study adopted a simple random sampling method whereby the method used a standardized table to determine a sample size of 108 participants out of the 150 [11]. This is shown in Table 1. A questionnaire was also formulated and used as a tool to collect primary data in this study.

The questionnaire was divided into 3 sections. Section 1 was the demographic questions that assisted in knowing more personal information about the farmers in the area, the second section was the standardized household food insecurity access scale (HFIAS); FANTA [12] which was used and administered to the respondents to determine food insecurity status of the households. The HFIAS questionnaire comprises a series of nine questions about the past four weeks behaviors and attitudes that relate to the food security of the household, which are each followed by “severity of occurrence” questions that ask how frequent the particular occurrence took place [12]. The HFIAS is then scored, using the severity of occurrence questions, whereby the respondent is asked if a particular occurrence happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks. The HFIAS is scored from the answers given for the severity of occurrence questions as follows:

- Rarely is given a score of 1
- Sometimes is given a score of 2
- Often is given a score of 3

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This should give a total score from 0-27; the lower the total number the better the household food security and access situation and the higher the number the worse it is. This means that those scoring lower had a better food security and access situation in their households and the higher score means that the household food security and access situation would be worse. Therefore, the HFIAS has a scale that measures the food security situation in a particular household and at the point of completion of the questionnaire the outcome is analyzed with households being assigned a category in the scale of Coates *et al.* [12]:

- Food secure - Does not or rarely worries about food shortages.
- Mildly food insecure - Sometimes or often worries about having enough food.
- Moderately food insecure - Sacrifice quality more frequently.
- Extremely food insecure - Cutting down meal size of the number of meals.

For the purposes of this study, households were divided into two groups, in order to differentiate between food secure and food insecure. The food secure households were those found to have been categorized as rarely or not worrying about food shortages.

The third section contained questions used to determine financial and other contributions made by livestock farming in the household. The households were defined as individuals who usually lived together and shared the same bundle of income and interviews conducted on the head of households which were defined by the households themselves. Responses were then collated and categorized and grouped according to the different responses and data was then analyzed statistically.

RESULTS AND DISCUSSION

Demographic and socio-economic characteristics of the respondents

Table 2 reflects that the gender dynamics of the respondents was 23.1% female and 76.9 % of them were male. This shows that the majority of the respondents were male. This is prevalent in most cases where livestock production is involved and was also the case in a study by Yonas and Vuyiseka [13], where it was found that men were more involved in livestock farming in comparison to women. Males have been the primary caregivers and owners of livestock in traditional households and females in most cases receive ownership consequentially, for example through the death of a spouse.

Table 2 further reflects the age distribution of respondents where it was found that many of the farmers/ livestock owners were in the age group between 61-70 years, constituting 37.04%. This was closely followed by 51-60 constituting 21.30%. Those in the age bracket of 41-50 accounted for 19.44 % of the respondents and those in

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the age range of 31-40 years accounted for 12.96%. The rest (those in the age group of 20-30 years) constituted only 8.33%, reflecting a low interest in livestock production amongst the youth of the area.

The results reflect that youth involvement was lacking in livestock production in the study area, the number of youth was very few when compared to that of adults, which is a concern for the future of livestock farming. This could be due to the fact that the youth do not view the practice positively and as a viable career and livelihood option. This is consistent with the findings of Molieleng [14] and with those of Bahta [15] whereby youth were much less than adults in livestock farming and this was also found by Metelerkamp *et al.* [16], who found that lesser youth were farming and preferred other industries in a study they conducted in another area in South Africa.

The results further reveal that the majority of the respondents were unemployed (74.07%) followed by the employed who were 13.89%. Those that were self-employed were found to be 12.04%. This majorly reflects that most of the unemployed residents of the Botleng area used livestock farming as a means to have household income and make a living from the sales and the slaughtering of livestock for food. This is consistent with the results obtained in a study by Molieleng[14], whereby 72% of the livestock farmers in the study were not formally employed and did not run businesses and received income from livestock practices, some with the assistance of other sources such as social grants. This is also consistent with the results of Myeki and Bahta [17], where it was indicated that farming was treated as a business entity and found that 86% of the livestock farmers in their study depended solely on farming as their means of income. This shows that if the conditions are right (proper markets) farmers use livestock production as a business and use it for the livelihoods of their families. This was also the case with the farmers in the area, the markets were in place and more farmers were conducting the practice as a business rather than just owning cattle but using the practice to create income for themselves.

The food security status of the respondents

Table 3 reflects the results of the HFIAS scores of each household and how they were categorized. The table reflects that 73.15 % of the households were found to have rarely or not worried about the food access of their households and were found to be food secure and 29 households which make up 26.85% were found to have been worried sometimes (three to ten times) and often which is more than 10 times in the past 4 weeks, whether their households had enough food or not, and were found to be food insecure.

This shows that the majority of the households were food secure, which is a food security percentage of 73.15% in the area. This makes up more than two thirds of

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the households of the respondents. This is consistent with the results of Khumalo and Sibanda [18], whereby peri-urban farmers in another area in South Africa were found to be food secure at 71.6 % and another study where livestock farmers were mostly found to be food secure at 61% [15].

The contribution of peri-urban livestock farming on food accessibility of the respondents

The study sought to find out whether livestock production played a financial role in the households of livestock owners. This would assist in determining if farmer's households did positively benefit from livestock production, in terms of increasing food access and therefore contributing to these households being food secure.

Table 5 reflects that participants were asked whether livestock activities contribute financially to the household, that is, do the farmers make any money from rearing livestock through sales. It was found that 99.1% of them responded with a yes and 0.9% of them responded with a no, that is, they do not make any money from the livestock. These results are consistent with the statement that peri-urban farmers are increasingly now pursuing more income for their farming practices [19]. It was also stated that livestock production in and around cities is increasingly becoming more and more commercially oriented, with large holdings/herds and different livestock species in African cities [20].

This change is also supported by the advantages which are market developments in the area that favor urban livestock production and other exchanges that are culturally based, such as dowry payments in the case of marriage and ritual slaughters in the community [19]. In Table 5, from the number of respondents who said that they do get an income from livestock sales, it was asked which ones buy food from that income and it was found to be the whole group. This reflects that food access gets increased through the income gained from livestock sales. Therefore, food access increases through both consuming the livestock and also through sales. This was reflected in 99.07% of the respondents. This is consistent with the findings of Acosta *et al.* [21] who found that livestock producers use livestock as buffers in supporting the household with income and consumption.

Determining other contributions acquired through livestock production

The following section sought to find out whether animal production is more than just the keeping of livestock in peri-urban areas. Whether farmers had more benefits to it than just consumption and increasing household income. Three options were given to the respondents and were given to choose any option or all of them if they were relevant to them. These were: Social benefit (assisting in socializing with other community members), inter-agriculturally (benefitting other agricultural activities in the household) and waste prevention. The following results were found: 98.1% of

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them indicated yes to benefitting socially, 16.7% responded yes to benefitting from inter-agricultural use, whereby by-products from one farming practice contributes to another farming activity in the household, 27.8% responded with a yes when asked if owning livestock assisted their households in waste prevention and 0.93% said they benefitted in other ways which the participant indicated as stress relief (Table 6). This is consistent with the study by Ciamara and Otte [22], which stated that there are a number of benefits to livestock production and these are namely: food source for the household (meat, eggs and milk), household income, manure, transport, and draft power. Also mentioning indirect benefits such as social status, collateral security, insurance and a form of savings.

These results are also consistent with the results by Chagomoka *et al.* [23], which found that livestock producers experienced significantly less waste when compared to those that did not practice it. The results are also consistent with those of Falvey [24] whereby the uses of livestock production by peri-urban farmers were listed as different from the commercial farmers but that the farmers viewed the livestock as not only food but also for ploughing, traction, manure, fuel, construction material, packing and working with mills, while providing a regular small income from sale and consumption of milk, eggs, blood and hair.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

The study found out that there was little involvement by the youth in livestock production and that more participants were older and retired. It is therefore recommended that youth involvement be highly encouraged. This begins at household level where such practices are alive, whereby parents and grandparents encourage youth to participate and physically get them involved at young ages. It further puts a responsibility also on communities and government whenever they host meetings that involve the youth to educate them on the benefits of livestock production so that these practices are as much alive in the next generation as in this and the previous ones.

The study found that women were in the extreme minority in livestock production than their male counterparts. This is in contrast with women empowerment principles of modern-day society. Therefore, it is recommended that women be encouraged to participate in this practice by government departments and society, especially for the benefit of households, as most households are headed by women, and this would assist them financially. This would also assist in changing the perception that livestock production can only be practiced by men. Women should be targeted and trained in these practices by government Departments through, for example, agricultural extension. Current incentives such as women awards are already

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playing a good role in encouraging women in agriculture and should be specifically targeted at women involved specifically in livestock related agricultural practices.

This study found that farmers were not maximizing their potential by using proper livestock practices. Farmers used outdated information and were losing out on opportunities to maximize profit. Therefore, it is recommended that farmers receive training to better their livestock practices. Also, they should receive updated information, which is relevant to changing times and situations that would better prepare them for the current economic and natural conditions of the area.

Farmers in peri-urban areas are often overlooked by the government due to them practicing livestock production in peri-urban areas, which are predominantly residential areas. Therefore, farmers that reside in peri-urban areas need to be given attention and not looked down on because of by-laws, because essentially, they farm in these areas regardless of these laws and continue to do so. They need assistance in better infrastructure, especially those that help keep them safe when attending to cattle. They should be assigned more animal health care workers and extension officers from governmental Departments.

From what has been gathered in this study the data informs that, indeed livestock production contributes financially to the farming households and that those finances are used to buy food in the households. This has therefore, given the outcome to the research question that the study aimed to answer, that indeed livestock production does contribute to the food security of farmers in Botleng, in the Mpumalanga province of South Africa. This is achieved through increasing food access in the households that practice it, by slaughtering and selling animals that enable the household to buy more needed food.

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Table 1: Table for determining sample size from a given population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2 800	338
15	14	110	86	290	165	850	265	3 000	341
20	19	120	92	300	169	900	269	3 500	346
25	24	130	97	320	175	950	274	4 000	351
30	28	140	103	340	181	1000	278	4 500	354
35	32	150	108	360	186	1100	285	5 000	357
40	36	160	113	380	191	1200	291	6 000	361
45	40	170	118	400	196	1300	297	7 000	364
50	44	180	123	420	201	1400	302	8 000	367
55	48	190	127	440	205	1500	306	9 000	368
60	52	200	132	460	210	1600	310	10 000	370
65	56	210	136	480	214	1700	313	15 000	375
70	59	220	140	500	217	1800	317	20 000	377
75	63	230	144	550	226	1900	320	30 000	379
80	66	240	148	600	234	2000	322	40 000	380
85	70	250	152	650	242	2200	327	50 000	381
90	73	260	155	700	248	2400	331	75 000	382
95	76	270	159	750	254	2600	335	100 000	384

Note: N = Population size and S = Sample size

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Table 2: Demographic and socio-economic characteristics of the respondents

VARIABLE NAME	FREQUENCY	PERCENT %
Gender		
Female	25	23.1
Male	83	76.9
Age		
20-30	9	8.3
31-40	14	13
41-50	21	19.4
51-60	23	21.3
61-70	40	37
70-80	1	9
Employment status		
Employed	15	13.9
Self Employed	13	12
Unemployed	80	74.1

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Table 3: HFIAS questionnaire results

Question	Response		
Did you worry that your household would not have enough food in the past four weeks?	Yes 55.6%	No 44.44%	
If yes, how often did this happen?	Rarely 51.67%	Sometimes 30%	Often 18.33%
In the past 4 weeks, were you or any household member not able to eat the kinds of foods you preferred because of lack of resources?	Yes 10.19%	No 89.81%	
If yes, how often did this happen?	Rarely 17.35%	Sometimes 47.96%	Often 34.69%
In the past 4 weeks, did you or any household member have to eat a limited variety of foods due to lack of resources?	Yes 7.41%	No 92.59%	
If yes, how often did this happen?	Rarely 22%	Sometimes 45%	Often 33%
In the past 4 weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of foods?	Yes 42.59%	No 57.41%	
If yes, how often did this happen?	Rarely 45.65%	Sometimes 30.43%	Often 23.91%
In the past 4 weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	Yes 25%	No 75%	
If yes, how often did this happen?	Rarely 53.82%	Sometimes 30.77%	Often 15.38%
In the past 4 weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	Yes 14.81%	No 85.19 %	
If yes, how often did this happen?	Rarely 62.50%	Sometimes 25%	Often 12.50%
In the past 4 weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	Yes 55.56%	No 44.44%	
If yes, how often did this happen?	Rarely 45.76%	Sometimes 28.81%	Often 25.42%
In the past 4 weeks, did you or any household member go to sleep at night hungry because there was not enough food?	Yes 5.56%	No 94.44%	
If yes, how often did this happen?	Rarely 100%	Sometimes	Often
In the past 4 weeks did you or any household member go a whole day and a whole night without eating anything because there was not enough food?	Yes 0%	No 100%	
If yes, how often did this happen?	Rarely	Sometimes	Often
	N/A	N/A	N/A

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Table 4: Number of food secure and food insecure farmers

Demographic	Frequency (n108)	Percent %
Food secure	79	73.1
Food insecure	29	26.9

Table 5: Does livestock production contribute financially to the household?

Question	Frequency (n108)		Percentage %	
Does Livestock production contribute financially to the household?	Yes – 107	No – 1	Yes - 99.1%	No -0.9%
If Yes, does the money contribute to the buying of food in the household	Yes – 107	No – 0	Yes – 100 %	No – 0

Table 6: Farmers that experienced other benefits to livestock production

Benefit	Frequency (n108)	Percentage %
Social	106	98.1%
Inter-Agricultural	18	16.7%
Waste prevention	30	27.8%
Other	1	0.93%

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