Dairy Production among Small and Medium Scale Farmers in Nigeria: A Case Study of Kaduna and Kano States

Daniel S. Ugwu

Department of Agricultural Economics and Extension, Enugu State University of Science and Technology (ESUT), PMB 01660 Enugu, Enugu State, Nigeria

Abstract: A study on dairy production and processing by small and medium scale farmers was conducted in Kaduna and Kano states of Nigeria. The survey showed that dairy production is characterized by low milk production, and poor milk hygiene as a result of the use of indigenous/local breeds of dairy cattle managed under pastoral production system by Fulani herders which dominate the dairy sub-sector. There are limited availability of dairy production and processing technologies and facilities in these target states. Dairy processing and marketing are not well developed with hand milking and marketing by Fulani women being a common feature. These local women process these products into ‘nono’ (fermented milk) and yoghurt and market these milk products in semi-urban and urban cities and in the communities. Identified key constraints to small and medium scale dairy farming were lack of suitable improved breeds of dairy cattle, lack of modern dairy technologies and facilities, and dearth of such infrastructure as electricity and access road network. Other constraints include the poor socio-economic status of dairy farmers, poor input supply and distribution system, lack of credit facilities and insufficient institutional support. In order to promote the development and commercialization of the dairy sub-sector, it is recommended that there should be sustained provision of dairy technologies, technical and business advisory services to dairy farmers, modern market development and facilitation and capacity build/training of dairy producers and processors. There is the need for institutional and infrastructural support and development of a strong public-private partnership (PPP) for enhanced business environment and private sector participation.

Key words: Dairy · Small and medium scale · Nigeria

INTRODUCTION

Over 2% of world milk production is produced in Africa. The principal exporters of milk products are the European Community (EC), New Zealand and the USA, with the EC typically accounting for up to half of the total [1].

Dairying is a biologically efficient system which converts large quantities of medible roughage to milk. Milk production is more efficient than beef production when the nutritional potential of the feed resource base is high and therefore capable of supporting high levels of production. It is a continuous production process and requires a continuous supply of feed of consistently good quality. Beef production, on the other hand, is often better adopted to the to the seasonal fluctuations that are so common in sub-Saharan Africa [1].

Dairy production in sub-Saharan Africa is restricted to five agro-ecological zones, namely, Arid, semi-arid, sub-humid, humid and highlands [2]. The five milk production systems recognized in sub-Saharan Africa are pastoralism, mixed farming, intensive dairy farming and peri-urban dairying.

Milk production in sub-Saharan Africa (SSA) has more than doubled over the past 30 years, with most of the growth occurring since the mid-1970s. Gains in production have been largely affect by population increases. However, the encouraging trend is that the annual percentage gains in cow milk production since the late 1970s have exceeded population growth [3]. In terms
of demand for dairy products in SSA, World Bank [4] noted that consumption stands at 27kg LME per caput, growth rate in total demand 4% per year and income elasticity of demand 0.8.

Sub-Saharan Africa augments its milk production with dairy products imported either commercially or as food aid donations. Imported products include dry milk powder (whole and skin), butter and butter oil with dry milk powder dominating. On a liquid-milk-equivalent (LME) basis, dry milk and butter/butter oil imports account for about 80% of total dairy imports [3].

Kaduna State: Kaduna state occupies almost the entire mid-central portion of the northern parts of Nigeria and shares common borders with Zamfara, Katsina, Niger, Kano, Bauchi and Nasarawa states and the Federal Capital Territory (FCT). The state is located between latitudes 9° 03’N and 11° 32’ north of the equator and longitudes 6° 05’ and 8° 30’ east of the Greenwich Meridian.

The state experiences a typical tropical continental climate with two district seasons, the dry and rainy seasons. The average annual rainfall is 1,272.5mm, average humidity, 56.64%, wind speed, 176.12 knots, average daily minimum temperature, 15.1°C and average daily maximum temperature, 35.18°C.

Kaduna states topography is favourable for small, medium and large-scale farming and for tourism. Agriculture is the mainstay of Kaduna States economy. It is estimated that 80% of the population are engaged in small and medium-scale farming. Predominant feed crops grown in the state are maize, rice, cassava, sorghum, millet, yam, cocoyam, beans and Irish potatoes. Major cash crops include sugar cane, ginger, tomatoes, pepper, groundnut, rice, Irish potatoes, soybean and cotton.

This study, therefore, examines the potential for commercial dairy production among small and medium scale farmers in Nigeria with empirical evidence from Kaduna and Kano States.

RESEARCH METHODOLOGY

The Study Areas: The study locations were Kaduna and Kano states which are prominent in dairy production in Nigeria.
rainfall pattern is unimodal with an average rainfall of 600mm [13].

Kano State is made up of 44 LGAs with a population of 9.4 million [9] with an almost equal distribution of males (51%) and females (49%) [13].

Agriculture is the mainstay of the state’s economy involving at least 75% of the rural population. Rain fed and small-scale irrigated agriculture are practiced in the state at small and medium scale levels. Crops grown include cotton, guinea corn, groundnuts, maize, cowpeas and varieties of vegetables. The state has an estimated 1,754,200 ha of cultivated land area and 75,000 ha of forest vegetation.

Major livestock produced in the state include cattle (while Fulani, Bunaji and Rahaji Breeds), sheep, goats and poultry [13]. The estimated total livestock population is 9.2 million with an output of 2,36,102 mt of meat, 87 million litres and about 49 million eggs per annum.

The farming system is characterized by mixed cropping and mixed farming and sedentary pastoralism/trans-humans. About 62 different cropping patterns or mixtures feature in the mixed cropping system. The percentage of households growing different crops are as follows: 61.8% for sorghum, 44.2% millet, 52.7% maize, 16.4% rice and 27.3% groundnut [14]. Mixed farming is the dominant system of agricultural production with crop production combined with rearing of livestock and poultry.

The livestock sub-sector is under-developed. It is characterized by low milk output of local breeds, and poor milk hygiene, among others. Further, dairy production is adversely affected by lack of equipment, inadequate facilities, limited skilled personnel and inadequate infrastructure such as rural access roads, buildings and irregular electric power supply.

Private sector participation in livestock production on commercial basis is gradually picking up in the state. This is seen in the form of setting up small-holder dairy farms consisting of upgraded cows using Friesian and/or Simmental bulls. It is observed that milk yield from upgraded cow per day averaged 8 litres per head per day. This is 800% higher than the production from the traditional cow. Thus a wide difference in output indicates high potential in commercialization of small-holder dairy production system in Kano State [15].

**Sampling Procedure:** Three stage sampling method was used in the selection of respondents for the study. The first stage concerned the random sampling of five (5) representative urban and rural LGAs respectively. The second stage involved the purposive sampling of ten (10) small and medium scale dairy farms respectively for the study. The third and final stage focused on the identification of about 3 key officers managing the farms for in-depth interview and/or group discussion. In total, about 60 farmer respondents involved in the study.

**Methods of Data Collection:** Primary data were generated through consultation meetings, focus group discussions (FGDs) and in-depth interviews. Meetings and discussions were organized with various stakeholders and target groups involved in dairy production in Kaduna and Kano States. Indepth interviews were targeted on key informants. Guided discussions and in-depth interviews were organized to elicit relevant data in line with the objectives of the study.

Secondary data were collected from journals, technical reports from the Kaduna and Kano State ADPs, and other relevant publications.

**Data Analysis:** Primary and secondary data were collated and screened for analysis with the aid of a computer programme, the Statistical Package for the Social Sciences (SPSS).

Descriptive statistics such as mean, frequencies, tables and cross-tabulations were used to characterize and analyse the data generated from the study.

**RESULTS AND DISCUSSION**

**Kaduna State**

**Characteristics of Small and Medium Scale Dairy Production:** The estimated number of cattle in Kaduna is 2,041,049 while the number of cows-in-milk is 771,516. Total milk production per annum is 416.7 million litres with a yield figure 1.5 litres per day. The estimated net income per animal per day is about N250.00.

Dairy production by farmers in Kaduna State is characterized by low milk production and poor milk hygiene. Low milk yield or production could be attributed to the use of indigenous breeds of cattle. The predominantly local breeds such as Bunaji (white Fulani) and some Rahaji and Sokoto Gudali managed by pastoralists have poor genetic quality for milk production. High-producing exotic breeds are few and are found mainly on commercial private farms under intensive management.

**Dairy Production Systems:** Kaduna State has an agroecological climate with semi-arid, sub-humid, Plateau and well drained soil that favour dairy production. The socio-cultural background of the population and the
highest demand for milk and milk products. The following
dairy production systems are prominent among small and
medium scale dairy farmer in Kaduna State.

Pastoralism, agropastoralists and intensive dairy
farming. With pastoralism, the pastoralists move around
with their herds in search of fresh pasture lands or grazing
areas. Agro-pastoralism is practiced by sedentary farmers
who grow food crops and also keep livestock. In intensive
dairy farming farmers use part or all of their land to grow
fodder crops for their dairy cattle. This system of dairy
production is mainly undertaken by small farmers using
family labour while commercial farms use hired labour.

**Dairy Processing and Marketing:** Available milk
processing technologies were identified to include hand
milking and churning by local milk maids, milk
fermentation to produce local yoghurt, semi-mechanical
yoghurt making and mechanized milk processing. Hand
milking and churning is common practice among
pastoralists or traditional small scale and medium scale
dairy producers in Kaduna State. Their major
processed products are yoghurt, ‘nono’ fermented milk.
Semi-mechanised and mechanized dairy processing
feature mainly in commercial medium and large-scale dairy
farms in the state. Some of the dairy processing plants in
the state include NIYYA Your Farms, Kaduna, Home
Fresh Yoghurt, Kaduna, FAN Milk Yoghurt, Zaria. NAPRI
Yoghurt, Shika Zaria and Milcopal-farms, among others.
They use mechanical methods in processing milk into
yoghurt and other milk products in the state. There are
about eleven dairy processing plants in Kaduna State.
Many of these dairy firms engage in both commercial
production and processing of milk into varieties of
marketable products. These maybe fresh milk, or
processed milk products such as yoghurt and ‘nono’
fermented milk which are sold or marketed by Fulani
women in the communities, as well as in semi-urban and
urban cities of Kaduna, Zaria, Birni Gwari, Kafanchan,
Zonkwa, etc. The Kaduna Federation of Milk Producers
Cooperative Association Ltd (KFMPCAL) is an umbrella
organization for about forty village milk associations that
are engaged in milk production, processing and marketing
in Kaduna State.

**Constraints of Small and Medium Scale Dairy Farming:**
Identified constraints to dairy production in Kaduna State
were unavailability of improved breeds of dairy cattle,
high cost of using exotic or improved breeds, unhygienic
milking processes and inadequate health care provision
and facilities. Poor genetic quality of local breeds of dairy
cattle limit their milk yield to a low uneconomic level when
compared to the exotic breeds of Friesian Holstein and
New Jessy. High cost of using these exotic or improved
breeds of dairy cattle and associated high technology
such as artificial insemination for producing cross-bred
constitute a major problem. Other related costs such as
transportation and management costs are critical factors
that limit enhanced commercial milk production and
processing among small and medium scale dairy
producers and processors in the state. Unhygienic
milking/processing due to lack of or unavailability of
milking parlours and equipment lowers the demand for
milk and milk products from small and medium scale dairy
producers and processors in the state.

There are limited institutional capacities in dairy
farming with respect to the use of artificial insemination
related equipment in Kaduna State. Most of the breeds are
local, and available exotic bulls on some farms are
imported for the purpose of cross-breeding to upgrade the
local breeds for higher milk production. Generally semen
equipment, exotic bulls and standard milking machines are
imported from Holland, India and China.

**Kano State**

**Characteristics of Small and Medium Scale Dairy
Production:** The estimated dairy cattle population in Kano
State is 900,000. Specifically, the estimated total milk
production in the state is 810,000 litres. Thus milk yield
per animal is about 2 litres. In terms of returns or income,
the estimated net farm income per animal per day is
N100.00-N150.00.

Two prominent breeds of cattle (Bunaji/White Fulani
and Rahaji) are found in the state. The productivity of
these breeds of dairy cattle are threatened by insufficient
feed with the right quality [15]. Dairy production practices
are predominantly traditional with low milk yields and
slow growth rates.

**Dairy Production Systems:** There are five types of dairy
production systems that are recognized in sub-Saharan
Africa. These are pastoralism (nomadic and transhumant),
agro-pastoralism, mixed farming, intensive dairy farming
and peri-urban dairying. However, the commonly
practised dairy production system in Kano State is
pastoralism. Under this traditional system, the pastoralists
are with the herds always and move continually looking
for fresh grazing areas. It is characterized by subsistence,
milk production, communal grazing, low milk output and
limited potential for commercialization. Although the other
dairy production systems exist in Kano State, intensive
dairy farming and peri-urban milk production have good
potential for commercialization than the pastoral system.
These are mainly practiced by medium and large scale dairy farmers in Kano State.

**Dairy Processing and Marketing:** There are varied numbers of available milk production technologies in the state including local milk processing technology for fresh milk and yoghurt production. Hand milking and churning constitute a common practice among Fulani women who process fresh milk into ‘nono’ (fermented milk) and yoghurt. They market these milk products in semi-urban and urban areas of Kano State. A few privately owned milk processing facilities exist with an estimated capacity utilization in processing activities of about 25-30%.

**Constraints of Small and Medium Scale Dairy Farming:** There are many constraints that bedevil dairy production in the state. The most critical problems identified were lack of suitable improved breeds of dairy cattle, lack of modern dairy facilities and lack of infrastructure (e.g. electricity, access farm road network, etc). Others include poor socio-economic status of dairy farmers, poor input supply and distribution system insufficient institutional support and lack of credit facilities to dairy farmers, among others. Local breeds of dairy cattle have limited potential for optimal milk production. Only few farmers have exotic bulls for cross breeding purposes. It is important to note that there is little or no rural roads constructed or electricity linked to dairy producers and processors in Kano State. These identified constraints hamper the commercialization of small and medium scale production and processing in the state.

**CONCLUSION AND RECOMMENDATIONS**

Kaduna and Kano states of Nigeria have the potential for the development and commercialization of the dairy industry in Nigeria. This is against the background of the climate and agro-ecological conditions as well as the socio-cultural and occupational background/characteristics of the population. However, the identified constraints above need to be addressed for the realization of these potentials. Thus the following recommendations are preferred for action:

**Provision of Appropriate Dairy Technologies and Advisory Services:** Advisory services and dairy technologies such as exotic bulls for cross breeding, milking parlour and milking machines, etc should be made available to dairy farmers in the State. The States Agricultural Development Programmes (ADPs), NAPRI, FAN Milk and other service providers should be funded to educate and provide technical support to dairy producers and processors on improved animal production and health technologies, milk hygiene and milk handling, transportation and marketing.

**Provision of Technical and Business Advisory Services:** This could be in terms of construction of standard cattle pens, milk collection and preservation, milk transportation and marketing, etc. Other areas of intervention for dairy producers are with respect to improved breeds, pasture management, collection centres etc and in the case of dairy processing provision of chilling machines, preservers, boilers, centrifuges, packaging and cold storage facilities.

Marketing agents and consumers should be targeted with business advisory services on linkage with processors, product management for quality standard, product knowledge, storage and handling.

**Market Development and Facilitation:** Dairy marketing in Kaduna and Kano states is not well developed because of weak linkages between producers, processors and marketers. Modern infrastructure such as cold vans, storage facilities and collection centres are not adequately in place.

Thus the type of market facilitation required include the establishment of collection centres at strategic locations in the dairy value chain clusters. These collection centres should have grading, quality control and packaging facilities. Dairy farmers should be encouraged to be members of dairy farmers associations to promote cooperation and resource procurement and distribution among themselves in Kaduna and Kano States.

**Capacity Building/Training:** Small and medium scale dairy producers and processors in these large states are grossly lacking in modern production and processing techniques or methods. Thus there is the need to equip them with the knowledge and skills with respect to best practices in dairy production and management, processing, storage/preservation and marketing. They also need support in the area of group dynamics, organizational management, financial management, accounting and farm record keeping.

**Institutional and Infrastructural Support:** There is the need to strengthen the linkages between available relevant institutions in Kaduna and Kano states with small and medium scale producers, processors and marketers. These institutions include commercial banks,
communication media (e.g. radio and television), Power Holding Corporation of Nigeria (PHCN), Dairy and development partners such as the world Bank and FAO, etc. There is opportunity for synergy between these institutions and dairy farmers/processors for technical and funding assistance. This will be feasible with the development of a functional public-private sector partnership (PPP) arrangement between the government and the private sector. There is the need to promote business environment for the commercialization of small and medium scale dairy farming through adequate provision of such infrastructure as electricity (power supply), access roads and water supply and transportation facilities.

With the implementation of the above recommendations, it is expected that the dairy sub-sector in will be developed and commercialized; thereby contributing significantly to the non-oil sector Gross Domestic Product (GDP) in Nigeria.

REFERENCES