Dairy production practices at pastoral settlements of Adamawa and Taraba states, Northeastern Nigeria

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Abstract

A survey was undertaken to investigate the dairy production practices in pastoral communities in Adamawa and Taraba states using a well-structured questionnaire. A total of 600 pastoralists in 20 local government areas (LGAs) were used in this study. Data from the questionnaires were presented in simple percentages. The survey showed that dairy pastoralists was dominated by married middle aged men (82.0%), low in literacy level (78.0%), herding local breeds of cattle (97.0%) that used rivers (91.7%) around their settlements as source of water. Most of them sale raw milk once a day (98.2%), with highest quantity during rainy season (98.3%) which was mostly used in their families as food and sale remainder (81.5%), but were willing to sale to milk collectors (62.5%). The unavailability of extension agents to assist them improves their dairy practices (89.2%) and non-membership of cooperative societies by pastoralists (82.7%) were constraints to dairy production in pastoral settlements. However, majority of pastoralists are willing to join milk cooperative society (96.6%) indicates the future development and commercialization of pastoralist milk industry is bright. Extension agents are required to enlighten on the good feeding regimens, marketing and cross breeding techniques. The result from this study indicated the need for government to exploit the potentials of improving the business and entrepreneurship skills of pastoralists through encouraging private entrepreneurs in dairy production.

Keywords: Adamawa state, Milk, milk collectors, Pastoralist, Taraba state

Introduction

Globally, pastoralism is characterized by keeping large herds of indigenous breeds (Magembe *et al.*, 2010) by culture and economic orientation towards livestock. Pastoralism, a farming system involving mobility of people with their livestock in search of pastures and water is the major characteristic of rangelands. Livestock ownership currently supports or sustains the livelihoods of an estimated 700 million rural poor, approximately 70% of the world's rural poor population. The importance of the dairy cow is expected to increase as food imports to sub-Saharan Africa (SSA) are projected to more than double by 2030 under a business as usual scenario (The World Bank, 2008). In Nigeria, cattle provide more than 90% of the total animal milk output while goats and

sheep provide less than 10% and are kept for production of meat, hides and skin (Walsche *et al.*, 1991). The White Fulani breed popularly called 'Bunaji' is the most numerous and wide spread of all the Nigerian cattle breeds accounting for about 37% of the national cattle population (Oni *et al.*, 2001). In spite of the existing enormous livestock resource and great potential for increased livestock production, the productivity is disproportionately lower due to various livestock management problems; prevalence of major endemic diseases; poor feeding; high stocking rate on grazing lands and low genetic potentials. Degradation of rangelands manifested by bush encroachment, gullies due to soil erosion and bare ground along the cattle paths and resting grounds, has greatly affected their

carrying capacity and production potentials (Mpaire, 2001). Therefore, pastoralists keep animals as stores of wealth-in-kind and insurance scheme that ensure returns from the investment (David *et al*, 2001). As risk aversion strategy, pastoralists participate in the market primarily for convenience of adapting to inclement weather and disease incidences. However, the demand for milk and dairy products in developing countries is estimated to increase by 25% by 2025 (Delgado *et al.*, 1999), mainly due to human population growth, further urbanization, increased disposable income, greater diversity of food products to meet nutritional needs, and increased opportunities for domestic and external trade. Indeed, dairy imports in developing countries may reach 38.9 billion litres of milk equivalent by 2030 (FAO/IDF, 2004). This study, therefore, was carried out to access the dairy production practices in pastoral settlements of Adamawa and Taraba states.

Materials and methods

Study areas

Adamawa is a state in northeastern Nigeria, with its capital in Yola. Adamawa is one of the largest states in Nigeria and occupies about 36,917 km². It is bordered by the states of Borno in the northwest, Gombe in the west and Taraba to the southwest. Its eastern border also forms the national eastern border with Cameroon. Topographically, it is a mountainous land caused by the large river valleys- Benue, Gongola and Yedsare. The valleys of Cameroon, Mandara and Adamawa mountains form part of the landscape. The State has an estimated population of 3,737,223 (2005) and lies within the coordinates, 9°20'N and 12°30'E.

Taraba state is a state in Nigeria, named after the Taraba River which traverses the southern part of the state. Taraba's capital is Jalingo and has 16 local government areas. The state is bounded in the west by Plateau

and Benue states, on the east by the Cameroon and in the north by Adamawa state. The State has a landmass of 54,473 km², has an estimated population of 2,688,944 (2005) and lies within the coordinates, 8.00°N and 10°30'E.

Sampling/Data collection procedure

Three stage sampling methods were used in the selection of respondents for the study. The first stage was the sampling of nine dairy producing Local Government Areas (LGAs) in Taraba state. Namely: Jalingo, Sardauna, Bali, Yororo, Ardo-kola, Gashaka, Karim lamido, Zing and Lau LGAs, while the 11 LGA in Adamawa state includes; Shelleng, Lamorde, Mayo-balwa, Numan, Tongo, Guyuk, Demsa, Gombi, Song, Jada and Ganye. The second stage was the purposive sampling of three dairy producing communities in each of the 20 LGAs. The third and final stage was the focus on identification of 10 persons in each dairy producing community for in-depth face-to-face interview.

Data analysis

Descriptive statistics and counts from multiple responses analysis were used to determine distributions and magnitudes of variables among the respondents.

Results and discussion

The results showed that most (**82.0%**) of the respondents were male aged 30 years or more and majority (78.0%) had no formal education. Majority of pastoralists (**84.2%**) **were married** who practiced extensive grazing system and mostly (68.7%) own Bunaji (White Fulani) breed of cattle. Majority (**63.3%**) of the pastoralists were into dairy production for more than 10 years **that** grazed their animals on communal lands (77.5%) and that **91.7% of them** take their animals to the nearby rivers to drink (Table 1). Pastoral societies were dominated by men (Blench, 2001). That is male kept in trust even cattle owned by female members of the household. This

may be for the fact that the Fulbe ethnic group is patrilineal by culture and the concentration of cattle is in the hands of male. Even in situation where female household members owned cattle, they did so by proxy (Edwin *et al.*, 2018). In pastoral settlements, young boys begin to learn livestock responsibilities when they are as old as 10 years or older (Edwin *et al.*, 2018, Morner, 2006). Their responsibility increases as they age. The high percentage of married respondents might be connected to the fact that since milk is a major source of income to the pastoral families (Asaminew, 2007). A study found that most full-time dairy production pastoralists' were illiterates (Millogo *et al.*, 2018). The role of education is obvious in affecting household income, adopting technologies, demography, health, and as a whole the socio-economic status of the family as well (Kerealem, 2005). The fact that local breeds of cattle produce less amount of milk and the differences cattle breeds showed in milk composition and yield (IO'Connor, 1994), Crossbreeding indigenous breed with grade animals can increase and improve milk production (Perera, 1999). Natural pasture, browse and bushes accounts for the major food sources for livestock owned by pastoralists (Ibrahim and Ololaku, 2000). A study showed that Pastoralists land use is based on customary traditions and they hold the land under communal tenure (Migot-Adholla *et al.*, 1991). The Maasai pastoralists also rely on seasonal rivers as source of water for their livestock (Edwin *et al.*, 2018) as well as Pastoralists in Ethiopia (Kuma *et al.*, 2015) and in Burkina Faso (Millogo *et al.*, 2018). Majority of the pastoralists surveyed (98.2%) sold raw milk once a day and 12.7% of the cattle in the study area produced up to three liters/day (Table 2). Most milk produced every day in the pastoral settlements, 81.5% was used for

family and sales and 99.3% of pastoralists' calves were fed through suckling. There was slight difference between those that sold in one market (57.8%) and those that patronized more than one market (42.3%). Respondents that were willing to sell to milk collectors were 62.5%.

In pastoral system, the major product is milk (Jahnke, 1982). In pastoral societies, the first and most important purpose of dairy cattle production are to provide milk for family use and for sale (Jahnke, 1982). Milk is a perishable product and processing must start immediately after milking (Ahmed *et al.*, 2003). In pastoral communities, milk tends to be adequate for home consumption as well as for market (Beruk and Tafesse, 2000). However, in Ethiopia, about 2.6% of pastoralists in a survey used refrigerators to cool raw milk (Kuma *et al.*, 2015). A study showed that average milk yield of indigenous breeds of cattle in Nigeria ranges between 0.7-1.5 litres/day (Annette, 2010) and 1-2 liters in Burkina Faso (Millogo *et al.*, 2018), but stated that this could be higher if milk for the calf is included. However, in Ethiopia 97% of pastoralists in a survey produced raw milk in excess of 6 liters a day per cow (Kuma *et al.*, 2015). Due to absence of basic infrastructure, marketing milk in any volume is restricted to the urban and peri urban areas (Getachew, 2003) and this can affect milk sales (IPS, 2000) because demand for milk is high in urban areas (Ahmed *et al.*, 2003). Informal milk sale is characterized by no licensing, low cost of operation, high producer prices compared to formal market and no regulation of operation (Debrah and Berhanu, 1991). Formal markets on the other hand involves, milk collection and transportation in bulk from widely scattered rural sources require a well-defined method of preservation and distribution (Ahmed *et al.*, 2003). Respondents indicated that sales were higher in the rainy season (97.0%) and most

Table 1: Socio-demographic characteristics of respondents (%)

	Taraba state (N=270)	Adamawa state (N=330)	Combined (N=600)
Gender			
1) Male	208(77.4)	284(86.1)	492(82.0)
2) Female	62(22.6)	46(13.9)	108(18.0)
Age			
1) <30	31(11.5)	47(14.2)	78(13.0)
2) 31-40	67(24.8)	118(35.8)	185(30.8)
3) 41-50	111(41.1)	101(30.6)	212(35.3)
4) >50	61(22.6)	64(19.4)	125(20.8)
Marital status			
1) Single	33(12.2)	18(5.5)	51(8.5)
2) Married	223(82.6)	282(85.5)	505(84.2)
3) Divorce	0(0.0)	10(3.0)	10(1.7)
4) Widowed	14(5.2)	20(6.0)	34(5.7)
Educational Level			
1) None	223(82.6)	245(74.3)	468(78.0)
2) Primary	19(7.0)	35(10.6)	54(9.0)
3) Secondary	10(3.7)	39(11.8)	49(8.2)
4) Higher	18(6.7)	11(3.3)	29(4.8)
Livestock ownership			
1) Yes	228(84.4)	283(85.8)	511(85.2)
2) No	42(15.6)	47(14.2)	89(14.8)
Business period (yrs)			
<3	7(2.6)	22(6.7)	29(4.8)
4-6	34(12.6)	29(8.8)	63(10.5)
7-9	73(27.0)	55(16.7)	128(21.3)
>10	156(57.8)	224(67.9)	380(63.3)
Breed of cattle			
1) White Fulani	199(73.3)	213(64.5)	412(68.7)
2) Red Bororo	35(13.0)	59(17.9)	94(15.7)
3) Bokoloji	36(13.3)	40(12.1)	76(12.7)
4) others	0(0.0)	18(5.5)	18(3.0)
Grazing land ownership			
1) Yes	48(17.8)	87(26.4)	135(22.5)
2) No	222(82.2)	243(73.6)	465(77.5)
Source of water			
1) River	264(97.5)	286(86.7)	550(91.7)
2) Lake	4(1.5)	10(3.0)	14(2.3)
3) Borehole	0(0.0)	24(7.3)	24(4.9)
4) others	2(0.7)	10(3.0)	12(2.0)

(89.2%) respondents' reported lack of visits by extension agents (Table 3). There was awareness (60.7%) that banks give loans for dairy business, but 91.8% of the respondents never used any bank facility. Majority (82.7%) of the respondents were not members of any milk producing cooperative society, however, most (96.6%) of them indicated they are willing to join a milk production cooperative

society.

Milk sales are seasonal in pastoral and agro-pastoral dairy production systems (Zegeye, 2003; Annette and Ilu, 2016). The seasonality of milk availability is because the capacity for high level of production in the dry season by the indigenous breeds has remained low (IPS, 2000). The absence of dairy extension services will play a negative role in production and efficiency

Table 2: Milk marketing practices by respondents (%)

	Taraba state(N=2700)	Adamawa state(N=330)	Combined (N=600)
Raw milk sales/day			
1) Once	266(98.5)	323(97.9)	589(98.2)
2) Twice	491.50	7(2.1)	11(1.8)
3) Thrice	0(0.0)	0(0.0)	0(0.0)
Production/animal/day(L)			
<1	84(31.1)	79(23.9)	163(27.2)
2-3	148(54.8)	183(55.5)	33(55.2)
>3	38(14.10)	38(11.5)	76(12.7)
Usage of milk			
1) Family only	11(4.1)	55(16.7)	66(11.0)
2) Sale only	11(4.1)	43(10.3)	45(7.5)
3) Family/sale	248(91.8)	241(73.00)	489(81.5)
Calves feeding			
1) Bucket	0(0.0)	4(1.2)	4(0.70)
2) Suckling	270(100.0)	326(98.8)	596(99.3)
Milk transport to market			
1) Truck	82(30.4)	250(75.8)	332(55.3)
2) Foot	188(69.6)	80(24.2)	268(44.7)
Point of sales(markets)			
1) One	190(70.30)	157(47.6)	347(57.8)
2) More	80(29.7)	173(52.4)	253(42.3)
Milk sale to collectors			
1) Yes	236(87.4)	139(42.1)	375(62.5)
2) No	34(12.6)	191(57.9)	225(37.5)

Table 3: Constraints and challenges in milk production by respondents (%)

	Taraba state (N=270)	Adamawa state (N=330)	Combined (N=600)
Seasonality of sales			
Rainy season	270(100)	320(96.97)	590(98.3)
Dry season	0(0.0)	10(3.03)	10(1.7)
Extension visits			
Yes	2(0.7)	63(19.1)	63(10.8)
No	268(99.3)	267(80.9)	537(89.2)
Knowledge of bank loans			
Yes	2(0.7)	234(70.9)	236(39.3)
No	268(99.3)	96(29.1)	364(60.7)
Any benefit from bank loans			
Yes	1(0.4)	48(14.5)	49(8.2)
No	269(99.6)	286(85.5)	551(91.8)
Membership of cooperative societies			
Yes	16(5.9)	88(26.7)	104(17.3)
No	254(94.1)	242(73.3)	496(82.7)
If No, willingness to join one			
Yes	247(97.2)	232(70.3)	479(96.6)
No	7(2.8)	10(29.7)	17(3.4)

of the dairy industry in Nigeria (Annette and Ilu, 2016). A situation that might cause pastoral societies to feel been marginalized by government policies and development strategies (Dong, 2016). Finance is very important factor in dairy production expansion, so that credit is one of the sources to finance the dairy. Business models that incorporate cooperatives or community associations are given technical assistance by the government (Annette and Ilu, 2016). In commercial dairy production, the private sector is expected to take the lead to be involved in the business transaction. Cooperative societies assist pastoralists sell in bulk, collective bargaining, and increase market access and to avoid hazards of being encumbered with a perishable product with no rural demand (Annette and Ilu, 2016). In spite of challenges, however, in China, modernizing traditional pastoral activities is currently challenging the sustainable development of pastoralism (Kreutzman, 2013), by promoting the urbanization of township development in pastoral areas.

Conclusion and applications

In conclusion, to improve the dairy industry requires a higher literacy level among pastoralists, through mass literacy programs. There is need for Government to address absence of basic infrastructure, lack of extension agents to exploit the potentials of business skills of pastoralists.

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