

MIXED FARMING IN A GRAZING RESERVE IN NORTHERN NIGERIA

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Target audience: Animal Scientist, Agronomists, Pasture Agonomists, Agricultural Economists, Epizootiologists.

ABSTRACT

Nigeria's main pastoral development strategy is the settlement of pastoralists in grazing reserves. The goal of the strategy is to turn such nomadic pastoralists into mixed farmers who will take up crop farming to supplement livestock farming. Using the Bobi Grazing Reserve, Niger State, Nigeria as case study, the attainment of this goal is evaluated by the use of structured questionnaire, interviews, field surveys, project site visitation and personal observation. From the results, ninety-five percent (95%) of settled pastoralists willingly adopted mixed farming as an economic survival strategy. This was in response to reduced herd size on settlement, in the face of declining land available for nomadism among other reasons. Average herd size of 41.5 cattle, 14.0 goats and 7.5 sheep was insufficient to supply household income need hence settlers took up crop farming to supplement income. Annual income from livestock farming (N62,182.00) was 78.1% of total income per settler, while crop farming supplied 21.9% (N17,400) of the income. Farmers farmed a mean 3.97 hectares out the maximum 4.00 hectares allowed in the reserve. Ninety-five percent of settlers expressed willingness to expand farm size in response to domestic needs. Thus hitherto nomadic pastoralists became mixed farmers on settling in the reserve. Mixed farming therefore appears to be an achievable goal in Nigeria's pastoral development strategy.

Key words: Grazing Reserves, Mixed Farming, Pastoral Development

DESCRIPTION OF PROBLEM

Mixed farming is a system of farming in which crop growing is combined with the keeping of livestock for profit ⁽¹⁾. It is a land use system in which crop and livestock are integrated in various components and degrees to secure optimum resource use and yield maximum profit to the farming family, the degree of integration being dependent on how intensive the system is. ⁽²⁾ The advantages and disadvantages of

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mixed farming have been highlighted ^(3,4). Mixed farming could thus be regarded as the loss in livestock farming for the gain in arable crop farming with a net financial-economic benefit to the farmer.

The grazing reserve approach is a pastoral economic development programme involving the acquisition, gazetting, demarcation and development of land for the settlement of pastoralists and improvement in their livestock production efforts. Settlers are issued with

land rights to enable them raise animals and practice arable farming, while their basic needs such as pasture, feed supplement, water sources, marketing outlets, motorable roads, veterinary services, extension services and livestock improvement efforts (stock up-grading, cross-breeding and restocking) are provided.

The objective of the grazing reserve programme is to utilize an area to demonstrate to the pastoralists that a sustained higher level of development can be achieved by combining transhumance with modern management practice: by combining (semi-intensive) animal rearing with arable crop production ⁵. Transhumance is encouraged during dry season while settlers are encouraged to cultivate and improved leguminous forage resource (fodder banks). Settled livestock owners would be encouraged to develop a mixed farming system through extension advise and the realities of declined land available for nomadism. Increased crop yields are expected from residual soil nitrogen and improved soil structure in which had been grown leguminous forages. This is expected to be the ultimate development goal and should act as demonstration of the practicality and advantage of mixed farming systems to farmers and settled pastoralists outside the reserve. ^{5,6,7}

The objective of this study was to find out if the goal of mixed farming has been achieved by settlement of pastoralists in the Bobi grazing reserve.

MATERIALS AND METHODS.

The case study for this work was the Bobi grazing reserve located between latitudes 10°00' and 10° 10' N and longitude 5° 45' and 6° 00' E near Kontagora, Niger State, Nigeria. It was one of the three (3) new grazing reserves developed (in addition to five of the six older ones) during Nigeria's Second Livestock Development Programme (SLDP 1987-1995). The reserve is divided into six settlement blocks. While those in the reserve before development began in 1985 were 'enclaved' in block I, new pastoralists who wanted to settle in the reserve were distributed into blocks II to VI. By April 1995, there were one hundred and ninety six (196) settlers in blocks II to VI.

Primary data were collected between March 1995 and December 1996 by used of three (3) sets of structured questionnaires, by interviews, field surveys, project site visitation and personal observations. These were used to collect information on settlement, socio-economic and production characteristics of pastoralists. The questionnaires were translated into Hausa which was the medium of application. Taking the five settlement blocks as strata, a stratified sample of twenty percent (20%) (= 39.2) of settlers in the reserve by April 1995 was used. Forty settlers were used in all. Data were subjected to relevant statistical analysis (mean, median, standard deviation and percentile) to calculate herd composition, production parameters, as well as crop and livestock farming characteristics. Results were summarized in tables and by means median and standard deviation indices

RESULTS AND DISCUSSIONS

Production system of settlers: Table 1 shows the production pattern of settlers in the Bobi Grazing Reserve by December 1996. Ninety five percent (38 out of 40) of respondents were mixed farmers engaged in both arable and animal farming. Only 5% (2) respondents indicated they were arable farmers. Eighteen (18) respondents (45%) indicated that they practiced more herding than arable farming, twelve (12 or 30%) indicated more arable farming, while eight (8 or 20%) indicated they did roughly equal among of both. All settlers were chiefly animal rearers before settling. Thus there was a shift towards mixed farming by

Table 1: Arable/Pastoral Farming Activities, Bobi Grazing Reserve, 1996.

Production Activity	No. of Respondents	(%)
Exclusive arable farming	2	(5%)
"Equal" pastoral and arable farming.	8	(20%)
More arable than pastoral farming	12	(30%)
More pastoral than crop farming	18	(45%)
Total	40	(100%)

Source: Field Survey, 1995 - 1996.

hitherto animal farmers. Crops farmed were millet, rice, groundnut, beans, maize, guinea corn and pepper.

Herd size: Table 2 is the herd statistic at the reserve (1996). It has been noted that due to restriction on land size available for grazing, settled pastoralists tend to keep proportionally smaller herd size, relying more heavily on crop production to meet subsistence need.^{8, 9} The mean livestock holding per household at the Bobi grazing reserve was 41.5 cattle (with 14 goats, 7.5 sheep, 31.4 domestic fowl and 7.6 guinea fowl). The cattle herd size falls below the various herd sizes of 45, 64 and 68 variously suggested as minimal household herd size needed to meet a pastoral family's milk and meat subsistence need.^{10, 11, 12}

Farm size: Average farm size was 3.97 hectares just within the maximum 4.00 hectares allocated to settlers for farming. Almost all respondents (95 percent) expressed willingness to expand farm size in response to domestic need. Fifteen percent (15%) of respondents were already farming above the 4.00 hectares allocated. Hence a greater reliance is called on crop farming income to supplement livestock income by settlers and a shift towards mixed farming as a production system ensued

Table 2: Herd Statistics, Bobi Grazing Reserve, Dec. 1995

Type	Percentage composition	Mean holding per Settler*	Mean Tropical Livestock Unit *
Calves > 2 years	21.26%	8.78(7.46)	2.63 (2.24)
Heifers 2-3 years	16.82%	6.98 (5.25)	5.95 (4.40)
Bulls 2 - 3 years	9.89%	4.1 (3.05)	3.69 (2.74)
Bulls > 3 years	12.98%	5.35 (3.4)	5.35 (3.42)
Cows > 3 years	36.71%	15.2 (10.26)	15.22 (10.26)
Castrated bulls			
> 3 years	2.53%	1.0 (1.2)	1.0 (1.2)
Total Cattle	100%	41.48 (28.15)	33.83 (24.32)

* = Standard Deviation in brackets Source: Field Survey: January to February 1996.

Income: Table 3 shows gross annual income from agro-pastoral (mixed farming) activities in 1995. Virtually all respondents (39 out of 40) sold one livestock or the other in 1995. 80 percent have sold livestock products (milk, meat, manure) while 65 percent sold one farm product or the other (maize, g. corn, millet, g. nut etc).

Sale of livestock produced bulk of total household income (72.4 percent), while 9.7 percent of total income was from livestock products (milk, milk products and manure) and 21.86 percent of total income from crop farming (Table 3). This is compared to earlier figures (of livestock sales 66 percent of total household income, livestock products 23.5 percent of total income, and crop farming and others 10.5 percent) recorded among settled pastoralists in Kaduna.¹³ Compared to the Kaduna report, while the proportion of livestock income is identical, proportion of arable farming is doubled while that of livestock products is severely reduced. It will appear that the household heads who gave the data in this study did not correctly estimate income from dairy products since it is usually the business of women to prepare and market dairy products.

Yields and manure use: The average yield of maize per hectare was 240kg and for Guinea corn it was 211.2kg. These figures were significantly higher than yields of maize (54.1kg/ha) and guinea corn (127kg/ha) given by Fricke¹⁰ for the ecological zone in which the Bobi grazing reserve is located. This higher yield is attributed to use of animal dung for fertilizer. In this study 55 percent of respondents used both manure and fertilizer, 24 percent used only manure and 17.5 percent only fertilizer. This is an inversion of the figures of 48.7 percent using fertilizer, 33.3 percent using manure alone and 18.0 percent using both, given in a 1988 report.¹⁴ The report had correctly predicted a higher proportion of manure use due to high cost and non availability of inorganic fertilizer. In this study, all respondents gave lack of fertilizer, as most pressing need for settlement in the reserve.

Table 3: Gross Annual Income From Agro-Pastoral Activities 1995.

	Total (₦)	Frequency of sales	Mean(₦)
All			
Livestock	₦2,305,900.00	39 (97.5%)	₦57,647.50 (72.4%)
Livestock products	₦181,400.00	32 (80%)	₦4535.00 (5.7%)
*Farm products	₦696,000.00	26 (65%)	₦17,400.00 (21.86%)
Total income	₦3,183,300.00		₦79,582.50 (100%)

Source: Field survey, January - February 1996.

* N.B.: This is sale of farm products after domestic consumption has been taken care of i.e. not sale of total farm yield.

₦ = Nigerian Naira.

CONCLUSIONS AND APPLICATION

The following conclusions are deductible from the result of this study:-

The goal of using grazing reserves to turn nomadic pastoralists to mixed farmers has been achieved in the Bobi Grazing reserve. Settled pastoralists in the reserve necessarily took up crop farming to meet up with household subsistence needs. This was as a result of herd size below optimal subsistence need due to restricted land size available for free grazing. Increased crop yield above average due to availability and usage of manure is to be expected among mixed farmers. This was the case in the Bobi Grazing Reserve.

One could then summarise that pastoralists are not averse to settlement if they can still continue herding (though at reduced herd size levels) and alternative sources of subsistence (e.g. crop farming) are available. Mixed farming therefore appears to be a achievable goal in Nigeria pastoral development strategy.

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