

Livelihood and income of dairy farmers in Ibadan/ Ibarapa East area of Oyo state, Nigeria

Sosina, Adedayo Olalekan

Department of Animal Science, University of Ibadan, Ibadan, Nigeria

Corresponding mail: dayososina@gmail.com

Abstract— Dairy production and industry is still at its lowest ebb in sub Saharan Africa. Government and farmers are yet to invest into the dynamic and viable (dairy) industry. The study tries to investigate the livelihood and income of dairy farmers in Ibarapa East area, Oyo state of Nigeria.

A multi stage sampling technique was used to elicit information from 225 dairy farmers purposively selected with the assistance of extension agents. Parameters measured included livelihood enterprises, % income on household livelihood, record of sales, and seasonality. Qualitative and quantitative data collected were transcribed into Microsoft Excel the Feed Assessment Tool (FEAST) Excel macro program and analyzed with descriptive statistics.

The % income from livelihood enterprises identified were 11.10, 40.20, 34.00, 8.10, 4.00 and 2.60 for remittance, livestock, crop, labour, business and others, respectively. The average number and live weight (Kg) of bull sold over the past 3 years were 300.67 ± 10.89 and 180.23 ± 17.72 , respectively while cows were 50.56 ± 6.34 and 200.85 ± 19.89 , respectively. The total average milk yield (liters/day) ranged 180.67 ± 7.23 to 240.26 ± 9.34 at February and July, respectively. The average price received for milk (₦/liters) ranged 150.63 ± 3.67 to 170.82 ± 3.67 , at January and September, respectively. The average amount of milk retained for household use (liters/day) ranged 5.28 ± 1.78 to 8.78 ± 2.86 at December and September, respectively.

Seasons affects price and quantity of milk and farmers rarely sell cows. Dairy animals can sustain household income and livelihood if there is organized dairy value chain at the system level.

Keywords— Cattle population, household income, livestock enterprises, milk production, seasonality.

I. INTRODUCTION

Milk production and income from dairy products play a significant role in the household livelihood at the system level. Farmers and Government are yet to tap and invest into the dynamic and economically viable (dairy) industry in line with the objectives of sustainable development goal (SDG) (FAO, 2015). When consumed, milk is a good source of animal based proteins, vitamins, and other micronutrients (such as calcium and zinc) to complement plant based foods in local diets with significantly lower micronutrient bioavailability (Haile et al 2010). There is paucity of information on economic sustainability of the family from dairy products sales and production. Ibarapa area of Oyo State, Nigeria is ethnically heterogeneous area with a high concentration of smallholder

crop and livestock farmers, considered as the occupational group with a high incidence of poverty.

The consumption of even small amounts of milk can contribute significantly to improved dietary outcomes, especially for women and children (Henriksen et al. 2000; Black et al. 2002; Wiley 2009). Sosina et al. (2019) considered the dietary composition of feed resources (comprising of crop residue, cultivated fodder, zero-grazing, naturally occurring pastures and purchased feed) on ruminant production among farmers. Although there were reported cases of wanton destruction of lives and properties arising from the crop farmers/ pastoralist crises in recent past (Sosina 2017), livelihood aspect of dairy production still receive tremendous attention (ILRI 2015).

Open Access

Furthermore, dairy cows ownership can enhance household welfare and individual nutrition outcomes in on farm studies (Sosina et al 2019). Ownership of dairy cows increased household-level intakes of dairy products as well as cash incomes in a sample of 184 households in coastal Kenya (Nicholson et al 2004). Other studies indicated a possible positive correlation between child linear growth and ownership of dairy cows by the foster households (Nicholson et al. 2003; Rawlins et al. 2014). In the baseline survey conducted by UNDP and EU project in Eritrea, Haile et al (2010) reported that livelihood situation of the households in target areas including livelihood activities; level and source of household income; household food consumption and diet composition; household asset holdings and borrowings; livestock and crop sales; etc. livestock and its contribution including livestock number and type; livestock production and productivity; livestock products and its contribution to household income and diet composition.

Kanunga (2014) assessed the impact of adoption of improved dairy cow breeds on enterprise-, household-, and individual child-level nutrition outcomes in Uganda; where it was discovered that the adoption of improved dairy cows significantly increases milk yield, household's orientation to milk markets, and food expenditure. Knowledge they say is power, hence any information that can improve household income even from milk production will directly influence farmers' livelihood (Sosina et al 2019). Consequently, adoption substantially reduces household poverty and stunting for children younger than age five thus improved the nutrition (Kanunga 2014) and livelihood of the farmers' household (Sosina 2017).

Feed Assessment Tool (FEAST) offer a systematic and rapid methodology for assessing feed resources at site level with a view to developing a site-specific strategy for improving feed supply and utilization through technical or organizational interventions (ILRI 2015). Although, the methodology can still elicit valuable information on livelihood of livestock farmers (Babayemi et al 2014; Sosina et al 2019). Wassena et al (2013) and Sosina (2017) evaluated the relationship that existed between the nutrition and livelihood of respondent farmers using FEAST in Tanzania and Nigeria, respectively.

Attempt to consider the various contributions of other household enterprises to the family resources has not receive much attention. Thus the study tries to investigate the livelihood output of farmers on dairy cows in Ibarapa East area, Oyo state of Nigeria.

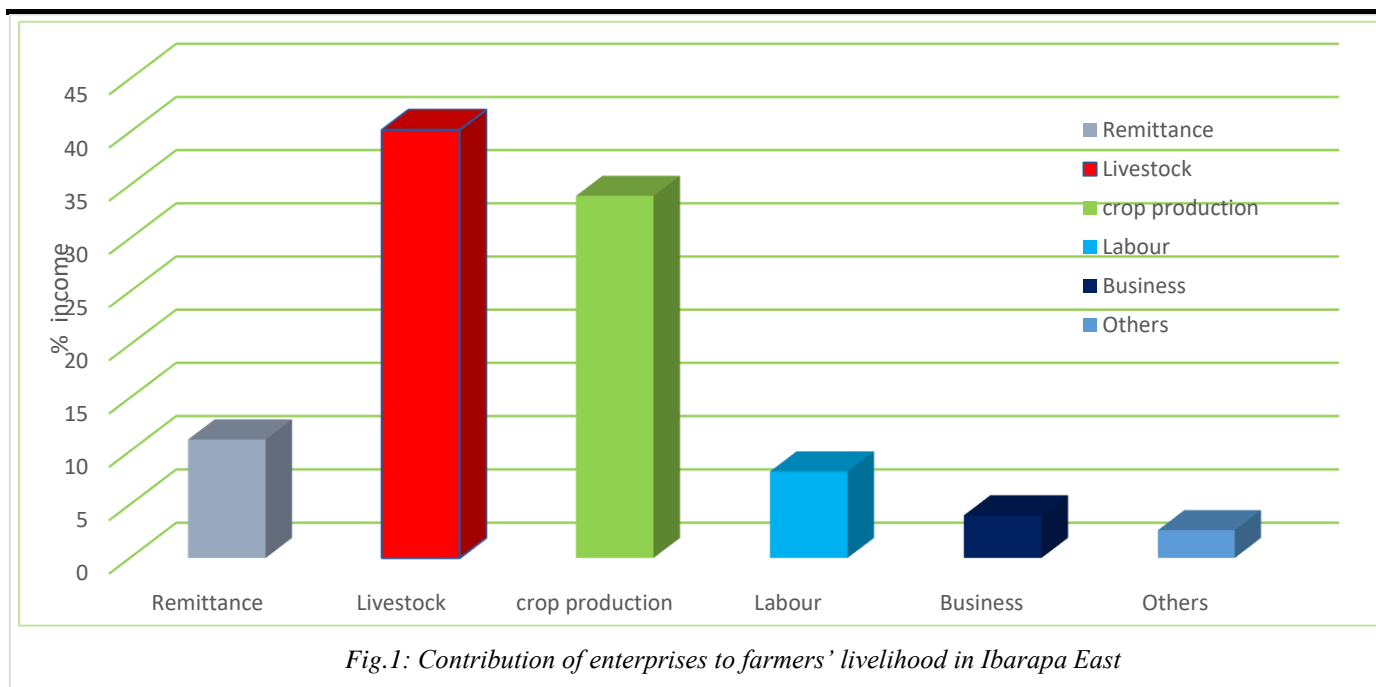
II. MATERIALS AND METHODS

The study was conducted in the derived savannah area of Ibarapa East, Oyo State, ethnically heterogeneous with a high concentration of smallholder crop and livestock farmers. The soils in the study area are poor chemical nutrients and regarded as low in fertility while population is 81,115 out of which 52% are males and 48% are females. The area lies within Longitudes 1°5' W and 1°39' W and Latitudes 7°9' N and 7°36' N, covering an area of 1,782.2 km². It has a bimodal rainfall pattern ranged 1200mm to 1500 mm with a major rainy season from April to August, and a minor rainy season from August to November.

Livestock (dairy) farmers in the study area were purposively selected with the help of the state extension agents. A multi-stage sampling technique was used to purposively select 225 respondents involved in dairy production, nine respondents per village, three villages per cell and three cells were randomly selected in the area, were evaluated. Parameters measured were livelihood enterprises, % income on household livelihood, milk production (litres, L), seasonality, pricing of milk and amount of milk retained for household use (litres/day). Qualitative and quantitative data collected through questionnaire were transcribed into Microsoft Excel the FEAST Excel macro program (www.ilri.org/feast) (ILRI 2015) and analyzed with descriptive statistics.

III. RESULTS AND DISCUSSIONS

3.1. Contribution of livelihood activities to household income (as a percentage) The FEAST also provided the opportunity to evaluate the contribution of livelihood activities to household income as in Fig.1. FEAST evaluated four major contributors to the farmer average % of income as agriculture/crop production, livestock, business and remittance.



Agriculture/crop production contribution to the average % income of respondent farmers in the study area was significant. The contribution of agriculture (%) to the livelihood activities of household income ranged 42 to 74 in the study area. This result showed that agriculture form the main stay of the respondents income which supported the findings of FAO (2015) that agriculture remains the highest contributor of the populace especially in the sub-Saharan. However, contrary to the ATA (2013) that reported higher national income accruing from oil than agriculture.

Livestock contribution to the average % income of respondents was ranged from 26 to 42. This suggested that livestock enterprises were ranked next to agriculture/crop production in household income generation in the study area. This finding supported Okumadewa (1999), Amujuyegbe (2012) and Sosina (2017) that livestock in the major contributor to farmers' income. This was in contrast to Amole and Ayantunde (2016) that reported that livestock was ranked ahead of crop agriculture in the contribution of livelihood activities to household income.

Business contribution to the average % income of respondent farmers in the study area ranged 0.5 to 8. This result showed that only a few of the respondents were individual in business i.e petty trading to complement their main source of income. Major business engaged by respondent farmers in the study

area was petty trading, black smith, carpentry and other artisans (Sosina 2017). This result showed that only a few of the respondents are individual in business i.e petty trading to complement their main source of income. This supported the finding of ATA (2013) agriculture and agricultural enterprises should be a business not just a way of life but in contrast with Enukeje et al. (2013) that reported business hinders the involvement of youth in livestock and agricultural production especially in the southeast of Nigeria.

Remittance was the kind of income that comes from wards, spouses outside the village or systems level from cities or abroad which are very consistently, mostly received every month. The % of remittance to livelihood income ranged 0.2 to 8.0. Remittance from this finding is no doubt, the main stay of the respondent income. The remittance (% income) ranged 0.2 to 8 forms the main stay of the respondent income. Livelihood from remittance of respondent farmers agreed with the submission of Wassena et al. (2013) that reported high remittance level among farmers in Ethiopia.

3.2. Contributions of livelihood enterprises: The Feast Assessment Tool (FEAST) also provided the opportunity to evaluate the contribution of livelihood activities to household income as in Fig. 1. FEAST evaluated contributors to the farmer average % of income as agriculture, livestock, business, remittance, labor, and others. This agreed with the

Open Access

submission of Sosina (2017) that reported similar enterprises' contribution to livelihood in the Ibadan/Ibarapa area. The % income from livelihood enterprises identified in the study area were 11.10, 40.20, 34.00, 8.10, 4.00 and 2.60 for remittance, livestock, crop, labour, business and others, respectively. While livestock, crop and remittance were ranked as primary, secondary and primary enterprises, respectively. The various enterprises in the study area agreed with the findings of Sosina (2017) and Amole and Ayantunde (2016) that ranked livestock highest but in contrast with Haile et al (2010) and Amujuyigbe (2012) that reported crop production as a primary enterprise in some forest zones.

The average contribution of livestock to the farmers' income was 40.20%. This suggested that livestock enterprise was ranked primary ahead of other enterprises among the respondent farmers in the study area. This finding was supported by Okumadewa (1999), Amole and Ayantunde (2016) and Sosina (2017) that livestock was among the major contributors to farmers' income. But in contrast with Amujuyegbe (2012) that ranked crop production ahead of livestock in the contribution of livelihood activities to household income.

The contribution of agriculture to the livelihood activities of household income was 34.00%. This result showed that agriculture forms the mainstay of the respondents' income which supported the findings of FAO (2015) that agriculture remains the contributor to the populace income, especially in the sub-Saharan. However, the result was contrary to the ATA (2013) that reported higher national income accruing from oil than agriculture.

The contribution of remittance to the average % income of respondent farmers in the study area was 11.10. The remittance was the kind of income that comes from wards, spouses outside the village or systems-level from cities or abroad which are very consistent, mostly received every month (Sosina 2017). Remittance from this finding was among the major source of respondent income. Remittance to the livelihood of respondent farmers agreed with the submission of Wassena et al. (2013) that reported high remittance levels among farmers in Ethiopia.

The % contributions of enterprises labor, business and others to the farmers' income from the study area were very negligible 8.10, 4.00 and 2.60, respectively (as in Fig.1). This result agreed with Sosina (2017) that reported similar % contributions of these enterprises to the farmers' income. Furthermore, farmers' involvement in various enterprises for

their income and livelihood were corroborated by Haile et al (2010) that reported that majority of the households had one (39.4%) or two (37.9%) sources of income and those with three or more income sources accounted for 11.3%.

3.3. Income or livelihood outcome of farmers in Ibarapa East
The number of bulls and cows sold over the past 3 years were (300.67 ± 10.89) and (50.56 ± 6.34), respectively (as in Table 1) while the approximate weight of bulls and cows sold over the past 3 years were (180.23 ± 17.72) and (200.85 ± 19.89), respectively. The results were similar to Amole and Ayantunde (2016) and Sosina (2017) that reported weight of cattle of 180-250 kg for sales. The result is in contrast to Haile et al (2010) that reported annual sales from livestock and livestock products higher (6,181; 90%) than the sales from crops products (186; 10%). Livelihood income from livestock was lower than Haile et al (2010) that reported some farmers' dependence on agriculture for their source of income constituted 69% of the total households. Furthermore, farmers' involvement in various enterprises for their income and livelihood was corroborated by Haile et al (2010) that reported that majority of the households had one (39.4%) or two (37.9%) sources of income and those with three or more income sources accounted for 11.3% while Amole and Ayantunde (2016) reported that majority of respondents were involved in the livestock enterprises for their household income and livelihood.

Table 1: Income or livelihood outcome of farmers in Ibarapa East

Type of Animal sold	Number	Approximate
Number of male cattle sold over the past 3 years	300.67 ± 10.89	180.23 ± 17.72
Number of female cattle sold over the past 3 years	50.56 ± 6.34	200.85 ± 19.89

3.4. Seasonal influence on milk production and livelihood among farmers in Ibarapa East
The total average milk yield, average price received for milk and amount of milk retained for household use are affected by seasons (as in Table 2). The total average milk yield (liters/day) ranged 180.67 ± 7.23 to 240.26 ± 9.34 at February and July, respectively while average price received for milk (₦/liter) ranged 150.63 ± 3.67 to 175.28 ± 5.78 at January and May, respectively. The amount of milk retained for household use (liters/day) ranged 5.18 ± 1.67 and 8.78 ± 2.86 at March and September, respectively.

Open Access

The total average milk yield (liters/day) and amount of milk retained for household were similar with that of Sosina (2017) that gave a lower range of 3-4 liters of milk per day per cow. The amount of milk retained for household use (liters/day) was influenced by a lot of factors which includes seasonality, social factors and market forces on milk sales at the system

level. The total average milk yield of milk (liters/day) was higher than that reported by Haile et al (2010) that the number of households (%) that owned one or more milking cows ranged 7.70 to 29.71 and the daily milk yield of a cow (liters) ranged 0.91 to 0.95.

Table 2: Seasonal influence on milk production and livelihood among farmers in Ibarapa East

	Total average milk yield (liters/day)	Average price received for milk (₦/liter)	Amount of milk retained for household use (liters/day)
January	195.78 ±6.78	150.63 ±3.67	5.67 ±1.89
February	180.67 ±7.23	160.37 ±4.46	5.90 ±1.78
March	190.45 ±7.12	170.42 ±5.38	5.18 ±1.67
April	200.34 ±7.45	170.60 ±5.68	7.72 ±2.09
May	205.45 ±7.87	175.28 ±5.78	8.71 ±2.12
June	230.17 ±8.89	170.97 ±5.13	6.67 ±1.69
July	240.26 ±9.34	165.08 ±3.23	7.82 ±2.23
August	220.46 ±6.58	165.65 ±3.71	6.08 ±2.28
September	230.67 ±8.17	170.82 ±3.67	8.78 ±2.86
October	200.38 ±7.76	165.67 ±3.84	6.45 ±1.69
November	195.29 ±6.45	160.36 ±3.77	5.87 ±1.67
December	190.67 ±6.89	160.35 ±3.88	5.28 ±1.78

₦360 = 1 US Dollar

3.5 Seasonal influence on Cattle market price in Ibarapa East
Cattle market price in the study area is influenced by seasons and other market forces (as in Table 3). The market price of cattle (₦/TLU) ranged 230.06 ±14.78 to 260.08 ±15.34 in January and July, respectively. Usually there limited feed resources at the peak of dry season affect the weight and body conformation of cattle while there is abundance of good quality and quantity of pastures at the peak of wet season thus

having positive influence on the cattle body conformation and physiological state for increased milk production. The seasonal influence on milk production was similar to the report of Sosina (2017) while examining the cattle production in derived savannah area of Ibadan/Ibarapa zone of Oyo state. The dollar equivalent of the market price also follow the same trend in terms of seasons.

Table 3: Seasonal influence on Cattle market price in Ibarapa East

Month	Market price for cattle 1 TLU (₦/head)	Market price for cattle 1 TLU (\$/head)
January	230.06 ±14.78	0.63
February	250.90 ±12.56	0.69
March	250.89 ±11.64	0.70
April	240.67 ±10.47	0.66
May	250.45 ±12.87	0.69

Open Access

June	250.56 ±10.76	0.69
July	260.08 ±15.34	0.72
August	240.53 ±11.49	0.66
September	250.76 ±14.78	0.69
October	235.98 ±13.18	0.63
November	240.12 ±12.56	0.66
December	230.78 ±13.56	0.63

3.5

3.6. Livestock holding of farmers' household in Ibarapa East
The livestock holding of farmers' household in Ibarapa East in the study area as in Table 4. The local dairy cows among the respondent farmers were classified as lactating and non-lactating (dry). The number of animals for lactating and non-lactating were 70.60±6.89 and 250.23±12.42, respectively while the approximate weight per animal (Kg) were 230.56

±13.78 and 200.45 ±11.62, respectively. The result affirmed the feasibility of cattle production in the derived savannah area. The area is blessed with clement weather, large expanse of land and fair share of water bodies favorable for viable and commercial cattle production (Sosina 2017, Samireddypale et al 2014).

Table 4: Livestock holding of farmers' household in Ibarapa East

Type of Animal	Number of animals	Approximate weight per animal (kg)	Dominant Breed
Local Dairy cows – lactating	70.60±6.89	230.56 ±13.78	WHITE FULANI,GUDALI,
Local Dairy cows - non lactating (dry)	250.23±12.42	200.45 ±11.62	WHITE FULANI,GUDALI,
Local Dairy heifers (>6mths old - < 1st calving)	150.56±10.56	75.23 ±6.27	WHITE FULANI,GUDALI,
Local Dairy calves (<6mths old) – female	50.67 ±8.91	50.78 ±7.89	WHITE FULANI,GUDALI,
Local Dairy calves (<6mths old) – male	60.34 ±7.68	50.80 ±5.25	WHITE FULANI,GUDALI,

The number of animals and approximate weight per animal (Kg) for local dairy heifers (>6 months old but before first calving) were 150.56±10.56 and 75.23 ±6.27, respectively. The weights were lower than that reported by Haile et al (2010) and Kabunga (2014). There were no significant difference in the approximate weight per animal for local dairy calves male and female. The weight per animal (Kg) for female was 50.78 ±7.89 while male 50.80 ±5.25. The number of animals of local dairy calves below 6 months were 50.67 ±8.91 and 60.34 ±7.68 for female and male, respectively. The dominant dairy breed among respondent were the white Fulani and Gudali which was similar to the findings of Sosina (2017) and Amole and Ayantunde (2016) that reported white Fulani as a dominant breed.

IV. CONCLUSION

Dairy production could be another hub for investors with a lot of opportunities to earn living on household bases. Ibarapa East has its fair share of good quantity and quality of feed resources with adjacent water bodies, that these resources could be tapped to enhanced household income and livelihood. Seasonality influences milk production of animals and in turn affect farmers' livelihood from dairy milk production. If given the desired attention and approach, livelihood from dairy animals is sustainable to household income though linkage to organized dairy value chain will go a long way in improving the farmers' economy and household income.

Open Access

ACKNOWLEDGEMENT

I am deeply indebted to Prof. O.J. Babayemi, the Dean, Faculty of Agriculture, University of Ibadan, Ibadan and Prof. A.E. Adekoya former, Head of Department, Department of Agricultural Extension and Rural Sociology, University of Ibadan, Ibadan for their supervision and immense contribution to this work.

CONFLICT OF INTEREST

There is no conflict of interest in this paper.

REFERENCES

- [1] T.A. Amole and A.A. Ayantunde, "Assessment of Existing and Potential Feed Resources For Improving Livestock Productivity in Niger". International Journal of Agricultural Research 11: 40-55. 2016.
- [2] B.J. Amujoyegbe, "Farming System Analysis of Two Agro Ecological Zones of Southwestern Nigeria". Agricultural Science Research Journal Vol. 2(1), Pp. 13 - 19, 2012.
- [3] ATA.MNAR, FMARD Nigeria. GES live data dashboard. 2013. Retrieved on 02/12/2014 from <http://www.fnard.ng/ges-live-data-dashboard> Score card FMA&RD Mid-Term Report January, 2013
- [4] A.A. Ayuk, G.A. Kalio, L.N. Agwunobi, and B.I. Okon, "Agro By-product Feedstuffs and Livestock Management Systems for Rural Livelihoods in Cross River State". Journal of Agricultural Science Vol. 3, No. 2. 2011
- [5] O.J. Babayemi, A. Samireddypalle, A.O. Sosina, A. A. Ayantunde, I. Okike, and A. J. Duncan "Characterization of farming and livestock production systems using the feed assessment tool (FEAST) in selected local government areas of Osun state, Nigeria. Research program on integrated systems for the humid tropics ILRI Technical Report, December, 2014
- [6] R.E. Black, S.M. Williams, I.E. Jones, and A. Goulding "Children who avoid drinking cow milk have low dietary calcium intakes and poor bone health." The American Journal of Clinical Nutrition, Vol. 76, Pp. 675-680. 2002
- [7] J.M.I. Chah, U.P.I. Obi, and H. M .Ndofor-Foleng, "Management practices and perceived training needs of small ruminant farmers in Anambra State, Nigeria". African Journal of Agricultural Research Vol. 8 (22), pp 2713-2721. 2013.
- [8] E.C. Enujeke, I.M. Ojeifo, and G.U. Nnaji, "Residual effects of organic manure and In organic fertilizer on maize grain weight and some soil properties in Asaba area of Delta state". International J. of Advance Biological Research. Vol. 3 (3) 433-442. 2013.
- [9] E.O. Fakoya, "Utilization of Crop – Livestock Production Systems for Sustainable Agriculture in Oyo State, Nigeria". J. Soc. Sci., 15(1): 31-33.2007
- [10] FAO "The state of food and agriculture: social protection and agriculture: breaking the cycle of rural poverty". FAO publication. 2015.
- [11] G. Haile, A. Haile, and G. Asghedom, "Baseline Survey emergency response addressing livelihood (food) security of former IDPS/expellees, host communities and drought affected rural populations in Eritrea". A UNDP project report, Asmaria, Eritrea.2010.
- [12] C. Henriksen, M. Eggesbø, R. Halvorsen, and G. Botten, "Nutrient intake among two-year- old children on cows' milk-restricted diets." Acta Paediatrica, Vol. 89, Pp. 272-278.2000
- [13] ILRI "Feed Assessment Tool (FEAST) focus group discussion guide". Nairobi. www.ilri.org/feast. 2015
- [14] O.A. Lawal-Adebowale, "Dynamics of Ruminant Livestock Management in the Context of the Nigerian Agricultural System". Livestock Production INTECH open science 2012 Chapter 4, pp 64-71.2012.
- [15] C.F. Nicholson, L. Mwangi, S.J. Staal, and P.K. Thornton. "Dairy Cow Ownership and Child Nutrition Status in Kenya". AAEA Meetings Selected Paper, 2003.
- [16] C.F. Nicholson, P.K. Thornton, and R.W. Muinga, "Household-level Impacts of Dairy Cow Ownership in Coastal Kenya." Journal of Agricultural Economics, Vol. 55, Pp. 175-195.2004.
- [17] F.O. Okumadewa, "Livestock industry as a tool for poverty alleviation". Tropical Journal of Animal Science, 2: 21-30. 1999.
- [18] O.A. Olafadehan, and M. K. Adewumi, "Livestock management and production system of agro pastoralists in the derived savanna of South-west, Nigeria". Tropical and Subtropical Agro ecosystems, 12 (2010): 685 – 691.2011.
- [19] R. Rawlins, S. Pimkina, C.B. Barrett, S. Pedersen, and B. Wydick, "Got Milk? The Impact of Heifer International's Livestock Donation Programs in Rwanda." Food Policy, Vol. 44, Pp. 202–213.2014.
- [20] A.O. Sosina, "Assessment of crop residues as feed resources for crop-livestock production Systems in Ibadan/Ibarapa area of Oyo State, Nigeria". A Ph.D. thesis submitted to the Department of Animal Science, University of Ibadan, Nigeria. 2017.
- [21] A.O. Sosina, O.J. Babayemi, and A.E. Adekoya, "Crop-livestock production systems contributions to livestock diet and farmers' livelihood in Ibadan/Ibarapa area, Oyo state, Nigeria". Wayamba Journal of Animal Science (WJAS), Vol.11, Pg 1827- 1835.2019.

Open Access

-
- [22] F.J. Wassena, W. Lukuyu, B. Mangesho, W. E. Laswal, G. H. Bwire, J. M. N. Kimambo, A.E and B.L. Maass, "Determining Feed Resources and Feeding Circumstances; Usefulness and Lessons learnt by applying FEAST in Tanzania". From <http://www.tropentag.de/2013/a>. 2013.
- [23] A.S. Wiley, "Consumption of milk, but not other dairy products, is associated with height among U.S pre-school children in NHANES 1999-2002." *Annals of Human Biology*, Vol. **36**, Pp. 125-138. 2009.