

Analysis of the Current Status of Small-Scale Sheep and Goat Production by Farmers of Different Age Groups in the Jirapa and Lambussie Districts, Ghana

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We analyzed the current status of basic animal husbandry and health care undertaken by small-scale, mixed-operation farmers in the Jirapa and Lambussie Districts of Ghana. Sixty mixed-operation farmers were interviewed through a structured questionnaire. SAS was used to analyze data grouped by farmers' age (age groups of 30-39, 40-49, 50-59 and 60-69). The mean total household size of farmers aged 60-69 was found to be significantly higher than the mean household size of farmers in their 30s or 40s. Independent of their age group, agricultural income from crops and from livestock production was not statistically different. The average numbers of both sheep and goats did not differ significantly between the various age groups. Use of veterinary services was highest among farmers of the 50-59 age group, and this group recorded the minimum mortalities of sheep and goats among the four age groups. The proportion of farmers keeping written records was significantly higher in the 40-49 age group than in the other age groups. None of the farmers in the 60-69 age group kept records. The survey indicated that because of the larger family size of the oldest group, the per capita income from livestock production was lower for families of farmers in this age group than for the younger age groups. Livestock mortality was highest for farmers in the 30-39 and 60-69 age groups; in order to increase income from livestock production in these age groups, reducing livestock mortality should receive topmost priority. Farmers recognize the necessity of animal health care especially vaccination and de-worming, but the actual numbers of farmers undertaking these activities appropriately were not captured in the data. It is therefore recommended that further studies be conducted to ascertain figures and determine the challenges associated with vaccinations and treatment of sheep and goats.

Key words: sheep, goats, Jirapa, Lambussie, Ghana

1. Introduction

1.1 Livestock Production in the Jirapa and Lambussie Districts

The Jirapa and Lambussie Districts and the northern part of Ghana as a whole are well noted for production of livestock, particularly sheep, goats, and guinea fowl. Livestock production, which is often termed "a bank on hoofs," serves as a supplementary source of income for most farmers. As reported by Chantalakhana and Skunmun (2002), livestock are a source of family

savings and economic security, as well as a means of averting risk in case of crop failure or natural hazards such as flood, drought, or other calamities. The majority of farmers in the districts of Jirapa and Lambussie are small-scale farmers who practice mixed farming. They hold combinations of a few sheep, goats, pigs, guinea fowl, local fowl, and occasionally cattle. Livestock are kept mainly under a semi-intensive system of farming. Pigs are kept mostly by households in which the women brew "pito" from sorghum or own a grinding mill; the sorghum by-products and waste flour can be

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obtained to feed the pigs. The districts lie in the Guinea savannah zone, where grasses and fodder abound for grazing by both small and large ruminants; supplementary feed for all kinds of livestock may be supplied in the morning and or in the evenings. An important channel for marketing livestock is the various markets, within and outside the district, where truckloads of mostly sheep and goats are bought and transported mainly to the southern parts of Ghana.

Challenges faced by the livestock industry in the district include low market prices at the beginning of the rainy season from May to October (during which farmers are compelled to reduce stock numbers because of the difficulty in feeding them during this period and to get money to purchase inputs and services for crop cultivation); the apathy of some farmers towards treatment and vaccination of livestock; theft; and the outbreak of diseases. The Jirapa and Lambussie District Agricultural Development Units (DADU), non-governmental organizations, and other stakeholders have been helping farmers to combat some of these challenges.

The current study was conducted to analyze the socioeconomic status of rural livestock farmers of various age groups (30–39, 40–49, 50–59, and 60–69), analyze basic husbandry and care in small-scale sheep and goat production, and suggest recommendations on basic animal husbandry practices to further improve the business of rural livestock farmers.

1.2 Sheep and Goat Production in the Districts of Jirapa and Lambussie

The dominant breeds of sheep and goat in the district are the indigenous West African Dwarf types. A publication by the German NGO Forum on Environment and Development (2001) indicates that local breeds are an important reservoir of biodiversity, as they are both hardy and disease-resistant. Breeding is all year round, as males are always with the females, except when the animals are tethered during the rainy/cropping season. At times inbreeding sets in when farmers keep “good looking” males for long periods.

Among the various ruminant species in the district, sheep and goats have the greatest prospects for profit maximization. Their management is less intensive and they are more prolific than cattle.

They also have faster rates of growth and greater environmental adaptability. Adjorlolo *et al.* (2007) indicated that sheep and goats can be used to augment local meat production and appropriately termed them the “poor man’s cow.”

1.3 Development of the Livestock Sector in the Jirapa and Lambussie Districts

Over the past 13 years, various government and non-governmental organizations have put in place a number of interventions to help alleviate poverty and increase livestock production in the two districts. The earliest was the Upper West Agricultural Development Project under the International Fund for Agricultural Development (UWADEP, 2005b) from 1996–2003. Livestock development was one of the sub-components of this project. The project introduced Sahelian sheep and goats aimed at improving the sizes of local breeds in the beneficiary communities and its environs. It was realized that individual farmers that had the financial resources and were willing to invest in their animals benefited the most.

Another important project, the Livestock Development Project (LDP) in 2003–2008, which has been extended a further 2 years, also aims to increase the incomes of smallholder livestock and dairy farmers, processors, and traders in the project areas. In the Jirapa and Lambussie Districts, 10 community livestock workers were trained and equipped to help livestock farmers with basic animal health care and husbandry practices to augment the services that the six veterinary technical officers and nine agricultural extension agents were providing in the communities. From 2005 to 2008, a total of 32,500 Ghanaian cedis was disbursed to 19 groups of livestock farmers as loans, of which there has been an 80% recovery rate. Interestingly, the LDP seeks as one of its objectives to promote and sustain local breeds of sheep, goats, and pigs, contrary to other projects, which introduce exotic breeds.

The government, through pro-poor intervention (grants in 2006), supplied goats to 10 women’s groups. Each group received 10 local does and one Sahelian buck. The groups received free drugs for treating their animals when sick. Because the bucks were allowed occasionally to cross with other local breeds, neighbors in recipient communities also

gained their share of improved crossbreeds.

An important local non-governmental organization, Rural Action Aid Program, also supports their working groups with livestock. As of 2008, 14 groups had each received 10 local ewes and an improved ram to improve their breeds. Another 15 groups had received similar packages, but with goats instead of sheep. Groups receiving these small ruminants pass on similar numbers of mature animals to other new groups, so that the project becomes self-sustaining.

1.4 Feed Availability in the Jirapa and Lambussie Districts

The Jirapa and Lambussie Districts lie in the Guinea Savannah Zone. This zone is characterized by important grasses such as guinea grass (*Panicum maximum*) and elephant grass (*Pennisetum purpureum*). Cutting fodder from, and allowing animals to browse on, trees such as *Faidherbia albida* (formerly known as *Acacia albida*) and fig trees is also quite popular. *Faidherbia albida* fruits are harvested in September-December and sold for 5 Ghanaian cedis per 15–20 kg in the dry season (November-April). The fruits are stored on top of sheds and in other storage rooms. It is so liked by sheep and goats that it always lures them back to their pens in the evening after free-range grazing during the day. Leaves from fig trees are occasionally cut by farmers and fed to animals, but they are not sold in these districts. In the regional capital Wa, it is a common sight to see people on bicycles carting fig leaves towards the livestock market to sell them. Koney (2004a) reported that the sale of guinea grass and elephant grass for feeding small ruminants is also a regular sight in many large towns especially along the Nima Highway in Accra, the national capital. Brisso *et al.* (2007) pointed out that trees and shrubs are hardy and can provide year-round fodder to supplement grazing in lean periods. Another feed resource in the district is farm residues such as groundnut tops, cowpea vines, soya bean vines, maize stovers and rice straw. Because legumes are uprooted whole and gathered at various spots in the field during harvesting before the pods are detached, it is easy to carry some home to feed livestock. On the other hand, rice straw is usually left in the field because only the topmost parts are harvested, and this feed is usually wasted

because pigs living in the valley bottoms trample it and root it up. Very few farmers cultivate the habit of gathering farm residues to be used as supplementary feed for livestock. Most crops are planted just around farmers' houses, and as such, roaming ruminants also have access to crop residues after harvesting. On the other hand, in the Nandom community in the neighboring district, it is a common sight for farmers to collect farm residues on the tops of sheds. Karbo *et al.* (2007) also reported that in communities and districts such as Gia in the Kassen-Nankana District, Diaga in the Bawku East District, and the Bongo and Bolgatanga Districts, where land has been fragmented because of high population pressure and grazing lands are few and poor in quality, the drying of groundnut haulms, cowpea vines, and other crop residues for supplementary feeding is practiced by over 70% of the community.

At the onset of rains, new grass and leguminous fodder sprout and the fields look green. Ørskov (1993) indicated that, in many developing countries that he visited, the number of cattle kept is geared towards the amount of feed expected during the dry season. He moreover stated that much feed goes to waste during the wet months, and if good methods of preserving feeds were available more animals could be maintained throughout the year, particularly as the quality of the feed also varies seasonally and declines in the dry season. According to Okantah *et al.* (2007), cattle farmers in the Sege-Aveyime area of the Accra Plains indicated that a shortfall in grazing materials during the dry season was a major constraint to production. In the Jirapa and Lambussie Districts, animal husbandry rather becomes a challenge during the rainy season. Even though grasses become much available, sheep and goats are tethered and do not have free access to them. Livestock numbers also are reduced, because they are sold to obtain services and to purchase inputs for crop farming. There have been attempts under the LDP to inculcate in farmers in the two districts the habit of establishing 0.2–0.4 ha of *Stylosanthes* and *Cajanus* spp. pasture for their livestock. The major challenge has been the project's sustainability, as the seeds are usually procured by the District Agricultural Development Unit (DADU) rather than by the livestock farmers themselves.

Very few farmers in the Jirapa and Lambussie Districts purchase mineralized salt blocks or licks, and most farmers are unaware that they are available at some of the agro-chemical and veterinary drug stores. However, the small quantity that the DADU procures runs out within a few weeks, as they are purchased by curious and collaborating livestock farmers.

Farmers purposely fetch drinking water for their livestock in the mornings and evenings. However, when sheep and goats are allowed to roam freely in the field they also drink from boreholes fitted with pumps, which have receptacles to collect excess water.

1.5 Destruction of Feed Through Bush Burning in the Jirapa and Lambussie Districts

Annual bush burning in the dry season or the Harmattan, a dry and dusty West African trade wind, seriously affects the availability of feed for livestock. It blows south from the Sahara Desert into the Gulf of Guinea between the end of November and the middle of March. January to March marks the period of the bushfires, also called wild fires, although fires may be started as early as November. During this period grasses turn brown and very dry, serving as a catalyst for bushfires. In a report entitled "Bushfires in Ghana", Nsiah-Gyabaah (1996) indicated that burning is embedded in the cultural values and traditional farming systems of the people. Fires are started mostly intentionally by hunters, herdsman, farmers, etc. Some farmers burn as a means of clearing their fields for easy cultivation during the major rainfall season, whereas herdsman on the other hand burn so that young grasses sprout easily. Natural trees, shrubs, grasses, and crop residues left in the field are burned, and it is noteworthy that bushfires burn feed or vegetative cover that sheep and goat can utilize and convert to body weight. In the Nandom community in a neighboring district, the Environmental Protection Agency, the Nandom Agric Project (an NGO), and the Chief and Opinion leaders have measures put in place to safeguard against bushfires. For example, a case study report from that area indicated that three boys caught setting a fire at Goziiri to help them collect honey were sentenced to collect three truckloads of stones as punishment (International Resource Group,

2005). Also, field excursions to neighboring Burkina Faso by some agricultural staff and livestock farmers from the Jirapa and Lambussie Districts revealed that farmers in the communities visited in Burkina do not burn. It was also noted during these field excursions that dried maize stovers are sprinkled with salt solution and given to ruminants during the lean season. Such trips, although expensive, serve as eye openers to the consequences of desertification.

1.6 Improving the Standard of Living of Farmers Through Livestock Production in the Jirapa and Lambussie Districts

Crop production yields have been decreasing over the years because of several internal and external factors. A problem-tree analysis carried out by the districts found that the major causes of low crop yields included erratic rainfall, poor soils, erosion, and the high cost of agricultural inputs (Agricultural Development Plan, 2006). Livestock production, on the other hand, has experienced fewer and more controllable risks. Important projects aimed at improving the standard of living of farmers have had livestock components. In the interim main report of one such project, the Upper West Agricultural Development Project (UWADEP, 2005b), which included the Jirapa-Lambussie District as a beneficiary, it was stated that "improved stock reaches a larger size than the local breeds, thus bringing farmers a higher income more quickly".

With the cost of inorganic fertilizer skyrocketing, the manure from small-scale ruminant and pig production has been a source of fertilizer for both farms that are closer to farmers' houses and dry-season vegetable gardening. Farmers already know the benefits of this animal manure, but the quantities collected are very small because no intensive system of keeping livestock is practiced. Extra efforts in livestock housing would maximize the amount of animal manure and thus would help to increase crop yield.

2. Materials and Method

2.1 Study Area

The districts of Jirapa and Lambussie together cover 1,667 km², approximately 9% of the 18,476 km² area of the Upper West Region. Major towns

include Jirapa, Hamile, Lambussie, Han, Piina, Tizza, and Karni. Together, the two districts share boundaries to the south with Nadowli District, to the east with Sissala West District, to the west with Lawra District, and to the north with Burkina Faso, and therefore serve as a national gateway with Burkina Faso from the Upper Western part of the country. The landscapes of the districts are generally flat and low lying, with an average elevation of 300m above sea level. There are a few plateau surfaces at elevations of between 300 and 350m at Yagha, Banwon, Jirapa, Lambussie, and Billaw. The districts are not well-drained and no major rivers are found, although there are intermittent tributaries of the Black Volta River. The vegetation of the districts is Guinea Savannah woodland with sparse undergrowth and scattered trees. Shea (*Vitellaria paradoxa*), dawadawa (*Parkia* spp), baobab (*Adansonia digitata*), and neem (*Azadirachta indica*) trees are of high economic importance to the people. The districts are located in the tropical continental climatic zone. The predominant soil type is sandy loam with underlying hard iron pans. There are however, narrow strips of alluvial soils along the numerous dry valleys of the tributaries of the Black Volta River. The granite rocks of the extensive Birimian formation store considerable quantities of ground water for borehole development.

The 2000 National Population Census put the population of the two districts at 96,834. This was made up of 51,334 females and 45,500 males representing 53% and 47% respectively. Until the splitting of the district into two in 2008, the Jirapa-Lambussie District had been the fourth largest in area and second in terms of population size. Approximately 5% of the people live in major towns in the districts, and 95% live in rural settlements. The districts are therefore considered rural. The major tribes are the Dagaabas and Sissala.

Agriculture is the main economic activity in the districts. About 90% of the people there are engaged in agriculture, which is largely subsistence in nature. A very small number of farmers are engaged in medium-scale production of cereals and legumes in the Lambussie, Han, and Mwankuri areas. Cash crops cultivated in the districts are shea nuts, cotton, groundnuts, and cashews. A few farmers are graduating into small-scale businesses

in the transport sector. Farming systems include mixed farming, rotational cropping, and bush fallowing. The land tenure system and the increasing pressure on land for farming and other activities are gradually limiting the systems of farming. Cattle, sheep, goats, pigs, and poultry are mainly produced as supplements to crop farming. Medium-scale livestock production is carried out by only a few farmers in the Han and Lambussie areas.

2.2 Data Collection

The survey was carried out in 15 communities in the Jirapa and Lambussie Districts of the Upper West Region of Ghana in December 2008. Fifteen agricultural extension agents (AEAs) were selected to administer the questionnaire to five farmers each. The selected AEAs were holders of certificates or diplomas in general agriculture and also had more than 10 years' service and experience. The AEAs were thoroughly briefed beforehand on the details of the questionnaires. To avoid any bias, no specific knowledge about the objective of the research was shared with the AEAs. The AEAs were free to interview any livestock farmer, whether young or old, male or female, from their communities or operational areas. Questionnaires were administered to 75 livestock farmers across 15 communities in the two districts. However, 15 were incomplete and had to be omitted from the study leaving 60 questionnaires for the final analysis. The data was analyzed using Statistical Analysis System (SAS).

2.3 Content of Questionnaires

Biographical data collected included name, age, sex, marital status, number of wives, educational level, main occupation, number of children, number of school-aged children actually in school, number of other dependants, size of household, number of children outside community, and the type of employment children outside the community are engaged in. Types of economic activity engaged in by respondents (such as livestock production, marketing, food crop production, cash cropping, meat and milk processing, fishing, etc.) were also recorded. Information on types of training attended, including field visits and excursions and their locations, as well as the topics treated, the

organization responsible, the usefulness of training, and the application of knowledge from training, was also collected. Data on credit were collected as well.

With regard to general husbandry practices, data collected included housing conditions and the system and costs of feeding, watering, record keeping, and marketing/off takes.

Finally, with regard to health care, data were collected on vaccination and treatment of livestock, including farmers administering medication to livestock by themselves, consultations with community livestock workers and veterinarians, the frequency of such consultations, the use of community livestock workers or veterinarians or both, total expenditure on animal health care, and total livestock mortality.

3. Results

The mean number of children was significantly higher for farmers of the 60–69 age group than for farmers of the other age groups (Table 1). The mean number of children at school going age was significantly lower for farmers in the 30–39 age group than for farmers in the other age groups except age group of 40–49 (Table 1). The total household sizes of farmers in the 60–69 age groups were significantly higher than the rest except the 50–59 age group. (Table 1). The proportion of farmers keeping written records was significantly higher for those in the 40–49 age group than for those in the other age groups; no significant difference was shown between the 30–39 and 50–59 age groups (Table 1). None of the farmers in the 60–69 age group kept written records, and this age group recorded the highest level of illiteracy (Table

1).

There was no significant difference ($P > 0.05$) among farmers in any of the various age groups with regard to the proportion of income derived from either crop or animal production (Table 2).

The average numbers of sheep and goats among farmers of the various age groups were not significantly different ($P > 0.05$). The male to female ratio of sheep owned by farmers in the 30–39 age group was 1: 7; the ratio in the other age groups was 1: 5. The male to female ratio of goats owned by farmers in the 30–9 and 40–49 age groups was 1: 3; the ratio in the 50–59 and 60–69 age groups was 1: 4 (Table 3).

Use of veterinary services was significantly greater to farmers of the 50–59 age group than it was to the other age groups (Table 4). This is correlated with a lower rate of livestock mortality for the farmers of this age group than for the farmers of other age groups. The proportion of farmers who vaccinated, de-wormed, and castrated did not differ significantly between age groups (Table 4). The proportion of farmers who de-ticked their animals was significantly higher in the 60–69 age group than in the other age groups. No significant difference was observed between the proportion of farmers in the 40–49 age group who de-ticked and the proportion of farmers in the 50–59 age group who de-ticked. The proportion of farmers who de-ticked their animals was significantly lower in the 30–39 age group than the proportions in other age groups (Table 4). There was a significant difference between each of the four age groups with regard to the mortality rates of their animals (Table 4).

Table 1. Family structure, literacy, and record keeping among farmers in the districts of Jirapa and Lambussie

Age	No. of farmers	No. of children	No. of school-age children	Total household size	Illiterate (%)	Written records kept (%)
30–39	9	5.0±0.7 ^c	3.1±0.5 ^b	9.8±1.6 ^b	33.3 ^c	11.1 ^b
40–49	17	6.0±0.7 ^{cb}	4.7±0.6 ^{ab}	10.0±0.8 ^b	47.1 ^b	29.4 ^a
50–59	25	7.7±0.7 ^b	6.0±0.6 ^a	12.2±1.1 ^{ab}	44.0 ^b	16.0 ^b
60–69	9	10.4±1.5 ^a	6.0±2.0 ^a	14.4±1.8 ^a	88.9 ^a	0.0 ^c

^{a,b,c}: Different letters in the same column indicate that the values differ significantly ($P < 0.05$).

±: plus/minus standard deviation.

Table 2. Proportions of income from crops and livestock

Age	No. of farmers	Percentage income from crops	Percentage income from animals
30-39	9	63.3±5.8 ^{A,a}	32.2±5.7 ^{B,a}
40-49	17	57.9±5.4 ^{A,a}	35.0±4.0 ^{B,a}
50-59	25	59.6±3.7 ^{A,a}	35.9±3.5 ^{B,a}
60-69	9	50.6±5.0 ^{A,a}	43.9±6.9 ^{B,a}

^{A,B}: Different letters in the same row indicate that the values differ significantly ($P < 0.05$).

^a: Same letters in the same column indicate that the values do not differ significantly ($P > 0.05$).

±: plus/minus standard deviation.

The percentages do not add up to 100% because some farmers had other sources of income, including remittances and petty trading.

Table 3. Average numbers of sheep and goats

Age	No. of farmers	Sheep		Goats	
		Male	Female	Male	Female
30-39	9	1.6±0.6 ^{B,a}	10.9±4.3 ^{A,a}	5.2±1.5 ^{B,a}	14.4±2.9 ^{A,a}
40-49	17	2.5±0.9 ^{B,a}	12.2±4.2 ^{A,a}	4.7±0.7 ^{B,a}	14.4±2.4 ^{A,a}
50-59	25	3.1±0.7 ^{B,a}	14.3±3.3 ^{A,a}	3.9±0.5 ^{B,a}	16.9±2.9 ^{A,a}
60-69	9	3.6±1.2 ^{B,a}	16.2±5.9 ^{A,a}	3.3±0.7 ^{B,a}	13.0±2.5 ^{A,a}

^{A,B}: Different letters in the same row indicate that the values differ significantly ($P < 0.05$).

^a: Same letters in the same column indicate that the values do not differ significantly ($P > 0.05$).

±: plus/minus standard deviation.

Table 4. Percentages of farmers undertaking animal health care; veterinary availability and procedures; and animal mortality rates

Age	No. of farmers	Veterinary availability (%)	Yearly vaccination (%)	De-worming (%)	De-ticking (%)	Wound treatment (%)	Castration (%)	Animal mortality ¹⁾ (%)
30-39	9	44.4 ^b	100.0 ^a	66.7 ^a	11.1 ^c	55.6 ^b	55.6 ^a	44.4 ^a
40-49	17	41.2 ^b	82.4 ^a	70.6 ^a	47.1 ^b	64.8 ^a	64.8 ^a	11.8 ^c
50-59	25	76.0 ^a	96.0 ^a	76.0 ^a	48.0 ^b	40.0 ^c	64.0 ^a	4.0 ^d
60-69	9	44.4 ^b	88.9 ^a	66.7 ^a	77.8 ^a	66.7 ^a	77.8 ^a	22.2 ^b

Chi-squared test:

^{a,b,c,d}: Different letters in the same column indicate that the values differ significantly ($P < 0.05$).

±: plus/minus standard deviation.

¹⁾ Percentage of farmers losing more than 15% of their livestock per year.

4. Discussion

The information on family structure (Table 1) revealed the background of the farmer, spouses, children, and other dependants. It was not surprising for farmers in the 60–69 age group with the exception of the age group 50–60 to have the significantly higher household sizes because, traditionally, polygamy is practiced widely and men continue to marry younger women and have children by them. A consequence of large family sizes is the high number of dependents. According to The Association of Church Development Projects (ACDEP), 49.7% of the population of the Upper West Region (286,652 people of a population of 576,583) are dependents, a proportion higher than that found in the Ashanti, Brong Ahafo, or Western regions (48.1%, 47.5%, and 46.9% respectively). The report further states that "...perhaps the low level of education and large Catholic and Muslim populations offer the explanation to this phenomenon. While it is an undeniable fact that family planning methods and policies hardly succeed among illiterate population, the two religions who do not embrace modern family planning methods cannot wholly divorce themselves from the problem of large family sizes in the region" (<http://www.acdep.org/Regions/UpperWestRegion.php>). With large family sizes, farmers are likely to have more responsibilities toward their family members such as payment of bills, food, clothing, shelter and other basic needs. This is likely to have an impact on the number of sheep and goats kept by these farmers as they normally tend to sell these animals to cater for family needs and wants.

Keeping simple written records on livestock is difficult for illiterate farmers. Gradual improvement in education by various governments and NGOs over the years might have resulted in the higher literacy levels seen among the younger farmers. Data (2000) posted on ModernGhana.com indicated that 38.8% of the Ghanaian population (33.1% males and 44.5% females) had never attended school, but that in the Upper West Region 69.8% of the population aged 6 years and older had never attended school (65.1% males and 73.9% females); this was the highest rate in the country. Information from the Ghana Statistical Service indicates that in the Jirapa and Lambussie Districts

the net enrolment rate in Primary and Junior High Schools is only 11.5%. This low enrolment rate would undoubtedly have contributed to the low levels, or lack, of written data kept by livestock farmers. On the other hand, agricultural extension agents and veterinary staff at times enter data in farmers' books, especially when such farmers are being groomed for a district or regional award during "Farmers' Day" celebrations. Record keeping aids in easy access to loan facilities. It also becomes necessary when farmers want to accurately know their net profit on their livestock production. Record keeping helps farmers to identify and know animals whose performances are below standard and to remove them from their stock (cull them). Koney (2004b) indicated that basic record to be kept should include: herd size and composition, birth rate, offspring mortality and off-take. Although farmers are being advised by agricultural extension agents to let their literate children enter data into their farm books for them, the majority of farmers simply keep livestock data in their memories.

Although there are no significant differences in incomes according to age group, a close look at the figures reveals that farmers in the 30–39 age group concentrate more on crops than on animal production (Table 2). Farmers in this age group are more energetic and able to cultivate the land using primitive tools such as hoes and cutlasses. Donkey ploughs are limited to a few villages, and tractor services depend on farmers' ability to pay. It can be inferred that farmers in this age group concentrate more on crops to augment the losses due to the high livestock mortality rates recorded. According to the Association of Church Development Projects (ACDEP), "one significant factor about the population of the two upper regions of Ghana is the seasonal out-migration of the people, especially the youth, to the southern part of the country where life is comparatively better. A short rainy season, poor soils, inadequate infrastructure, absence of industries, and inadequate job opportunities in the region are driving people from the region. These are relatively abundant in the south, which is the destination of most of the migrants. These problems, coupled with a long dry season (from November–April), also a period when the emigration takes place, seem to justify this movement". In

an interim evaluation of the UWADEP, Blench (2006) reported that the Jirapa and Lambussie Districts had the highest proportion of household members absent on migration (45.2%). From these observations it can be inferred that no proper care can be given to the livestock of younger farmers who migrate seasonally to the south of the country.

There was no statistically significant difference among the various age groups with regard to sheep and goat production (Table 3), and it can be inferred that farmers of the various age groups attach equal importance to sheep and goat production. However, a close look at the figures indicates that farmers of all age groups apart from the 60–69 age group had more goats than sheep. This might be due to the fact that the oldest group finds the management of sheep easier. Results of a survey by Adjorlolo *et al.* (2007) showed that the majority of farmers (58.3%) preferred rearing goats, whereas 36.7% preferred rearing sheep. In that same survey, 57% of those who preferred goats gave the prolificacy of goats as the major reason, whereas 63.6% of those who preferred sheep gave the ease of management of sheep as the major reason for their preference. Adjorlolo *et al.* add that goat meat is a delicacy in southern Ghana and farmers there prefer goat to sheep. In another study in the Upper East Region of Ghana, Karbo *et al.* (2007) also indicated that goats are seen as being more prolific than sheep, kidding twice a year at 6-month intervals, compared with sheep, which lamb once a year. The same study reported twinning in goats to be 43.7% compared to 5.4% in sheep flocks, further supporting the point regarding their prolificacy. The mating ratio for both sheep and goat is averagely 1male: 35 females. In this present study, overall mating ratio for sheep was 1: 5 while that of goats were 1: 3. This is because farmers keep few tens of sheep or goats and mostly put one or two mature males for breeding purposes.

The high use of veterinary services to farmers of the 50–59 age group (Table 4) may be due to the trustworthiness of farmers in this age group in terms of payment of veterinary services such as drugs, vaccines, service charges (revenue to the government), and fuel (at times) for the distance travelled by motor bike. Occasionally, some farmers in some communities neglected the vacci-

nation of either their sheep or goats during the yearly vaccination period against “peste des petits ruminants” (PPR), with the mistaken perception that either their sheep or goats were resistant to the disease. In the Jirapa and Lambussie Districts, this problem was prominent in the communities of Tuggo, Karni, and Sabuli (Reference to 2006, 3rd Quarter LDP Report). Also, this vaccination period usually coincides with the onset of the rainy season because sheep and goat roam freely during the day unless tethered at the beginning of the cropping season. Therefore, the animals are available for the vaccination at this time. The PPR vaccination is effective for 12 months (<http://www.cfsph.iastate.edu/diseaseinfo/notes/PestedesPetitsRuminants.pdf>). Animals are vaccinated yearly in the districts. Whether deliberate or not, some farmers are able to confine most of their sheep, but only a few of their goats; they claim that their schoolchildren/wards are unable to chase and tether their goats because goats are generally very active in running. Farmers learn hard lessons only when there is an outbreak of the disease later in the year, as occasionally happens. Another reason often given by farmers concerning their neglect to vaccinate their livestock is the lack of money to pay for the government subsidized vaccinations, although extension agents constantly advise farmers to sell one animal to treat or vaccinate the rest. Ironically, a popular saying among some farmers is that “there is no funeral for a dead animal”, which can be interpreted to mean that a dead animal is eaten and not buried, regardless of whether it has been slaughtered or died of unknown cause. Such farmers do not bother vaccinating their sheep or goats against the PPR. At a quarterly LDP review meeting of the entire beneficiary district in the region in 2005, some stakeholders proposed that, among other things, to curtail the challenge of high mortality as a result of farmers’ inability to pay for the government subsidized vaccination, the cost of vaccination should be totally free. Even though this suggestion is unsustainable, they claimed that this would be one of the surest ways of reducing the poverty of livestock farmers in the Upper West region. In a related development, in 2007, on the occasion of Ghana’s “Golden Jubilee” of independence from Britain, there was a free “Jubilee vaccination” program to vaccinate small ruminants

against PPR. Because this time round the vaccination was free, over 10,000 sheep and goats were vaccinated within only a few weeks (as compared with only 5,701 in 2006), and there was a shortage of the vaccine. Veterinarians explained that production of the vaccine demanded huge numbers of poultry eggs and that the shortage of vaccine was due to the outbreak of avian flu. Most of the communities not able to be covered by the Jubilee vaccination program expressed their disappointment over the shortage. Even with the shortage of vaccine, that year recorded one of the highest vaccination figures against PPR in the Jirapa and Lambussie Districts.

5. Conclusion

The study revealed the performance of small-scale sheep and goat farmers in the districts of Jirapa and Lambussie. All the age groups of livestock farmers showed no statistical difference in the average numbers of either sheep or goat; the percentage of their agricultural income from livestock and from crop production; necessity for vaccination, deworming and castration of sheep and goats. They however differed significantly in keeping of *written records on livestock production and in livestock mortality*.

It is noteworthy to point out that farmers of the age group of 50–59 used veterinary service the most and also had the least percentage mortality. They can therefore be considered as performing best in sheep and goat production among the various age groups.

For further improvement in sheep and goat production of farmers, sufficient relevant and updated education should be shared with agricultural extension staff. Also, because young and old livestock farmers have different degrees of knowledge and acceptant of various animal husbandry and health care practices, dissemination of modern and traditional animal husbandry techniques needs to take into consideration the various age groups of farmers. It would be best for this knowledge to be shared among both young and aged farmers and agricultural extension agents through “participatory technology development”. Moreover, there is also the urgent need to upscale the concept of “the model farmer”, whereby success stories of local livestock farmers are recognized and made known

in individual communities for others to emulate. Lastly, to increase the income from livestock production, reducing the high mortality rates of livestock owned by farmers of the 30–39 and 60–69 age groups should receive topmost priority. It is also recommended that further studies be conducted to ascertain figures and determine the challenges associated with vaccinations and treatment of sheep and goats.

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