

Characteristics of Smallholder Pig Production in Southern Kaduna Area of Kaduna State, Nigeria

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Abstract: This paper presents the results of a survey of pig producers in Southern Kaduna Area of Kaduna State, Nigeria. A total sample of 300 respondents spread over 2 LGAs and 5 village areas was drawn. Only households which kept pigs at the time of the study were sampled. Data were collected from the respondents through the use of structured questionnaire. Data generated included demographic characteristics of pig owners, pig distribution by household, management practices and problems, sources of feed by season, type of housing and livestock disease profile. The data collected were analyzed using descriptive statistics such as means, ranges and percentages. The results show the influence of some socio-economic variables on pig production. Over 85% of the respondents acquired their foundation stock from the open market, while others came from neighbours' herds. Most respondents expressed the desire to increase their holdings. However, feeding was most frequently mentioned as a limiting factor in increasing pig herd size. Brewers' residues (*Burukutu* wastes) and household wastes were the major sources of animal feed. There was a very low awareness level of the use of commercial feeds. Only 10% of the respondents indicated having used any form of commercial feed. Implications for improved pig production in Nigeria's sub-humid zone are drawn.

Key words: Pigs • smallholder • management • Kaduna State • Nigeria

INTRODUCTION

Nigeria, like many other developing countries, is facing the problem of shortage of dietary animal protein. The gravity of this problem is increasing with the growing population and urbanization. In Nigeria, the daily animal protein intake is below the recommended minimum level of 65 gm per caput per day. It has been observed that only 8.4 gm of the 53.8 gm of protein consumption level of Nigerians is derived from animal sources [1] suggesting less than 16% contribution of animal products to protein consumption of Nigerians. This is very poor indeed when compared with countries like USA with about 69% of total protein being derived from animal sources [2]. Due to the acute shortage of animal protein in the diet of the average Nigerian, there is the need to increase the production of domestic animals, which are conventional sources of animal protein.

Sources of animal protein in Nigeria include beef, milk, pork, poultry, sheep, goats, fish and game animals. Of these sources, pork represents one of the fastest ways of increasing animal protein, since pigs grow at a faster

rate and are more prolific than cattle, sheep and goats [3, 4]. Also, pigs excel other red meat animals in converting feed to flesh [5]. The importance of pigs in the livestock industry in Nigeria cannot be over-emphasized. Although, pigs represent about 4% of the total domestic livestock in Nigeria [6], they display a unique ability to adapt and survive in areas where they are found. The pig is a potential protein deficit gap-filler considering the population in Southern Kaduna area of Kaduna State and the generational interval among other favourable attributes of the animal.

The pig is not only a source of protein; it serves as an investment alternative and source of additional income especially among the women [7]. The rearing of pigs is usually an individual concern and herds are not usually found in commercial quantities. Pig keeping is a secondary enterprise and represents some proportion of the income earned by women. Incomes derived from the sale of pigs are usually spent on acquisition of household goods and in meeting social and cultural obligations.

Of the three major production systems recognizable in Nigeria, the semi-intensive system of pig production is

the most prevalent in areas with high population density like the Southern Kaduna [8]. This production system has a low labour input and low priority adjunct to the intensive management system.

The predominant breeds of pigs kept in the study area are the Large White and crosses between Large White, Hampshire and Duroc. The existence of a large number of exotic breeds especially the Large White and their crosses could be attributed to the maintenance of pure exotic breeds like the Large White and Hampshire multiplied by Ahmadu Bello University Farm, Zaria [8].

Southern Kaduna area is well known for the abundance of pigs in its villages. Pigs are quite popular as food but the economic basis of village production is sales to traders from the Southern part of Nigeria and the West African sub-region. Kafanchan pig market in Southern Kaduna area is well noted for this [9].

Under the semi-intensive system of production, animals are partly confined and allowed to scavenge on kitchen wastes with occasional supplements of maize by-products or local beer residue (Burukutu wastes). Cereal brans and fresh grasses are also fed to the pigs. This is usually not supplemented with any extra protein source. Feeds are generally bulky and of low nutritional quality. Feeding in some cases is done only once a day with little or no extra clean water supplied to the pigs besides that used to mix the feed.

Labour requirements, however, often limits the number of animals kept at any given time period under this management system. Due to high population densities and land squeeze most especially during the rainy season, animals are frequently confined. The growing human population in Nigeria generally, coupled with rapid urbanization and the subsequent pressure on land will compel further confinement which will directly necessitate intensive management practices. There is therefore, the need to develop appropriate feeding strategies in consonance with perceived shortage (costly nature) of conventional feeds. This situation can effectively limit the size of rural pig holdings. The unique position of agro-industrial by-products in pig feeding system underscores the need for research to fully exploit these feed resources. These agro-industrial by-products such as brewers' spent grains are readily available and relatively cheap. As monogastric livestock, pigs cannot depend entirely on natural vegetation and thus the question of feed takes on greater importance than for the ruminants.

This study reports part of a larger survey of pigs production and marketing in Southern Kaduna area of Kaduna State, Nigeria which investigated the socio-

economic factors of producers and their influence on pig management practices and also the economics of pig production and marketing.

Objectives of the study: The general objective of the research was to study the management practices and problems associated with small-holder pig production in Southern Kaduna area of Kaduna State, Nigeria with the aim of better understanding the prevailing production systems.

The specific objectives include the following:

- To describe the system and structure of pig management in the study area;
- To describe the attitude of pig producers to important management practices as they relate to pig production; and
- To draw implications for enhancing pig research, development and extension services in the study area in particular and Nigeria at large.

MATERIALS AND METHODS

The study area: The study area is Southern Kaduna area of Kaduna State, Nigeria. The state was chosen for the study primarily because it ranks among the highest pig population area in Nigeria such as Benue (703,438 pigs), Plateau (535,319), Gongola (476,143) and Ondo (291,304). The pig population of Kaduna State is 249,651 representing about 7.3% of the total pig population in Nigeria [6]. Furthermore, Kaduna State has the highest number of pigs per household [6].

The state is situated between latitude 09°30'N and longitude 08°30'E in the Northern Guinea Savannah. The rainy days last between 190 to 200 days with distinctive dry and rainy seasons. The study location has two distinctive seasons; a dry season (November-April) and a rainy season (May-October).

The study was conducted in two Local Government Areas (LGAs) of Kaduna State: Jama'a and Zango-Kataf LGAs. The study area is bounded in the North by both Kajuru and Kauru LGAs, in the east by Lere and Kaura LGAs, in the West by both Kachia and Jaba LGAs and in the south by Akwanga LGA of Nassarawa State (Fig. 1).

The soil is rich and suitable for the cultivation of a wide range of crops. Most of the ethnic groups are farmers that keep a good number of pigs, small ruminants and poultry in addition to arable cropping.

Southern Kaduna is sub-humid and is predominantly Christian area of Kaduna State. The location was

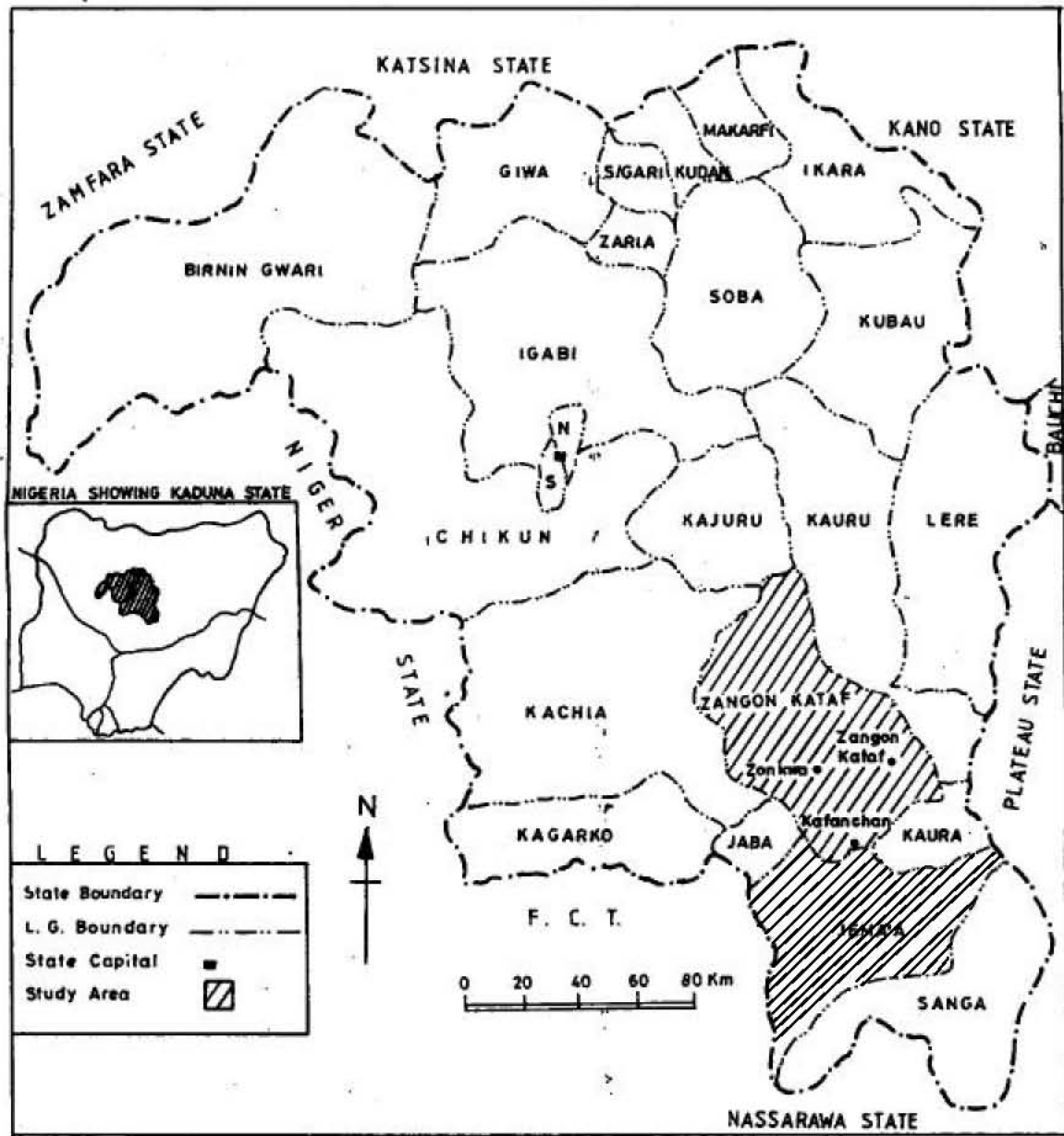


Fig. 1: Kaduna State showing the study area

specifically chosen for the study because majority of the farmers in the area are involved in pig production. In Jama'a LGA alone, out of the total of 2,368 farm families identified, 1,804 representing 75% of the farm families, rear pigs [10]. Secondly, the area is a known potential pig market in the country [9].

Data collection: The Southern Kaduna area of the State was chosen for the study. Total samples of 300 households were sampled from two Local Government Areas (Jama'a and Zango-Kataf LGAs). One hundred and fifty households were randomly drawn from each LGA. Within an LGA, five village areas were selected with at least, thirty households interviewed in each village area. The sampled population comprised households which kept pigs at the time of the study. The survey was conducted between June 2001 and May 2002 in order to cover both the dry and wet seasons.

Variables investigated include demographic characteristics of pig owners, pig distribution by households, management practices and problems associated with current management systems, others are sources of feed by season, preferred feedstuff and reasons for choice of feed materials and livestock disease profile.

RESULTS AND DISCUSSION

Demographic characteristics of pig farmers: Analysis in Table 1 shows that age affects production of pigs, since the lowest age group of 21-30 years has a mean pig herd size of 3.02, while the group above 60 years has 2.52. This is corroborated by the fact that there is a significant difference in herd size across age groups.

From the analysis, it can be adduced that the number of pig farmers of 87 within age bracket of 21-30 years is three times those in age bracket of 60 and above with a frequency of 29. The reason for this could be because the farmers within age bracket (21-30 years) are young and can easily bear the risk of accepting new innovations aimed at improving pig production. The fact that they are young shows they can still face the challenges of pig rearing given the demand of integrating both crop and livestock enterprises especially for labour.

Household size includes members from the age of seven years in a family that were engaged in productive activities. Table 2 shows that 37% of the respondents fell within the range of 1-5 members per household, while 40, 15 and 8% fell within the range of 6-10, 11-15 and 16-20

Table 1: Age distribution of pig farmers by mean herd size

| Age bracket (years) | Frequency of respondents | % of respondents | Mean herd size |
|---------------------|--------------------------|------------------|----------------|
| 21-30 | 87 | 29.0 | 3.02 |
| 31-40 | 79 | 26.3 | 2.97 |
| 41-50 | 60 | 20.0 | 2.84 |
| 51-60 | 45 | 15.0 | 2.66 |
| Above 60 | 29 | 9.7 | 2.52 |
| Total | 300 | 100.0 | |

Source: Field work, 2002

Table 2: Distribution of pig producers by household size and herd size

| Household size | Frequency of respondents | % of respondents | Mean herd size |
|----------------|--------------------------|------------------|----------------|
| 1-5 | 111 | 37 | 2.87 |
| 6-10 | 120 | 40 | 2.84 |
| 11-15 | 45 | 15 | 4.15 |
| 16-20 | 24 | 8 | 3.48 |
| Total | 300 | 100 | |

Source: Field work, 2002

Table 3: Distribution of pig farmers by herd size

| Herd size | Frequency of respondents | % of respondents |
|-----------|--------------------------|------------------|
| 1-3 | 156 | 52 |
| 4-6 | 87 | 29 |
| 7-9 | 57 | 19 |
| Total | 300 | 100 |

Source: Field work, 2002

members respectively. The result shows that the larger the household size, the more the herd size of pigs, up to 11-15 household size.

Analysis revealed that majority of the respondents (52%) had less than four adult pigs while 29% had between 4 and 6 pigs (Table 3). The mean adult herd size was 2.9±1.6. All the respondents were small-scale farmers. This conforms to an earlier report by Pathiraja *et al.* [11], that pig farming in Southern Zaria (now Southern Kaduna) is primarily a smallholder concern.

Table 4 shows that about 85% of the respondents acquired their foundation stock from the market, while others came from neighbours' herds. It was observed that the best breeding stock rarely goes to the market resulting in the use of foundation stock with poor breeding qualities. The results also indicate non-utilization of improved breeds from government farms, increased use of own stock and that of neighbours; this gives rise to inbreeding and consequently low productivity.

Table 4: Sources of parent stock

| Source | Number | Percent* |
|-----------------|--------|----------|
| Market | 254 | 84.7 |
| Inherited | 20 | 6.7 |
| Neighbour | 96 | 32.0 |
| Bred | 79 | 26.3 |
| Government farm | 9 | 3.0 |
| Borrowed | 25 | 8.3 |
| Others | 10 | 3.3 |

*Total observations>100% due to multiple responses, Source: Field work, 2002

Table 5: Desire/plan to increase herd size

| Decision | Number | Percent |
|-------------|--------|---------|
| Yes | 193 | 64.3 |
| No | 18 | 6.0 |
| Not decided | 89 | 29.7 |
| Total | 300 | 100.0 |

Source: Field work, 2002

Table 6: Anticipated problems if herd size is increased

| Problem | Number | Percent* |
|----------|--------|----------|
| Feed | 216 | 72.0 |
| Health | 170 | 56.7 |
| Theft | 67 | 22.3 |
| Accident | 48 | 16.0 |
| Labour | 144 | 48.0 |
| Housing | 196 | 65.3 |
| Others | 5 | 1.7 |

*Table observations>100% due to multiple responses, Source: Field work, 2002

Table 7: Sources of animal feed by season

| Source | Dry season | | Wet season | |
|-----------------------------------|------------|------|------------|------|
| | No. | %* | No. | %* |
| Household wastes | 238 | 79.3 | 204 | 68.0 |
| Brewers' residue (Burukutu waste) | 204 | 68.0 | 186 | 62.0 |
| Cut grasses | 42 | 14.0 | 51 | 17.0 |
| Commercial feeds | 30 | 10.0 | 30 | 10.0 |
| Animal fend for self | 156 | 52.0 | 117 | 39.0 |
| Don't know | 9 | 3.0 | 6 | 2.0 |

*Total observations>100% due to multiple responses, Source: Field work, 2002

Most respondents expressed the desire to increase their holdings (Table 5). In the event that herd sizes are increased, however, feeding was most frequently mentioned as a limiting factor in coping with pig keeping (Table 6). This requires additional labour input in

providing the feeds. It was observed that feeding, housing and health constituted the major constraints to increased pig production in the study area. Housing, health and nutrition are interrelated. Inadequate housing can predispose pigs to diseases and possibly trigger-off (facilitate) the spread of contagious diseases especially where animals have been over-crowded in a place.

Household wastes and brewers' residues (burukutu wastes) were the major sources of animal feed (Table 7). Due to the fact that most respondents practiced the semi-intensive system of management whereby animals are partially confined most especially during the dry season and totally confined during the wet season, cut grasses are fed along with household wastes such as peels of yams, potatoes, cocoyam; brans and cereal crops like maize, sorghum and millet. Only 10% of the respondents indicated having used any form of commercial feed. Closely associated with sources of feed was the prevailing management system practiced. The fact that almost 58% of the respondents confined their animals year round and another 42% confined seasonally justifies the availability of other sources of feeds such as the high incidence of brewers' residues (burukutu wastes) plus household wastes. Another reason may be the fact that most of the respondents are burukutu brewers (local beer brewers) and crop farmers. A large proportion of cereal and root crop residues which are available from households and unsuitable for marketing and family use, are used as pig feeds.

All the respondents provided some form of housing to pigs. Various types of housing materials were used by the respondents depending on their scale of production (size of holding). Three types of pig houses were identified in the study area: (i) the mud-brick walls with thatched roof and rammed earth floor type, (ii) the cement-brick walls with zinc roof and concrete floor type and (iii) the burnt-brick walls with zinc roof and concrete floor type. Majority of the respondents had low cost pig houses built mainly from locally available materials and household labour. Majority (62%) of the respondents used mud-brick walls with thatched roof type of housing while 30% of the respondents used the cement brick walls with zinc roof and the remaining 8% used the burnt brick walls with zinc roof and concrete floor. Although most of the respondents kept their pigs in the mud-brick walls with thatched roof and rammed earth floor because of its cheapness. Apart from the undurability of the building, it predisposes the pigs to diseases. The cement block walls with zinc roof and concrete floor had been advocated because of its durability and high level of hygiene. Apart from durability and hygiene, the

Table 8: Prevalent diseases in the study area

| Diseases | Dry season | | Wet season | |
|-----------------------------|------------|------|------------|------|
| | No. | %* | No. | %* |
| Diarrhoea (gastroenteritis) | 208 | 69.3 | 133 | 44.3 |
| Cough/pneumonia | 44 | 14.6 | 71 | 23.7 |
| Mange (itching/lousing) | 195 | 65.0 | 106 | 35.3 |
| Anaemia | 64 | 21.3 | 82 | 27.3 |
| Ascaris suum | 30 | 10.0 | 17 | 5.7 |
| Worms | 154 | 51.3 | 182 | 60.7 |
| Mastitis | 40 | 13.3 | 31 | 10.3 |

*Total observations>100% due to multiple responses, Source: Field work, 2002

economy of better housing would favour such housing in the long run [12].

Survey results indicated that the main disease problems reported by the respondents were helminthoses, cough, diarrhoea, skin conditions mainly sarcoptic mange (itching/lousiness) and the presence of *Ascaris suum* in pig faeces. Mange prevalence in herd was about 68%. There was also high incidence of cough and diarrhoea. Cough prevalence was higher during the dry season from December to May while diarrhoea was more prevalent from July to September corresponding to the peak of the wet season. Helminthoses, sarcoptic mange and gastroenteritis were observed to be the commonest diseases in the herd (Table 8) followed by anaemia, pneumonia and mastitis (24.3%, 19.2% and 11.8% respectively).

Mange (louse infestation) can cause considerable production losses because of the biting nuisance, especially when prevalence is as high as 65% during the dry season as recorded in this study. The low incidence observed in the wet season is due to high humidity during the rainy season which is not conducive to lice development.

Although, there was high incidence of diarrhoea in the study area, respondents noted that it was more common with young pigs and was observed to be probably responsible for their mortalities. Most mortalities have been reported to occur in piglets of the pre-weaning age of three months and below. The most important cause of mortality was observed to be poor mothering ability (crushing or eating of the young) due to poor housing and inadequate nutrition, followed by diarrhoea.

Over 60% of the respondents vaccinated their pigs against diseases. It was equally discovered that 35% of these respondents used modern method of vaccination while 25% used local or ethno-veterinary vaccination

practices. The materials used as local means of treatment in the study area included iron-rich soil and wood-ash in combating anaemia (shortage of iron in the blood) in piglets. Although wood-ash will not provide iron; but it provides other important materials such as calcium and phosphorus which are important for the growth of the piglets' bones.

For mange, treatment involves the removal of scales and dirt through washing with soap, scrubbing with brush and smearing with oil. For the control of ectoparasites also, hot wood ash, corn shaft and lime are used.

Response to disease attack varied among the respondents. Ten percent of the respondents slaughtered and ate pigs showing signs of disease attack, 15% did nothing, 35% gave local remedy while 40% called veterinarians to treat their pigs.

Generally, pig production in Kaduna State was a part-time occupation as a combination of animal species (domestic fowls, ducks, goats and sheep) were kept by the rearers, 78% of whom were also crop farmers. About 27% of the respondents reared the pigs for both income generation and consumption while the remaining 63% of the respondents kept pigs mainly for commercial purposes. Pigs were sold at different ages or sizes among the respondents. Ten percent of the respondents sold their pigs at the age of 6-12 months. About 7% respondents sold them at less than 6 months of age, 60% sell theirs at the age of 1-2 years, while 23% sell at less than 6 months of age. This was supported by Bawa *et al.* [12] that pigs can be reared and marketed at different weight and ages. The selling price depended on the age and weight of the pigs at the time of sale.

On access to credit, 60% of the respondents belonged to one form of cooperative group or another while the remaining 40% did not. Sixty six percent of the respondents indicated their willingness to obtain credit, 23% of the respondents were unwilling to obtain credit because they did not want to incur debts. Also 11% of the respondents were unwilling because of the problems of high interest rates on loans.

CONCLUSIONS

From the study, it is very clear that small-holder pig production has great potential in bridging the animal protein supply gap and also enhance the employment status of the farmers and the rural economy in general.

Disease control programmes, if carefully planned and executed should compliment adequate feeding and reduce

mortalities and increase overall productivity of pigs. The implications of higher animal productivity at the farmers' level can be seen in enhanced income and improved living standards of the farmers and their households as well as increased animal-source protein for Nigerians.

It is envisaged that a reduction in pig mortality especially under traditional management will go a long way in making more animal protein available to the general populace.

Evaluation of traditional remedies on a research station (National Veterinary Research Institute, Vom) to determine their effectiveness in controlling diseases and parasites.

The quality of feed given to pigs should be improved. The farmers should be educated through the use of extension workers, on feeding methods using non-conventional feeds and the need of the inclusion of protein mineral and vitamin in the diet of pigs.

Soft loans with adequate moratorium period could be given to pig farmers, this will aid expansion of the enterprise.

Without prejudice to the aforementioned, improved nutrition should be seen as the bottom-line to any successful programme of improved and increased pig production in Nigeria.

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