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Sheep and Goats
in Nigerian Agriculture

Structure of Small Ruminant Production
in S.W.Nigeria and Improvement Possibilities

edition herodot

Abstract

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This paper describes the traditional method of keeping small ruminants in South-Western Nigeria and shows initial steps for future development. The data necessary for this paper have been gained through extensively questioning smallholders in two small regions, which are typical for the humid tropical area of West Africa (forest zone and derived savanna). Moreover, data from other studies of ILCA Small Ruminant Programme, among which this paper may also be included, were of use, too. The findings can be summarised as follows:

Small ruminants are traditionally kept in small herds, there being a high loss of young animals. In addition to natural pastures, the main sources of fodder are the waste products of the traditional way of preparing food. The range of fodder is particularly poor during the dry period. Breeding animals are on the whole gained by borrowing young female animals. Since owners of large-sized herds can hardly refuse requests for borrowing animals, the economic impetus for increasing animal stock is minimal. The traditional way of selling animals by way of middle men as well as the significant seasonal fluctuations in demand are both factors which characterise the business of marketing stock. The animals' health situation and the quality of fodder during the dry season have been identified as the most important restricting factors in improving the keeping of small ruminants.

Veterinary measures and certain procedures of growing animal fodder ('alley-cropping') on fallow areas are thus recommended for the future development of the existing production system; relevant experimental findings from ILCA and IITA can be referred to here.

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Diese Arbeit beschreibt die traditionelle Kleinwiederkäuerhaltung im Südwesten Nigerias und zeigt Ansätze zur Weiterentwicklung auf. Die dazu erforderlichen Daten werden durch umfangreiche Befragungen von Kleinbauern in zwei für die feuchten Tropen Westafrikas typischen Kleinregionen (forest zone und derived savanna) gewonnen. Außerdem fanden Daten aus anderen Studien des ILCA-Small-Ruminant-Programms, in das auch diese Arbeit einzuordnen ist, Verwendung. Die Ergebnisse können wie folgt zusammengefaßt werden:

Die traditionelle Kleinwiederkäuerhaltung erfolgt in kleinen Herden; die Verluste an Jungtieren sind hoch. Zur Futterversorgung dienen neben der Naturweide hauptsächlich Abfallprodukte der traditionellen Nahrungsmittelverarbeitung. Besonders während der Trockenzeit ist das Futterangebot schlecht. Zuchttiere werden in der Regel durch Ausleihen weiblicher Jungtiere beschafft. Da Bitten um Leih-tiere von Besitzern größerer Herden kaum ausgeschlagen werden können, ist der ökonomische Anreiz zur Bestandsvergrößerung gering. Die Vermarktung ist durch den traditionellen Absatzweg über middle-men und starke saisonale Nachfrageschwankungen gekennzeichnet. Als wichtigste Hemmfaktoren einer Verbesserung der Kleinwiederkäuerhaltung wurden die Gesundheitssituation der Tiere und die Futterqualität in der Trockenzeit identifiziert.

Zur Weiterentwicklung des vorgefundenen Produktionssystems werden folglich Veterinärmaßnahmen und bestimmte Futterbauverfahren ("Alley-Cropping") auf den Brachflächen empfohlen; dabei kann auf einschlägige Versuchsergebnisse von ILCA und ITTA verwiesen werden.

5. Summary and Conclusions

Even though the indigenous West African dwarf breeds of sheep and goats (the Djallonke) are known to be trypano-tolerant and the most predominant livestock species in the high populated and tsetse-infested humid zone of West Africa, their potential role in the overall livestock production has never received the desired recognition as far as government development policy and research efforts are concerned.

Following the available literature, this study's hypothesis assumes that farmers' income and the overall meat supply in the increasingly high demand region of West Africa could be substantially increased by the adoption of improved forms of livestock management, particularly improved health control measures incorporated with improved nutritional base.

The present study, which was carried out as an integral part of the multi-disciplinary research concept of the ILCA-Small Ruminant Programme covers general agricultural and socio-economic aspects and examines the present structure and constraining factors for improved sheep and goat production within the existing farming systems typical for the humid zone of West Africa as illustrated by an example of S.W.Nigeria. Socio-economic data from a sample of 40 farmers, 20 in each of the forest and derived savanna zones, East and West of Ibadan (Oyo State), respectively, were collected by means of questionnaires. All activities related to livestock and arable and tree crop production as well as other miscellaneous undertakings were enumerated at least once weekly for a period of 14 months. Further, inputs and outputs to crop and livestock production, farm sizes, livestock inventories, etc. were also recorded. In addition to this study which involved smallholders, socio-economic data on three large-scale (commercial) sheep and goat farms, 50 km north of Ibadan were also collected for a period of 12 months. The collected data on smallholdings were compiled by means of electronic data processing equipments and the analysis covered mainly the methods of descrip-

tive statistics. Thus similarities and differences among the sample farms in the two research sites of the study area in respect to resource endowment, factor allocation in the different enterprises, i.e. crop farming, livestock production and miscellaneous activities, as well as realized incomes were investigated. Data on animal productivity, health and nutritional aspects from parallel studies within the ILCA-Small Ruminant Programme were also utilized whenever found relevant for this study.

The results can be summarized as follows:

- (1) The resource base of the smallholdings in both locations of the study area is characteristic of peasant agriculture in most of West Africa and Africa at large:
 - Small and fragmentary farm plots. The average farm-size for the study area was 3 ha, whereby approximately 50% and 20% of the farm area in the forest and derived savanna zones, respectively, were under fallow. In general, land is not yet a limiting factor for both crop and livestock production in the study area in S.W.Nigeria.
 - Low farm labour capacities. The average during the study period (1980-82) was approximately 3 man-equivalents per farm and this comprised of mainly the husband and his wife/wives. This was due to the fact that almost all the children between 6 and 15 years attended school and the young adults between 16 and 35 years had occupations outside farming, mostly in urban centres. Further, the majority of women, especially in the forest area, were engaged in off-farm activities such as petty trading and food processing. During peak periods, household farm labour was thus supplemented by labour from outside, e.g. exchange, communal and hired labour. Of the three sources, hired labour, which could be sought from fellow farmers and people from other states, was the most important and was usually employed for such activities

like land preparation and weeding. The wage rates of N 0.63 per ME-hour during the study period were extremely high for rural areas. Except for the occasional help by neighbours for supplementary feeding the animals, non-household labour, especially hired labour, was not employed in livestock production.

- Low level of technology. The capital assets, particularly farm equipments were limited to simple tools such as hoes, cutlasses and axes. The replacement value of farm equipments belonging to an average farmer during 1980/81 was estimated to be N 105.

- (2) Sheep and goats were reared extensively in small mixed flocks of approximately 7 and 9 small ruminant units (SRU) per farm in the forest and derived savanna zones, respectively. Goats were preferred to sheep, this being particularly true for the derived savanna area, where the goat/sheep ratio was 3:1 compared to 1.3:1 in the forest area. Sheep were disliked due to religious reasons (in the derived savanna) and also due to their habit of wandering far and thus destroying crops. While goats were sold and slaughtered for almost all festivities, sheep (rams) are of high demand during Muslim festivals (e.g. Ileya).

Among the means of acquiring breeding stock, borrowing from friends and relatives was the most common and this results in sharecropping of the offspring. Purchasing was rarely practiced due to financial constraints and the non-availability of suitable animals in the market.

- (3) The dwarf breeds of sheep and goats, though extensively managed, showed high reproductive rates. Age at first parturition was 544 ± 28 days among ewes and 562 ± 23 days in does. With a parturition interval of 287 ± 44 days for ewes and 278 ± 10 days for does, approximately 3 parturitions in 2 years seem to be feasible.

The lambing and kidding rates were impressive. Taking the average litter size of 1.3 lambs and 1.6 kids, the annual reproductive rate was 1.7 lambs per ewe and 2.1 kids per doe.

Even though the dwarf breeds of sheep and goats are known to breed all year around, lambings and kiddings showed some seasonal character, this depending on the plane of nutrition.

Lambs were noted to grow faster than kids. The average growth to 90 days was 74 g/day among lambs compared to 35 g/day for kids. Post-weaning growth rates were remarkably low for both species. Lambs grew at a rate of 49 g/day between 91 and 150 days compared to 20 g/day for kids.

Growth rates were influenced by sex (males growing faster), type of birth (singles growing faster), age of dam and nutritional levels.

- (4) Among the factors limiting sheep and goat production in the humid zone of West Africa, disease has been noted to be the most important. In the study area, diseases of significant importance included peste des petit ruminants (PPR), ectoparasites, particularly sarcoptic mange, helminthiasis and pneumonia. Of the two species, goats were more prone to PPR and mange than sheep.

Due to the laissez-faire attitude of farmers towards livestock production and thus poor animal husbandry practises combined with the nonavailability of animal health control measures under village conditions, morbidity and mortality rates were noted to be remarkably high in the study area. While pre-weaning mortality rates among studied animals were in the order of 10% (n=158) among lambs and 24% (n=707) among kids, post-weaning (4-12 months) mortality rates were 14% (n=148) in sheep and as high as 22% (n=699) among goats. For animals over 12 months of age, mortality rates were 12% (n=138) among sheep and 14% (n=576) for goats.

- (5) The nutritional base under village conditions was comprised mainly of natural forages on rangelands in and around the villages. There exists a bush belt around most of the villages in S.W.Nigeria, which serves not only as a source of fodder for all the village animals, but also as a buffer so that animals do not destroy crops on farm plots near the villages. The carrying capacity of the bush belt was estimated to be 0.21 to 0.52 ha/SRU (or 1.92 to 4.76 SRU/ha) in the forest area and 0.24 to 0.61 ha/SRU (or 1.64 to 4.17 SRU/ha) in the derived savanna. Judging from the present average number of animals per village, 150-300 animals in the study area, flocks can be increased by 40-50% without putting undue pressure on the available feed. However, it should be noted that, even with the present nutritional base, which is said to be adequate, an acute feed shortage exists during the dry season. Thus, for viable production, carrying capacity estimations should be adjusted for dry season conditions. Fallow lands were observed to be occasionally used for grazing sheep, especially in the forest area, where they are tethered during the dry season. Farmers had no established pastures for their animals. However, cutting and carrying of grasses, browse plants and some residues from farm plots and fallow lands was occasionally practiced.

Of particular importance in the nutrition of sheep and goats in the villages are the agro-industrial byproducts (supplements). The most important agro-industrial byproducts were maize chaff (eri) in the forest zone and casava peelings in the derived savanna. Animals were offered supplements at least twice daily throughout the year. The type and size of rations, which were biggest during harvesting period and smallest during the dry season, depended on the cropping pattern, food preferences and season of the year. While supplements were obtained free-of-charge in the derived savanna, in the forest area, which has urban

characteristics and thus high degree of commercialization, cash costs were incurred for the purchase of maize chaff (eri). On average, forest farmers spent N 4.44 per SRU and year. Nevertheless, except for maize chaff, most of the agro-industrial byproducts available in the village have been found to be of low nutritional value.

- (6) Livestock inventories conducted during the entire study period have revealed that sheep and goats were reared more for sale than for home consumption. Of the 6 SRU leaving an average farm in the forest area, 35% were sales and 25% home consumption. In the derived savanna, on the other hand, 43% of the 5 SRU which left an average flock were sales compared to only 10% consumed at home. Home consumption was limited to slaughtering during festivals and ceremonies and emergency slaughter of terminally sick animals.

Even though there exists a high demand for the dwarf breeds of sheep and goats in Southern Nigeria, farm-gate prices received by producers (farmers), who sold their animals to middlemen in the villages, were between 30 and 45% lower than those received in the urban markets.

Lack of market information, the traditional belief that middlemen are experts in trading coupled with liquidity constraints contribute to the wide trade margins. The elimination of the middlemen or reduction of their influence combined with better market information, possibly by establishing producer co-operatives and an efficient Extension Service can improve the marketing situation considerably.

- (7) A comparative analysis of the enterprises of an average sample farm, i.e. farming, livestock production and off-farm activities (e.g. petty trading, handicrafts, etc.), especially with regards to household labour input and realized gross margin, was conducted.

Of the 2011 ME-hours spent by the 2.94 ME on productive work per farm per year in the forest area, 66% were allocated to crop farming, 22% to off-farm activities and 11% to livestock (small ruminant) production. The yearly work load per ME was thus 453 ME-hours for crop farming, 154 ME-hours for off-farm activities and 78 ME-hours in livestock production. In the derived savanna, on the other hand, 83% of the 2889 ME-hours enumerated for productive work were spent in crop-farming, 11% in off-farm activities and 7% in livestock production. Thus, considering the labour capacity of 2.66 ME per household, each ME spent 898 ME-hours yearly in crop farming, 115 ME-hours in off-farm activities and 73 ME-hours in livestock production.

During the cropping season (March to September/October), when labour demand for crop farming was highest, farmers in both locations of the study area spent comparably less time for livestock production and off-farm activities, this being particularly true for the derived savanna area, where farmers were more dedicated to farming than their forest area counterparts, who are becoming increasingly involved in off-farm activities, particularly the women.

The economic performance of the three enterprises, varied tremendously. Out of the total gross margin of N 730 per farm in the forest area, crop farming contributed 63%, while off-activities had a share of 28%. Livestock production, which included poultry and wild game, contributed only 9% of the total gross margin, whereby small ruminants had a diminishingly low share of 4%.

In the derived savanna, on the other hand, crop farming contributed 66% of the N 963 total gross margin per farm, off-farm activities and livestock production had a share of 21 and 13%, respectively. Sheep and goats contributed a good 11% of the total gross margin.

Concerning labour productivity, the gross margin per ME-hour household labour in the forest area was ₦ 0.34 for crop farming, ₦ 0.45 for off-farm activities and ₦ 0.30 for livestock production.

Disappointingly, the gross margin per ME-hour in sheep and goat production was only ₦ 0.07.

Comparably, gross margin per ME-hour in crop farming was ₦ 0.26, ₦ 0.65 in off-farm activities and as high as ₦ 0.68 in livestock production.

The gross margin per ME-hour in small ruminant production was ₦ 0.51, which was approximately double that realized in crop farming.

The better performance of small ruminant production in the derived savanna zone may be explained by the following. Supplementary feed, which had to be purchased in the forest area was obtained free-of-charge in the derived savanna. Further, the flock inventory revealed a positive flock growth amounting to + 1.21 SRU (~₦ 38) per farm in the derived savanna, compared to -1.32 SRU (~₦ 36) in the forest area.

Bearing this in mind, one can conclude that being a low-input activity, sheep and goat production at village level can be as economically efficient as other economic activities.

- (8) Commercial sheep and goat production in S.W.Nigeria and the humid zone of West Africa at large, can be said to be at an infant stage. Not only are the few known farms only recently established (≤ 8 years), they are small in size and the production is carried on along with other economic activities such as crop farming and poultry production. Further, their economic performance has been found to be disappointingly poor, this notwithstanding the enthusiastic capital investments as demonstrated by the case of the 3 commercial farms in Oyo.

The reasons for the poor performance can be summarized as follows:

- Lack of management skills and experience in intensive sheep and goat production, were surely the major causes of the high cash inputs in housing, fencing and pasture establishment. Costs for fodder provision could have been relatively low if cheap sources such as cut-and-carry would have been utilized, particularly since permanent labour was employed for the few animals (≤ 50 SRU/farm).
- Lack of commitment in sheep and goat production; time and effort being spent in other enterprises, particularly poultry production.
- General high morbidity and mortality rates among animals under confinement in the humid tropics, coupled with poor veterinary services contributed to the high losses incurred.
- Purchasing foundation stock randomly and in large numbers without proper health control measures (quarantine procedures) which usually results in epidemics, contributed largely to the high mortality rates in intensive finishing units e.g. in ADEWUNMI Farm.

Given the high demand for sheep and goats, commercial production can be viable if the above named constraining factors are alleviated. Random purchasing of foundation stock and/or for expansion and fattening purposes is not recommended due to the high element of risk, especially when health control measures are inadequate. Further, there is scarcity of suitable animals (i.e. weaners and yearlings) in the markets. In such cases self-replenishing flocks seem to be more appropriate.

- (9) Improvement possibilities open to the village system of sheep and goat production involve the introduction of health control measures, especially against sarcoptic mange and helminthiasis. The ILCA

experiments in S.W.Nigeria have shown that such propositions are feasible, particularly when all animals belonging to a village or locality are included. Of the three alternatives for the introduction of health control measures, i.e. whole village control measures, mobile and stationary clinics, the former seem to be more practicable, because stockowners (farmers) will be directly more involved and thereby learning and accumulating experience in proper animal husbandry practices.

In addition to health control measures, the improvement of the nutritional base seem to be inevitable, especially when we consider the fact that the health control will reduce morbidity and mortality rates considerably, hence the result is a high reproductive rate and thus large animal numbers, which will make the available fodder supply insufficient.

The alley cropping system seem to be the most appropriate improvement strategy in this case. This is mainly due to its expected significant impact in soil fertility regeneration, particularly the possibility of continuous cropping on one plot; the traditional fallowing, which was characterized by shifting cultivation and longer fallow periods can no longer be practised (particularly in areas with high population densities) and, thus, land a scarcity exist. The use of the surplus foliage from the browse plants as mulch and the possible utilization of the animal dung as manure, especially when animals are confined and thus fed using the cut-and carry system, makes the alley cropping system the best option in fulfilling this study's hypothesis, namely the integration of small ruminant production in the existing farming systems.

In sum, any improvement in the existing village system of sheep and goat production should aim at maximizing the efficiency of the present resource base, before going on to more land, labour and capital intensive systems.

Since sheep and goat production is only secondary to other economic activities (such as crop farming and off-farm activities), the adoption of the proposed production systems will depend mainly on their competitiveness with the other activities, particularly with regards to the productivity of labour and possibly to capital. Further, the impact of a single improvement strategy will be insignificant unless all the other constraints are also eliminated, thereby taking the socio-economic setting of the farmers into consideration.