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Production practices of local pig farmers in Ghana

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Local pig production is of economic, nutritional and socio-cultural importance to livelihoods in Ghana. Data was collected from 176 local pig farmers in four regions of Ghana using pretested structured questionnaire. Majority of the farmers interviewed were males over 30 years and kept crossbred pigs (64%) with income (95%) as their main motivation. In terms of housing of pigs, most farmers use sheds (39%), about a third had permanent structures (34%), whilst the rest (22%) use stalls with a few keeping their animals in their yards (2%) or having no housing facility (2%) at all. Growth rate of pigs was a relatively important trait (49%) for the farmers compared to aesthetic traits like coat colour or ear orientation. Majority of the farmers (90%) acquired their breeding stock from family, friends and the open market with only 10% acquiring breeding stock from government breeding stations. Local pig production in the study area was characterised as semi-intensive with significant opportunities for stakeholders to make interventions for improvement through provision of improved breeds, housing, feeding and veterinary care.

Key words: Food security, farmer education, pig production, sustainable breeding programmes.

INTRODUCTION

As human population growth increases worldwide, there is need for continuous food supply to ensure food security (FAO, 2006). For the past three consecutive years, there has been a rise in hunger worldwide. It has been reported that about 11% of the world's population is undernourished, amongst which 23.2% are in sub-Saharan Africa and 15.1% are within western Africa (FAO, 2018). Livestock serve as a key source of protein and nutritional well-being (Komatsi and Kitanishi, 2015) and local pig production becomes an attractive option on account of the ease of management, prolificacy of the species and the many small-scale farmers keeping the animals (Osei-Amponsah et al., 2017). Pig production has a high potential to increase productivity due to its fast growth rate, shorter generational interval, good feed conversion efficiency, and high litter sizes compared to cattle (Mbuthia et al., 2015). There is however the need for more information on pig production practices of local farmers in order to make appropriate recommendations for improvement to increase productivity (Adjei et al., 2015).

Characterization of pig production systems provides useful information for their improvement and conservation. There is paucity of information on the
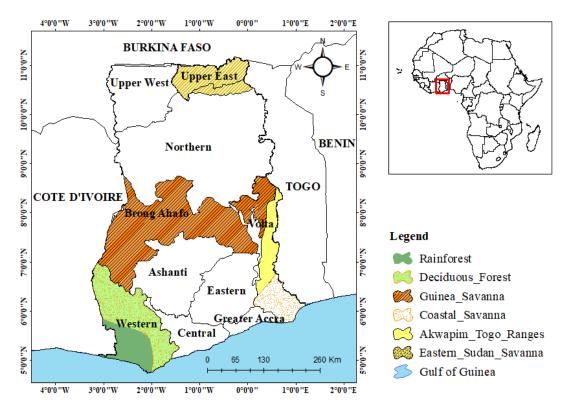
Figure 1. Map of Ghana, showing the location of farmers surveyed in this study.

on the production practices of local pig farmers which can be useful in the establishment of breeding programmes to enhance their production potentials (Adjei et al., 2015; Ayizanga et al., 2018). In this study, primary data were collected on production practices of local Ghanaian pig farmers to identify their limitations and challenges and make appropriate recommendations for improvement. The study should provide adequate information on pig production practices across all agro-ecological zones of Ghana and enhance the livelihoods of the millions of farmers including vulnerable women and children whose livelihoods to a large extent depend on pig production.

MATERIALS AND METHODS

Using purposive sampling, with assistance from District Directors and Extension officers of the Ministry of Food and Agriculture (MoFA, Ghana), pig farmers who raised local pigs were identified from selected districts of four regions of Ghana (Figure 1). These were the Upper east region (Sudan savanna ecological zone), the Brong-Ahafo region (Guinea savanna zone), Western region (Forest zone) and Volta region (Coastal savanna zone). A total number of 135 farmers were interviewed for the study using a pretested structured questionnaire. Following FAO guidelines (FAO, 2007), data was collected on the demographic attributes of the farmers (farmer's name, age, location, educational background) and pig production practices (breeds raised, trait preferences, housing systems, feeding, access to veterinary services and mortality rate recorded on farms). The data were analyzed using

Statistical Package for Social Sciences (SPSS) version 20.0 (SPSS, 2011) and the Survey Package in R version 3.5.2 (R Core Team, 2018).

RESULTS

Demographics of Ghanaian local pig farmers

The results of the survey indicated a significant difference ($P < 0.05$) between gender, age and education background of pig farmer across the different regions (Table 1). Apart from the Western region which recorded the highest number of females (87%) engaged in pig farming, the three other regions recorded relatively high number of male farmers. Across all the regions studied, majority of the farmers interviewed were young adults between the ages of 20 and 50 years. While majority of farmers in the Brong-Ahafo, Upper East and Volta regions had no formal education, it was found out that farmers in the Western region were more likely to have at least primary education.

Pig production systems in the regions

Three breed types were identified namely, the local breed thus Ashanti Dwarf pigs (ADPs), Exotic breeds (Large

Table 1. The demographic attributes of local pig farmers.

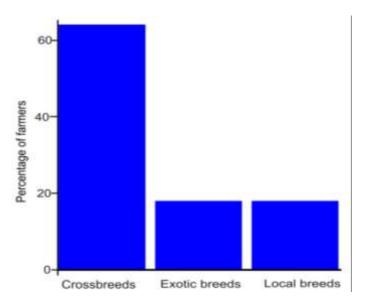| Demographic attribute	Brong-Ahafo (%)	Upper East (%)	Volta region (%)	Western region (%)
Gender				
Male	29 (74)	16 (67)	12 (48)	6 (13)
Female	10 (26)	8 (33)	13 (52)	41 (87)
Chi square test *P*-value		3.445e-08**		
Age				
20-30	3 (8)	1 (4)	18 (72)	3 (6)
31-50	20 (51)	12 (50)	5 (20)	20 (43)
51+	16 (41)	11 (46)	2 (8)	24 (51)
Chi square test *P*-value		3.597e-12**		
Educational level				
None	22 (56)	15 (63)	10 (40)	12 (26)
Primary	5 (13)	4 (17)	7 (28)	25 (53)
Secondary	7 (18)	3 (13)	5 (20)	6 (13)
Tertiary	5 (13)	2 (8)	3 (12)	4 (8)
Chi square test *P*-value		0.01064**		

**Significant at $P < 0.05$

Figure 2. Breeds raised by the sampled farmers; crossbreds were the major breeds raised by farmers.

whites and Landraces) and crossbreeds (crosses between local pigs and exotics). From the study, it was discovered that, the majority of farmers were keeping crossbred pigs compared to either ADPs or exotics (Figure 2). It was also found out that, most of these farmers (95%) raise pigs to serve as a source of income and not to provide just meat for the household. In terms of trait preferences, majority of the pig farmers (49%) consider the growth rate of the pigs with about a third

(30%) indicating body size and body length of the pig as important. However, these pig farmers consider less the coat or skin colour of the pigs (Figure 3). Almost all the pig farmers interviewed had some sort of housing facility. About a third of the pig farmers (35%) had permanent structures, only 2% of the farmers had no housing facility with others using sheds (39%), stalls/shade (22%) or yards (2%) (Figure 4). As shown in Figure 5, most of the pig farmers (66%) fed their pigs with kitchen left overs
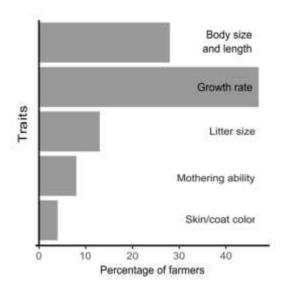
Figure 3. Trait preferences by farmers; growth rate is the most preferred trait by farmers sampled.

Figure 5. Feed types fed to pigs by sampled pig farmers; majority of the farmers sampled fed their pigs with kitchen left overs.
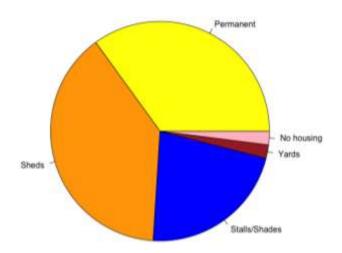

Figure 4. A pie chart showing housing systems used for pig production. The majority of farmers interviewed used sheds as housing facility.

(cooked cassava, fish, yam and soup) with a small fraction (11%) of farmers providing concentrates. However, some of the farmers (23%) also provide their pigs with feedstuff from agro-industrial by-products (AIBPs). According to majority (89%) of the pig farmers, feedstuffs are easily accessible but are costly. Most respondents (64%) acquired their breeding stock from family members, friends and the open market (26%) with only 10% of the respondents acquiring their breeding stocks from breeding stations (Table 2). Majority (65%) of the local pig farmers sampled had access to veterinary services with most of them (84%) recording no mortality on their farms.
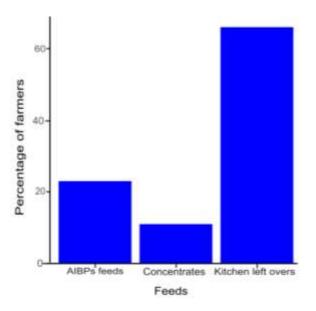
DISCUSSION

In the Volta region, Upper east and Brong-Ahafo region men were mostly the owners of local pigs but were generally managed by the women with the men concentrating on managing their crop farms. However, in the Western region, the study revealed that local pigs were owned and managed by women who engage in mixed farming, this indicates the eminent role women play in livestock production. This is in agreement with FAO reports that, women play an important role in subsistence farming including livestock production and food processing (FAO, 2006, 2008). Across the regions, apart from the Western region, most of the farmers especially in the Brong-Ahafo and Upper East regions have not had formal education. Similarly, Aina (2007) reported that majority of African farmers have not had formal education and most of them cannot read or write in any language and this contributes to their non-adoption of improved farming practices. UNESCO (2018), also reported that, as at 2010 about 58% of the Ghanaian population under the age of fifteen have had no formal education but by 2017, 84.5% of Ghanaian children were enrolled in primary education indicating the continuous effort to improve education in Ghana. Interestingly, the Western region may have recorded the highest number of educated farmers because from the year 1984 to 2000, the basic school enrolment increased significantly by 87% in an effort to curtail teenage pregnancy and other social vices in that region (GSS, 2004). The level of education of farmers recorded in the Western region may have also contributed to the high number of women engaged in pig

Table 2. Sources of breeding stock.

Source	Frequency	Percentage
Family and friends	86	64
Breeding stations	15	11
Open market	34	26

farming in that region, as education has been identified by Kimbi et al. (2015) as one of the factors that influence farmer's adoption to change. Results of this study also revealed that, majority of the local pig farmers were young adults aged between 20 and 50 years. This is of great significance because young people can contribute immensely to agricultural development in rural communities; policy makers and agricultural development experts worldwide have expressed worry that young people have less interest in taking up farming in rural communities (FAO, 2014).

A previous study reported that pigs are raised as homestead animals to provide just food for the household (Ganaba et al., 2011), but this study revealed that, although some pig farmers still raise pigs to provide the household with food, most pig farmers currently raise pigs mainly as a source of income. The study also revealed that exotic breeds (mainly Large White, Landrace and Duroc), Ashanti Dwarf Pigs and crossbreeds are the pig breeds raised by local pig farmers in Ghana. However, the majority of farmers were engaged in crossbreeding. This result is in agreement with a report by Osei-Amponsah et al. (2017) that most farmers resort to indiscriminate crossing of the local breeds with exotic breeds in a quest to improve the productivity of local pig breeds. This however leads to inbreeding and consequently low production, reproduction, poor health and dilution of adaptive traits needed for sustainable local pig production. Unfortunately, this practice has been encouraged over the years as the Ministry of Food and Agriculture import Grand Parent exotic breeds mainly Large White and supply to farmers for breed improvement (MOFA, 2013). We believe that future interventions must be carefully planned to maintain the adaptive germplasm needed for local pig production.

In the designing of breeding programmes for breed improvement, it is important to consider farmer's trait preferences. In determining which economic traits are preferred by farmers, both this study and previous work (Ouma et al., 2007) found that trait preferences by farmers are heterogeneous. Most pig farmers prefer pig breeds with fast growth rates; some also take into consideration the animal's body size/length, litter sizes, and good mothering ability. However, only a small fraction of farmers considers the animal's coat/skin colour. This is important information to consider in developing a pig breed for local production in Ghana.

Unlike in commercial farming where permanent housing facilities are built to provide shelter for pigs, in smallholder pig farming systems, pigs are raised under sheds, yards, stalls or shades. In the regions studied, only few farmers had permanent housing structures while majority of the sampled local pig farmers made use of sheds, yards and stalls or shades for housing their pigs. This may be due to how cheap, how accessible materials are and how easy it is to construct sheds, yards and stalls in these areas than it is for constructing permanent housing facilities (Karnuah et al., 2018).

High cost and availability of feed is one challenge most farmers face in pig production. In this study most of the farmers reported feed stuffs were available but costly. Due to this, they resort to feeding their pigs with kitchen waste and AIBPs rather than more expensive concentrates. Although the pig farmers did not keep financial records, they said they do not earn as much as commercial pig farmers. The feedstuffs used by these local pig farmers may explain the low level of income made from these pigs by the farmers. This agrees with reports by Karnuah et al. (2018) that local feedstuffs and concentrates were available in Liberia but expensive for the local pig farmer and affects the level of income of most local pig farmers.

The proximity of the various farms to each other (Supplementary Figure 1) explains why the pig farmers get their breeding stocks from friends, family and as inheritance. Only few farmers buy their breeding stock from breeding stations which are then circulated again to family and friends by crossing with other pig breeds in their localities. Due to this, there is a high possibility of indiscriminate crossbreeding among pigs in the communities studied. Finally, with regards to litter size, disease resistance and mortality experienced on farm, although these pig farmers do not keep records on their farms, they concluded that although local pigs had smaller litter sizes, they were resistant to most endemic diseases. Most farmers said they have access to veterinary services but are not able to purchase commercial drugs. Nonetheless, they record low mortality on their farms. This result agrees with reports that, local pigs are hardy, disease resistant and is able to survive drought incidence in Ghana (Adjei et al., 2015; Osei-Amponsah et al., 2017; Ayizanga et al., 2018).

CONCLUSIONS AND RECOMMENDATIONS

Local pig production in Ghana can be characterized as a semi-intensive production system with farmers keeping mostly crossbreeds. Growth rate and body size of pigs are important traits farmers consider in the selection of their breeding stock.

This study revealed that for the adoption of improved technologies by farmers, education must be prioritized. The Ministry of Education, Ghana Education Service

(GES) together with other stakeholders must put in place adult education schemes for local pig farmers.

To ensure the sustainable growth of the local pig industry in Ghana, improved housing, feeding and regular training of farmers, and adoption of community-based breeding programmes are recommended.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interest.

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SUPPLEMENTARY FIGURE

Supplementary Figure 1. Example images of housing conditions for pigs.