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Contributions of Indigenous Beef Cattle Fattening Schemes to Total Household Income and Wealth Creation in Semi-Arid Areas of Tanzania

by

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[1] This paper is based on a larger ongoing REPOA-funded study expected to result in a PhD thesis.

ABSTRACT

This paper evaluates the contribution of indigenous beef fattening schemes to total household income and wealth creation in semi-arid areas of Tanzania, particularly in Shinyanga Urban and Kishapu Districts. Comparison of income and poverty levels between schemes 1 and 2 were analytically performed. A sample of 144 fattening respondents was employed. Primary data like assets and incomes were collected using questionnaires and personal observation. Meanwhile, secondary data like demographic figures were collected using published reviews. Data were analysed using descriptive statistics and Principle component analysis (PCA). The results show that most of feedlot operators were males. The fatteners sourced capital and labourers from personal saving and hired labour, respectively**.** Moreover, most of scheme 2 feedlot entrepreneurs had more income, valuable assets and appeared in the top rich and medium quintiles compared to scheme 1 fatteners. It is concluded that investing in scheme 2 is a better endeavour for improved livelihoods, poverty mitigation and transformation of the traditional livestock industry into a more profitable and commercial based enterprise. It is recommended that provision of grants and training to the fatteners, pastoro-agro-pastoralists and traders is vitally important for development of livestock industry in Tanzania.

Key words: Fattening schemes, optimal capital, Income and Asset, Wealth, Tanzania

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LIST OF ACRONOMS AND ABBREVIATIONS

ADG	Average Daily Gain
CSC	Cottonseed Cake
CSHL	Cottonseed Hulls
DALDO	District Agriculture and Livestock Development Officer
DEO	District Extension Officer
EAC	East African Community
e.g.	Example
FAO	Food and Agriculture Organization of United Nations
GDP	Gross Domestic Product
LDC	Least Developed Countries
MES	Microsoft Excel Software
MFDP	Ministry of Finance and Development Planning
MDGs	Millennium Development Goals
MLD	Ministry of Livestock Development
MLFD	Ministry of Livestock and Fisheries Development
NGOs	Non-Government Organizations
NSGPR	National Strategy for Growth and Poverty Reduction
SADC	Southern African Development Community
SSA	Sub-Saharan Africa
TAS	Tanzanian shillings
TSHZ	Tanzanian Short Horn Zebu
URT	United Republic of Tanzania
USA	United States of America
USD	United Stated Dollar
WB	World Bank

1.0 INTRODUCTION

Beef cattle plays an important role for Tanzania's economy and development for it attributes about 53% of total meat produced in the country. Moreover, Tanzania is the first largest producer of cattle in the SADC and EAC regions because it comprises about 19.5 million cattle. On the other hand, Shinyanga region has 3.8 million cattle thereby constituting about 19.5% of the total population of cattle in the country. This sector could help households and Tanzania society to improve income, food security, consumer health safeguards, employment opportunities and overall living conditions. Despite of having huge stock, the country still imports meat **(**FAO, 2011). Importation of beef in the country suggests that there is increasing unmet demands of meat fueled by increasing urbanization, emerging and growing rural townships, classical hotels and tourism industry. Some of the established feedlot schemes in Morogoro, Sumbawanga and Arusha supply quality meat in the nearby towns and cities in the country.

However, the beef industry in the country contributes only 3.6% of the GDP out of 56% GDP attributed by the agricultural industry (MLFD, 2010). Other challenges facing the livestock industry in the country include low capital, poor quantity and quality of feeds, poor marketing infrastructures, lack of fattening and marketing entrepreneurships and poor grading system of cattle. Furthermore, most endeavours on improvement of the livestock industry in Africa has been reported to focus on technology driven programmes rather than basing on demand driven approach - which involves both the experts and livestock producers on decision making.

The lot feeding production system or beef cattle fattening scheme could be one of the alternatives to improve the quality of animals sold, meat and consequently human life through improved nutrition and increased wealth through sales of the animals and animal products at the domestic and export markets. This is based on the fact that feedlotting raises animals on high energy and protein feeds that fasten muscling, tenderness, attainance of attractive body conformation and weights for the market. This information conforms with the Neoclassical Theorists who portrays that "For each combination of variables inputs, there is at least one combination which gives the maximum possible profitable output. Furthermore, Many scholars have addressed the vitality of livestock on provision of cash income and improved livelihoods for the majority of the world communities **(Ahmed *et al*, 2011; Pica-Ciamara *et al*., 2011; Ceyban and Hazneci, 2010; Koontz, 2008; Umar *et al*., 2008, Mkonyi *et al*., 2007; Workneth, 2006; Moll, 2005).**

Yet, the existing income generating capacity of livestock and livestock products as compared to its vast potentials in Tanzania has not been exploited (MLFD, 2010,: Seiff, 1999). This is because the contribution of cattle to the rural and national

economy at large is still apparently low because the livestock industry is poorly performing (MLDO, 2010). More still, it is not well known whether the schemes address well to the one-target-one of the MDGs which aim at increasing income and reducing poverty by 50% under friendly environment by year 2025.

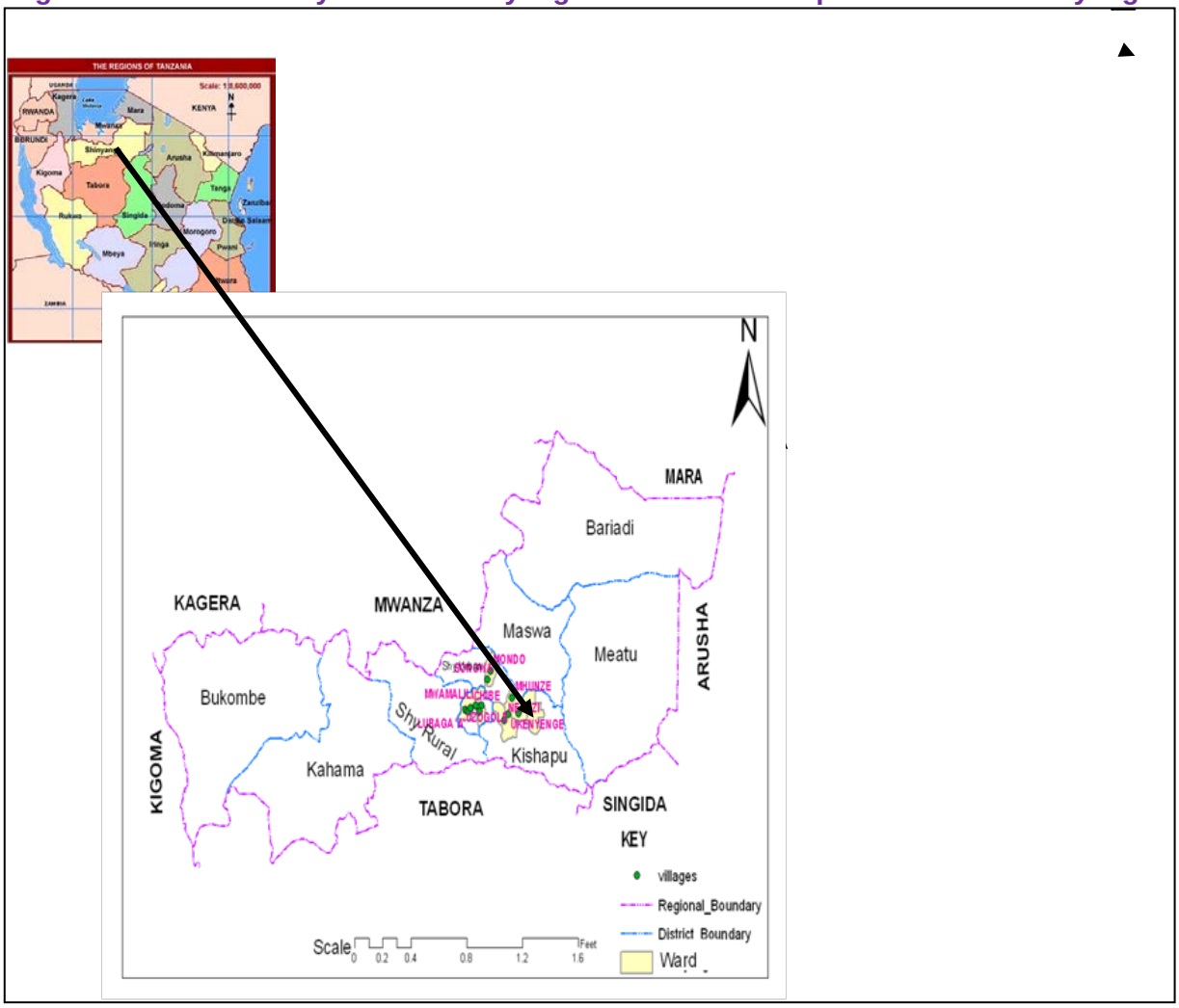
This study determines the contribution of beef fattening schemes to total household income in Shinyanga Urban and Kishapu Districts in Shinyanga Region. More specifically the study (i) explores demographic, social and economic characteristics of fatteners (ii) determines the optimal levels of investment capital and income in the lots (iii) compares income levels of fatteners between schemes 1&2 in the study area (iv) compares poverty levels of fatteners between scheme 1 &2 in the study area (v) recommends tangible strategies for development of sustainable wealth creating beef cattle industry through value chain approach.

2.0 METHODOLOGY

2.1 Study area

The study was conducted in semi-arid areas of Shinyanga Urban and Kishapu Districts in Shinyanga Region in which the fattening enterprise is carried out.

Figure1: Selected Study Area in Shinyanga urban and Kishapu Districts in Shinyanga



2.2 Data collection

Primary data were collected using structured questionnaires, interview and personal observation. Information from primary data include cash inflow and cash outflow input for three years, assets like cars, houses, TV, while secondary data were obtained using tools e.g. key informant, internet, websites and libraries to get information worthiness, status and sustainability of the lots.

2.3 Sampling techniques

Shinyanga Region and its two districts, Kishapu and Shinyanga Urban Districts were purposely selected for the study because the income of most dwellers relay on animal husbandry, mainly indigenous cattle. Further still, there is an abundant cottonseed for preparation of cottonseed cake and cottonseed hulls/husks useful for fattening feeder cattle. A detailed survey was conducted from March 2011 to December 2012.

2.3.1 Sample size

The sample comprised 144 respondents, 24 village leaders and 4 District administrators such as the DALDO and DEO to get information on fattening business in Shinyanga Region.

2.3.2 Categories of feeding regimes in the fattening schemes

Two main categories of fattening schemes were identified: Scheme1 comprised of fatteners feeding their animals on cottonseed hulls (CSHL) based diets and Scheme 2 composed of fatteners fattening their animals using cottonseed cake (CSC) based diets.

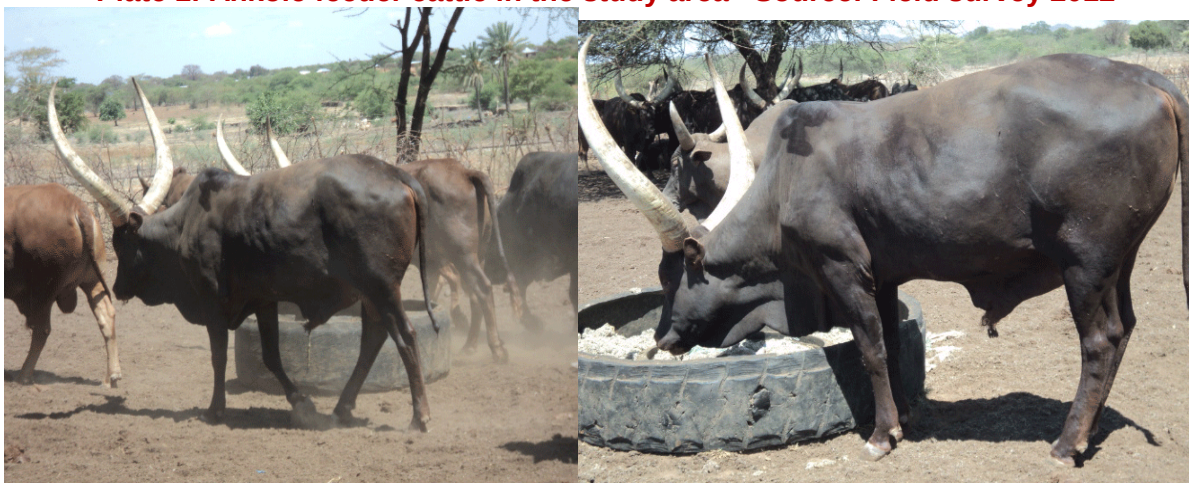
2.3.3 Herd size

The schemes were also classified into small scale fattening scheme having 1-15 number of cattle, medium scale with 16-30 cattle, and Large scale fattening scheme having number of cattle above thirty (>30)

2.3.4 Categorisation of breeds of feeder cattle

There are two main breeds of indigenous beef cattle, the TSHZ and Ankole breeds as shown below.

Plate 1: Ankole feeder cattle in the study area Source: Field survey 2012



Source: Field survey 2012

Plate 2: TSHZ feeder cattle in the study area

Source: Field survey 2012

2.4 Data analysis

Principle component and descriptive analyses were employed**.**

2.4.1 Principle component analysis

Data were analysed using principle component analysis (PCA) which estimates accumulation of assets (wealth concentration) like motor vehicles, houses, chairs, TV set, machinery of each fattener and reduces asset into asset index. It assigns weight for index to serve as a proxy for wealthy. Thereon, in the endeavours of developing asset indices, computer package like SPSS and Microsoft excel office were employed to facilitate operation of PCA as expressed by Mwageni *et al*, (2005) and Filmer and Pritchett (1998). In this study, the mean asset index of -0.76 was obtained and used to categorise the respondents into respective wealth categories. Thus, the result of principle component is an asset index for each household (A_1).

Mathematically:

The model for PCA was computed using the following formula:

$$A_i = f(\alpha_i - \alpha_1)\chi(S_1) + ... + f(f - \alpha_1)\chi(S_1)$$

Where: The Eigen value have been used to detect the amount of variation brought by each item contributed in the community

A_i = index for each household, f = the scoring factor or weights for the first asset

χ =the variable assets, α_i =the value of the asset, α_1 = the mean end

S_1 = the standard deviation of assets

2.4.2 Descriptive analysis

Wealth index namely asset indices were sorted into three groups (quintiles) depending on the weight given for each household asset index. The quintiles were 20 % (30) for top rich, 40 % (57) for medium class and 40% (57) for the poor, whereas figures in paradises are number of households.

3.0 RESULTS AND DISCUSSION

Distribution of respondents by demographic, Social and economic characteristics of Respondents.

3.1 Distribution of feedlot respondents by demographic characteristics

This section comprises age, gender and marital features of the feedlot operators.

3.1.1 Age of respondent

Age is an important demographic component for decision making and adoption of a particular technology or accepting a given business. The findings in this study reveal that very few respondents (8%) in scheme 1 and scheme 2 (7%) aged between 20 and 35 years as shown in Table 1. This is because individuals in the young cohorts are yet devoted to economic business. That is, most of people in youth cohort are yet self- committed to productive activities. Similarly, individuals in extremely old ages are dubious to new innovations. More evidently, the average age of the fatteners in the study area was analytically reported to be 39 years. The findings Further disclose that majority of feedlotters in scheme 1 (86%) and scheme 2 (87%) are in the middle age group because their age range from 36 and 50 years. This age belongs to the group of economically productive people who are engaged in productive activities. On the other hand, there were very few fatteners (6%) in the age group between 55 and 60 years and above. This age group embraces people who are slower adopter to new innovations and are hardly risk bearers. This more or less complies with the argument by **Yogandra and Uma (2006**) and **Rutasitara (2002**) who narrates that the old age set (65 and above) has fewer people in time consuming projects because they are less involved in tedious work.

3.1.2 Distribution of respondents by gender

Gender is one of the central organizing principles amongst human capital that governs the process of production, marketing, distribution and consumption. However, since history, disproportionate barriers in access to productive resources such as education, decision making and technology in many of African societies have placed women in the disadvantaged position throughout the developing world. This situation is typically visualised in this study where females are fewer as appears in schemes 1 (14%) and 2 (8%) as compared to their counterparts. This means that, the fattening business is occupied by males in the fattening business. The key reasons for the fewer numbers of women in the lots include less access to relevant information, fattening technology and property owning. Other causal factors include

prevalent of biased cultural norms and lack of financial capital which could be employed in purchasing feeder cattle, feeds, veterinary drugs, supportive services like extension and veterinary services.

Most of respondents reported that majority of women in this countries are often poorer than men because have less access to productive resources like income generating activities, land, education, social security, control over families' incomes. Other researchers strengthen comparable argument that women experience the harshest deprivation in the developing world and are piled into high degree of poverty (**Fletschner *et al*., 2011; Ruth and Caroline, 2010; Ogate *et al*., 2009; Ellis, 1998)**. Similar to previous studies, a common finding advocates that, though women play significant roles in animal husbandry, agriculture and food security in many developing nations, they continue to have a poorer command over a range of productive and financial resources and asset owning (**Mohamed and Abdulquadria, 2012**). This facet dictates for their perpetuating poverty spheres.

Some scholars sorted out feminist inferiority complex as factors that push women away from handling various economical projects (**Esther, 2005, Benin *et al.*, 2004; ILRI, 2000**).. In **Nigeria, Olawoye (1985**) advances and articulates that, neglecting women capability in the economy is akin to crippling half of the potentials of the national wealth.

3.1.3 Marital status of respondent

Marriage is a vital social institution for the married and the whole society because it forms units of production, consumption, and supply of produce and services. It is further connected to property; partnership rights (**Baker *et al*., 2009**). Statistical analysis Shows that majority of sample fatteners in scheme 1 (94%) and scheme 2 (96%) are married (Table 1), while 3% in both schemes are single. This implies that married individuals have family obligations which fuel them to engage in business or enterprises in order to generate cash income to meet various family needs, requirements and shaping prosperous households in future.

This suggests that marriage is a potential social component that is characterised by functional division of labour. These findings are also parallel to the principles of the "Game Theory and the Family" which narrates that the married couples bargain in such a way press wives in domestic roles while men deal with outdoor activities (**Gibbons, 1997**). More evidence from the author on the roles of marital status is that marriage ensure financial security to the couples because they tend to combine some of savings and assets they accumulated over years for prosperity.

Table 1: Distribution of respondents by demographic characteristics

Variable	Scheme 1		Scheme 2	
Age of respondent	n	Percent	n	Percent
20-35 (young)	6	8	5	7
36-50 (middle aged)	62	86	63	87
51-60 (old age group)	4	6	4	6
Total	72	100	72	100
Gender of respondent				
Female	10	14	6	8
Male	62	86	66	92
Total	72	100	72	100
Marital status				
Married	68	94	69	96
Unmarried	2	3	2	3
Separated	2	3	1	1
Total	72	100	72	100

3.2 Distribution of respondents by Social characteristics

Social characteristics comprise variables like respondent's household size, experience, household head and education level as discussed hereunder.

3.2.1 Household size

Household size includes the total number of individuals living together in the household, which in this case include own children, dependants (relatives), parents and any servant living in the family. The majority of fattening households in scheme 1 (68%) and schemes 2 (72%) have people ranging from 4 to 7 in the family (Table 2), with an average family size of 6 people in Shinyanga Urban and Kishapu Districts. This average of household size is higher than figures of 5.6 people reported by URT (2002; 2003) in Tanzania. This could be attributed by a good proportion of polygamous norms observed among male respondents in the study area

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Several studies (**URT, 1998; Rutasitara, 2002**) reveal that large families could be one of causes of poverty in Tanzania and other developing nations. This concurs with information in the survey by **Dimoso and Masanyiwa (2008)** who reported savings is easier in small families as compared to larger ones. However, a contradicting aspect is seen in the work of **Kayunze (2000)** who reported larger rural households are economically better off compared to smaller ones. This lies in assuming that a good number of people taking part in production is likely to shape a better profile of households' incomes.

Table 2: Distribution of respondents by social characteristics

Variable	Scheme 1		Scheme 2	
	n	Percent	n	percent
Household size				
1-3	3	4	2	3
4-7	49	68	52	72
8-10	18	25	17	24
Above 10	2	3	2	3
Total	**72**	**100**	**72**	**100**
Household Head				
Female headed	10	13	8	11
Male headed	45	63	45	63
Polygamous	17	24	19	26
Total	**72**	**100**	**72**	**100**
Experience in years				
1-6	4	6	5	7
7-10	49	68	54	75
11-12	19	26	13	18
Total	**72**	**100**	**72**	**100**
Education level				
Adult	3	4	3	4
Primary	62	86	63	88
Secondary	5	7	5	7
Post-secondary	2	3	1	1
Total	**72**	**100**	**72**	**100**

3.2.2 Experience of respondents

Experience is an important human capital that can influence the production efficiency, profitability, business performance and market conduct of an individual and the society at large. The statistical analysis in this study **(**Table 2**)** reveals that Profit margins were seen to increase with increasing years of involvement in the lots. For example, fatteners who were reported to work for more than seven years in scheme 1 (66%) and scheme 2 (75%) experienced production of quality cattle and huge income. It was further observed that experience strengthen farmers' negotiating ability during transactions with individual speculators and consequently prevent the possible exploitation of farmers by better-informed buyers**.** On the other hand, Musemwa *et al*. (2007) in South Africa addressed that experience has a vital role for farmer's choice on better market channels and levels for promising prices.

3.2.3 Household head

Household head is among the key determinants of socio-economic status, and cultural norms of the family. The findings reveal that most (63%) of the fatteners in schemes 1 and 2 in the study area were male headed and entirely characterised by

high rate of polygamy that ranged from 24% in the former scheme to 26% in the later. This therefore suggests that the observed high level of polygamy could be attributed to inherent cultural practices experienced over years. Furthermore, very few (12%) households were female headed. More still, the attributes of female headism in the study area were narrated to be divorce, separation and widow. Other causes of female headism include desertion and widow. More recent, various scholarly works have reported the highest percentage of female headism among developed nations to be attributed to desertion, imprisonment and never married women as stipulated by **Michael (2010) in Malaysia, Horrel and Krishnan (2007) in Zimbabwe**. For instance, female headism constitutes 54% of households in USA has, 22% in Canada, 20% in Australia (20%) and 19% in Denmark (19%). (**Michael 2010**). Meanwhile, the leading countries among the developing nations include Botswana (40%) and 35% in Ghana, Kenya, Rwanda, Trinidad, Tobago, Cuba and Costa Rica.

3.2.4 Education level

Education is a major factor for prosperity of an individual's social and economic status in the society for it enables a person to adopt easier new innovations. Education thereon is an important social capital that determines the status, healthy, life style and quality of life of an individual in a particular society and it has an impact on the well-being of the society **(Baum and Jennifer, 2007; Mareth, 2004; Harmon *et al*., 2003)**. Definitely, results on Table 2 shows that majority of households head have attained a primary level of education in scheme 1 (86%) and scheme 2 (88%) and could read and write, and some were post-secondary and secondary school leavers. This suggests that the formal education attained by the majority of fatteners could be useful in raising high quality feedlot cattle if empowered in terms of skills, resources and knowledge is secured. That is to say, educated entrepreneurs are more receptive to improved farming techniques which are prone to high profitability. Other researchers who reported on vitality of education in running a profitable business **include Sarma and Ahmed (2011) in Bangladesh, Gillespie *et al*., (2004) in Georgia, and Jones *et al*., (1992) in South Africa.**

3.3 Economic characteristic of the respondents in the fattening scheme

Economic characteristics include parameters like purchasing, pricing and marketing of fed cattle. Other variables include sources of capital and labour, occupation or employment status of respondents and breed preference as illustrated below.

3.3.1 Purchasing of finished cattle

Purchasing power is one of the key components for any entrepreneur to compete efficiently in a particular business for wealth creation. However, the survey result shows the feedlot business is dominated by males (93%) in the schemes 1 and 2 compared to their counterparts (8%) (Table3). It was seen that most of fatteners had very low negotiating ability. The reasons for low bargaining power amongst feedlot entrepreneurs include lack of entrepreneurial skills, marketing information and strategies. Furthermore, fewer numbers of women in the fattening business could be attributed to sex stereotyping and involvement of numerals household activities. Furthermore, this could be far back rooted from longstanding historical perspectives and notions where most societies have placed women in the disadvantaged position (**Baum and Jennifer *et al*., 2007**). More evidently, information in the World Bank in Afghastan explains that women and girls are delegated to activities at the lower stages of value chain such as sowing, weeding, harvesting, processing and rearing animals, while men predominate in the later stages of value chain such as public spheres, closer to markets and money-related decisions like price and pricing of produce (**world bank, 2005**).

3.3.2 Pricing and marketing of finished cattle by gender

Price is an important incentive and determinant of production decisions of farmers on their produce intended for sale at the market and determines what an enterprise receives in exchange of its products (**Orewa and Egware, 2012, Barret *et al*., 2003**), while livestock Marketing involves movement of the animals from the prouder to the ultimate consumer, targeting at generating ample income, creating wealth and unquestionably climbing out of poverty cycle **(Eze, 2007).** However, the marketing infrastructure in the study area is underdeveloped, characterized by lack of modern market sheds, fences and yards as shown on Plate 3 and Table 3 below.

Plate 3: Finished cattle at Mhunze Secondary auction market in Kishapu District in Shinyanga Region.

Source: Field survey 2012

Price fluctuation was also reported to affect the feedlot business amongst stakeholders.

Further still, fed cattle were mostly traded by males (92%) in both schemes (1 and 2) at various market levels as compared to females. The dominance of men over ladies in most businesses is clearly illustrated to be a result of gender inequalities in decision making and marketing of agricultural produce which have limited women's access to control of resources and huge- cash earning enterprises even if they make a major labour input. Another reason for these disparities is that male have great influence on policy making processes that favour their interests, thereby pressing women into less socio-political and marketing powers.

Other reasons for the limited participation of women in the fattening industry in this study include entry barriers like lack of capital. Other factors influencing price, pricing and marketing are body condition of the animal, education of stakeholders, husbands' restrictions for long distance trades, lack of self-confidence and involvement of ladies in numeral household duties (Economic survey, 2012). That is, husbands' barriers and household obligations are seen as steely blockers for women participation in large enterprises and huge trading. This further indicates that women are also pinned into household-based enterprises like selling staple food and cooked foods. For instance, in the Democratic Republic of Congo (DRC), women's trading opportunities are said to be restricted to small scale –home surrounding business which perpetuate poverty and set them to be trapped in the vicious cycle of petty trading and poverty (Harrigan, 1998). This is because male's dominance over women has placed ladies to be the least in-charge of finance.

3.3.3 Source of capital

Results of this study display that majority of cattle fattening entrepreneurs sourced capital from personal savings in scheme 1 (94%) and scheme 2 (96%) in Shinyanga Region. This suggests that none of the feedlot entrepreneurs or fatteners secured capital from formal financial institutions like banks and that very few of them gathered capital from non -formal financial institutions such as friends and relatives. The reasons for the fattening enterprisers to depend on own savings include lack of access to loans and credit or finance from microfinance due to lack of collateral or mortgage for facilitating and meeting banking procedures. Other attributes for the fatteners to use own savings was narrated to be lack of supportive grants from the government, local districts authorities, NGOs and other financial institutions. Other scholars who asserted problematic situations of livestock entrepreneurs in getting credit include that of **Orewa and Egware (2012**) in Nigeria and **Alemayehu (2011) in Ethiopia.** However, impressing information reviewed herein is that of **Sujan *et al*.,**

(2011) in Bangladesh that the fattening entrepreneurs are firmly supported by the Bangladesh government and other financial organs.

Table 3: Economic characteristic of respondents in the fattening schemes

Variable	Scheme 1		Scheme 2	
	n	Percent (%)	n	Percent (%)
Purchasing of background cattle				
Male	65	90	67	93
Female	7	10	5	7
Total	72	100	72	100
Pricing and marketing of feed cattle				
Male	64	89	66	92
Female	8	11	6	8
Total	72	100	72	100
Source of capital				
Own saving	68	94	69	96
Friends	2	3	1	1
Relatives	2	3	2	3
Total	72	100	72	100
Source of labour				
Family	6	8	4	6
Casual Labourer	67	93	68	94
Total	72	100	72	100
Employment status				
Off farm occupation	10	14	8	11
On farm occupation	50	70	52	72
Both on farm and off farm occupation	12	16	12	17
Total	**72**	**100**	**72**	**100**
Breed preference				
Sukuma	48	66	45	63
Ankole	7	10	8	11
Tarime	13	18	14	19
Tatulu	4	6	5	7
Total	**72**	**100**	**72**	**100**

3.3.4 Labour sources in the fattening schemes

Labour occupies one of the most important elements in the smallholder livestock entrepreneurs in the developing worlds. It's accessibility in the lots determines multidimensional aspects including the size of economic activity, economies of scale that a fattener is engaged in and the scope of improvement of value added farm produce. It was seen that most of work in scheme 1 (93%) and scheme 2 (94%) are performed by casual labourers (Table 3) which include feeds and concentrate feeding, water provision to the feeder and fed cattle and trekking the animals to the market place. However, the labourers were observed to be very under paid in the lots business. This is because each labourer was paid Tshs 20,000 (US$ 12.7) per

month (Economic survey, 2012). However, an advantage to the labourers is that, they do not pay for meals and rent houses because are accounted as family members in each of the surveyed fattening households. Other studies which reported related information on low payment of labourers in the lot feeding industry include that of **Jones (2000**. This suggests that motivation and incentives is extremely needed for these workers for reduction of exploitative spheres for mutual earnings, better livelihoods and poverty suppression.

3.3.5 Employment status of the fatteners in the fattening schemes

It is noteworthy that occupation or employment is an indicator of access to economic resources and thereby affects ones income and productivity. The statistical analysis of this study reveals that most of fatteners (71%) practiced both on- farm and off-farm entrepreneurial income sourcing activities. On farm practices include crop production like cotton, millet, sorghum and maize as well as taming animals like cattle, goats, sheep and chickens (household survey). The off-farm employment included petty business like tailoring, shops and grocery owning, kiosk, *bodaboda* (business motorbikes) and large trading like owning and running butchery, buses, and milling machines **(Economic survey, 2012).** Moreover, frank observation discloses that all of the sample population are also feeder and fed cattle business entities who targets at remunerative prices. This shows that there is change of business aspects from low paying ventures to high income generating firms for better livelihoods and poverty mitigation in the area understudy. A considerable body of research give similar arguments that the livestock industry underpins a definite pathway for climbing out of poverty (**Pica-Ciamara *et al*, 2011; Musemwa *et al*., 2007; Dovie *et al*., 2006; Okoruwa *et al*., 2005).** This suggests that integrated production systems that incorporate agriculture, animal husbandry and non-farms business could improve livelihoods of stakeholders. These suggestions are parallel to the points proposed by many scholars (**Pendell and Schroeder, 2006; Moll, 2005**).

3.3.6 Breed preference in the fattening schemes

Breed of the animal is one of the economically important traits which offers alternative sources of income and is the primary basis for economic classification of bovine species. Obviously, the results of this study reveal that the sample households fatten four types of breeds in different proportions in schemes 1and 2. Majority of sample population in scheme 1 (66%) and scheme 2 (63%) purchased and fattened Sukuma breed. The other breeds raised in the surveyed area include Ankole, Tarime and Tatulu. The Sukuma, Tarime and Tatulu belong to the Tanzanian short horn zebu (TSHZ) which constitutes about 97% of the traditional herds in Tanzania.

The merits of Sukuma breed lies in the fact that the animal possesses desirable productive and market traits which include highest average daily gain (ADG) of about 1.3 to 1.5 for males, 1 to 1.2 for steers and 0.9 to 1 for females. The difference in growth rate amongst sexes of the animals is attributed to inherent differences in muscling, which is higher in males followed by steers and finally by females (**Lacy *et al*., 2010**). The Sukuma breed has also attractive humps, body conformation, good marbling, cutability and muscling for the market.

Further still, the animal is reported to have the most palatable and tender cuts compared to other breeds (**Economic survey, 2011**).The breed therefore, could probably meet the multiple objectives that the poor thrive to meet. The traits compare well with the characters advocated by **Lacy *et al*., (2010**). The authors further asserted that skin colour like yellow-white face, black –white face are more attractive colours for the market compared to the grey, white, sported and stripped cattle. The sukuma breed is also said to have a variety of economically attractive colours. The prominent and attractive animal colour for the market in the lots understudy was brown and yellow-brown colour. Therefore, these arguments continue today sets the Sukuma breed in the economic traits (colours) which capture the attention and interests of many traders.

The Ankole and Tarime breeds have also good body conformation for the business. However, their slower gaining and fattening characteristics of about 5-6 months force many fatteners to avoid raising them. The fatteners further reported that animals with the longest body frame and heavy body weight like Ankole tends to gain very slowly and thereby discourages many feedlot entrepreneurs to practice fattening them. This is because longer duration of finishing the animal is associated with high cost of production and less profit.

3.4 The optimal capital for sustainable feedlot enterprise for small, medium and large scale fattening schemes

The optimal capital is a form of working capital that is necessarily needed by the individual entrepreneur, investor, firm or company to stay in a business competitively. In this case, the results show a significant ($p<0.01$) variation in capital amongst lot sizes in the schemes (Table 4). For instance, optimal capital was about TAS 5 602 860.715 (US$ 3564.16) for the small scale, TAS 9 134 467.11 (US$ 5810.73) for medium and TAS 14 106 983.12 (US $ 8973.91) for large scale fatteners in the study area, in which the feeder cattle houses are built of thorny materials without any shed or roofing. The minimum and maximum amount of investment capitals for the small, medium and large scale in scheme 2 were higher than that of its counterparts in scheme 1. This has been attributed to relatively higher income of scheme 2 fatteners emanating from sales of more valuable animals fed on

high quality concentrates like CSC compared to those ones in scheme 1, which were raised on low quality supplements such as cottonseed hulls and husks.

Lawrence (2000) has also reported similar results where the investment capital was US$ 2834.4 for the herd size of 10 beef cattle, US$ 5268.8 for 20 cattle and UU$ 7903.2 for 31 cattle for the earthen lot house without shed . Meanwhile Iowa Beef Centre (IBC) (2003) reported the highest initial investment figures ranging from US$ 7066.8 for raising 10 feeder cattle to US$ 14 133.6 for managing about 31 background cattle up to the selling weight. This suggests that, success of the lots requires high initial investment costs, and this would be possible if the fatteners are provided with credit by NGOs and financial institutions such as banks. Moreover, fatteners could flourish if will get some grants from the government to lower the cost of inputs and other operational costs. These services are not implemented in most of the developing nations (Tanzania inclusive) due to neglect policies related to livestock improvement and marketing strategies (Economic survey, 2012).

Table 4: The optimal capital for sustainable lot enterprise for small, medium and large scale fattening schemes

Variables	Scheme 1		Scheme 2		Schemes 1&2	
	Working Capital					
Herd size	High operating capital	Minimum operating capital	High operating capital	Minimum operating capital	Optimal operating capital	P value
Small scale (1-15	6 687 500.35	3 776 041.67	7 565 400.78	4 384 500.11	5602860.715	0.00
Medium scale(16-30	9 740,000.41	7 975 608.81	10 337 531	8 584 645.12	9 134 467.11	0.00
Large :scale (>30	13 340 325.16	10 311 756.75	17 435 325.16	15 340 425.30	14 106 983.12	0.00

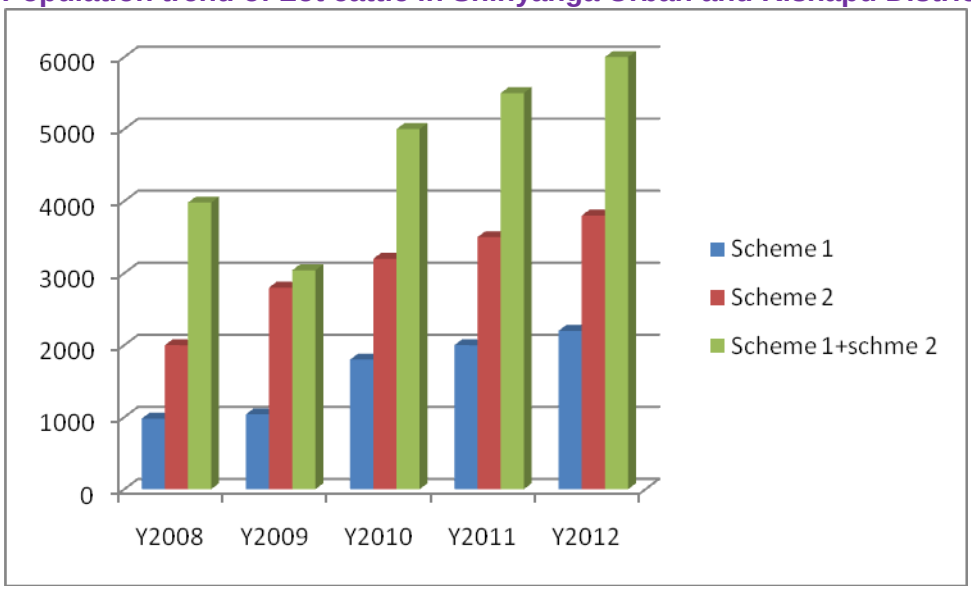
*Statistical significant at p<0,05 significant level.

3.5 Population of lot cattle in the fattening schemes in the study area

On average, lot cattle increased from 2980 cattle in 2008 to 6000 cattle in 3012. This implies that the feedlot enterprise is preferred and adopted for income generation and striving out of poverty burden. The study visualised high rate of spillover effect of the fattening schemes in the neighbouring districts and regions. This situation suggests that cattle increasing population of quality cattle highlight a bright future for Tanzania society. Moreover, in terms of schemes, the analysis show that the population of feedlot cattle was consecutively higher in scheme in 5 years compared to that of scheme 1 (Figure 2).. For example, the number of lot cattle increased from 2980 in 2008 to 3800 in 2012 for scheme 2, while the number of cattle in scheme 1 was lower and increased from 980 cattle in 2008 to 2100 cattle in 2012.The

increase of the value added lot cattle is envisaged to be associated with an increase of monetary economy and wealth accumulation from sales of quality animals, animal products and by-products..

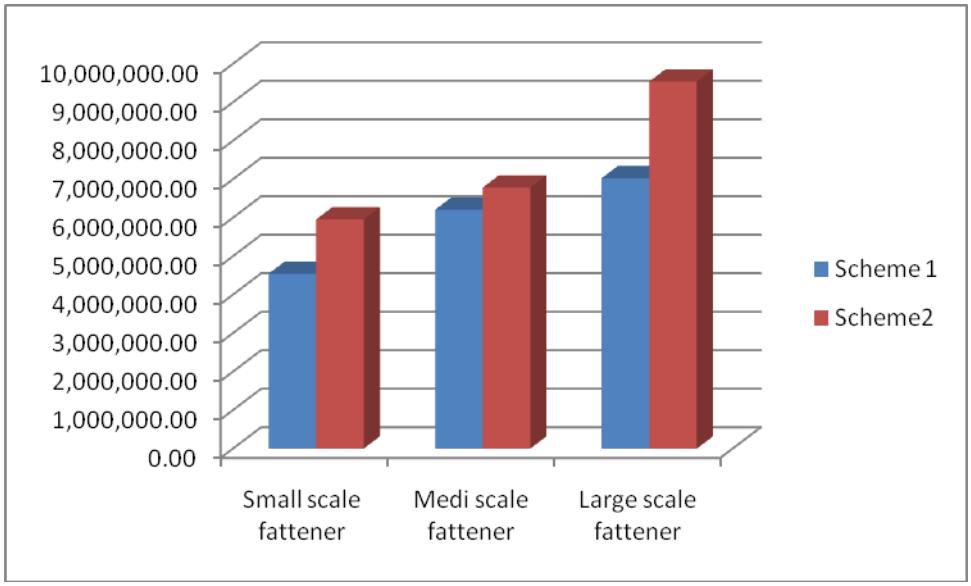
Figure 2: Population trend of Lot cattle in Shinyanga Urban and Kishapu Districts



3.6 Distribution of incomes of the fattening households in the fattening schemes

The distribution of incomes in different levels of farm size (small to large scale) show that the revenues from sales of finished cattle were higher in scheme 2, ranging from TAS 5.9 to TAS 9.5 million compared to those in scheme1 which ranged from TAS 4.5 to TAS 7.0 million for quarter a year (Figure 3)..It is remarkable that cattle fattening brings quick benefits within a short period of time. For instance, **Legese *et al***. (2012) in Ethiopia reported revenue of TAS 20,857,890.14/-per head from sales of live animals and TAS 14,022,842.20/- per head from export of meat to the neighbouring countries and Middle East. Definitely, the results of the current study dictates to argue that scheme 2 could be the best enterprise to address the issue of accrued income, tangible wealth accumulation, better livelihoods and poverty mitigation amongst the lot- stakeholders and the national at large. This comes true if the fatteners are supported financially (credit wise),provided with better advise and entrepreneurial skills on lots business , good animal health care and sustainable markets in a substantial value added agro-produce under defined government policies and strategies.

Figure 3: Distribution of incomes (Tshs) for the fattening households in the fattening schemes



3.7 Comparing income levels of fatteners between schemes 1 and 2 in the study area

3.7.1 PCA Asset indices

The asset indices attained form PCA was used to categorise households in the fattening schemes into three wealth groups known as wealth quintiles. (Table 5).The first quintile was for the rich, the second quintile for the middle group and the third one for the poor. Most of Scheme 2 Fatteners ranked at the top-rich class quintile. This is because they owned most of the valuable assets like houses, bicycles, radios, milling machines, radio cassettes, motor vehicles (cars, buses, motorbikes, bodaboda-business motorbike) and livestock species such as cattle, sheep, goats and poultry compared to those in scheme 1. This could be attributed to value addition of scheme 2 animals using nutritionally rich CSC based rations that led to high quality of the animals and better selling prices, which in turn rendered high purchasing power and investment capacity of scheme 2 respondents compared to those in scheme1. This indicates that household asset, housing condition, land acreages, and household characteristics like water sources estimate better and more accurately the economical and social status of various entrepreneurs. Furthermore, evidence indicates that the asset index approach has been utilized and recommended by many scholars in estimating economic status of individuals in various enterprises (Mwageni *et al*., 2005; Msaki, 2003;). Another study received here in is that of Montgomery and Hewett (2005) who advocate that PCA asset index is a useful tool in estimating income of people in the developing countries where direct income data in monetary form are difficult to gather. For instance, based on entire explication provided hereunder, it is clearly observed that economic status was

demarcated and explained well by the PCA indices in such a way that the poorest members in both schemes (1and 2) had no valuable assets like milling machine, radio cassette, car, motorbike, satellite dish and water pump, while their counterparts had such items. Further still, impressing observation in this study revealed that there were similarity in possession of assets and housing characteristics between scheme 1 and 2 fatteners, though at different ranks. For example, while better-off households had better housing conditions (with stony walls and tiles roof), poor households on the other hand had cement walls and iron sheet roofs, without muddy walls and earth floors. This indicates that fatteners in both schemes prosper in the feedlot enterprise, though at different wealth categories

Table 5: Distribution of assets, housing conditions and water sources by quintiles (%)

Quintiles (population percent)								
	Scheme 1 (n=72)				Scheme 2 (n=72)			
	1st	2nd	3rd	P-value	1st	2nd	3rd	P-value
Assets								
House	100.0	100.0	100.0	0.52ns	100	100	100	0.68ns
Television set	28.5	25.8	16.4	0.01*	67.2	60.1	18.5	0.01*
plough	4.3	12.4	40.6	0.05*	5.7	13.1	13.9	0.05*
Car	11.6	8.4	0.0	0.03*	26.1	14.6	0.0	0.02*
Television	100	100	100	0.83ns	100	100	100	0.32ns
Motorbike	70.2	100	73.7	0.04*	100	100	78.5	0.01*
Bicycle	50.7	60.2	70.5	0.00*	80.6	80.8	89.1	0.02*
Radio	33.3	87,3	80.6	0.02*	48.6	100	100	0.03*
Tailoring machine	6.5	00	0.0	0.00***	7.4	3,8	0.0	0.00***
Radio cassettes	20.4	18.7	8.3	0.04*	60.1	57.9	11.1	0.0**
Land acreage	70.2	69.6	34.1	0.98ns	100	100	70	0.00*
Wooden bed	100	100	100	0.32ns	100	100	100	0.87ns
Sofa set	5.6	4.7	3.3	0.30ns	6.8	6.2	1.2	0.02*
Electrical iron	54.1	54.2	57.1	0.86ns	58.1	57.3	53.3	0.22ns*
Mattress	100	100	100	0.72ns	100	100	100	0.42ns
Fan	.6.1	5.5	5.2	0.1ns	6.7	7.3	6.8	0.13ns
Satellite dish	11.4	10.1	0.0	0.01*	13.3	11.6	0.0	0.0**
Milling machine	3.3	2.9	0.0	0.1ns	7.2	3,4	0.0	0.0**
Shop	10.4	12.7	3.3	0.62ns	32,9	22.5	8.7	0.01*
Bus	3,2	0.0	0.0	0.56ns	4.1	0.0	0.0	0.6ng

Quintiles (population percent)								
	Scheme 1 (n=72)				Scheme 2 (n=72)			
	1st	2nd	3rd	P-value	1st	2nd	3rd	P-value
Butcher	3.4	3.1	0.0	0.58ns	3.7	3.6	0.0	0.8ns
Bodaboda	14.3	12.2	0.0	0.01*	24.4	20.3	6.7	0.0***
Fan	6.7	5.5	0,0	0.0**	7.0	6.6	0.0	0.01**
Tamed cattle	44.7	47.5	36.2	0.55ns	50.1	48.4	45.7	0.63ns
Sheep	8.3	11.6	9.9	0.01*	10.1	12.4	9.7	0.02*
Goat	18.1	20.7	19.1	0.4ns	20.2	23.5	22.1	0.57ns
Chicken	60.5	70.4	70.3	0.03*	67.2	77.5	90.1	0.02*
Housing conditions								
Earth floor	0.0	0.0	0.0	0.7ns	0.0	0.0	0.0	0.9ns
Cemented floor	0.0	11.1	33.3	76.9	5.3	26.7	66.7	0.00***
Tiles floor	11.7	10.3	9.0	0.1ns	40.5	37.4	12.0	0.0***
Muddy wall	0.	0.0	0.0	0.6ns	0.0	0.0	0.0	0.7ns
Cemented wall	100	100	100	7.7ns	100	100	100	0.10ns
Corrugated iron sheet roof	100	100	100.0	0.8ns	100	100	100	0.9ns
Tiles roof	7.2	6.3	0.0		20.4	15.1	2.2	0.0**
Water sources								
Public tap	100.0	100.0	100.0	69.2	100.0	100.0	100.0	0.61ns
Private tap	25,7	20.2	0.0	0.0*	40.3	27.1	0.0	0.0**
Dam/river water	30.6	49.2	70	0.0**	10.9	40	70	0.0**

*ns not significant, * statistically significant at* (p<0.05), * **statistically significant at* (p<0.01)*, ***Significant at(p<0.001)*,

3.8 Comparing wealth status of fatteners between scheme1 and 2 in the study area

3.8.1 Wealth index by frequency analysis

This section illustrates that frequency analysis quantified the respondents into particular quintile using asset index scores and expressed well wealth distribution among fattening schemes based on frequencies and percentages **(**Table2)**.** For instance, most of scheme 2 members (47%) appeared in middle quintile followed by the top -rich quintile, while very few of scheme 1 members were categorized in the list of the top rich individuals (25%). It was also brilliantly observed that most of scheme 1 members scored the highest percentage of the poor at the bottom list (51%), implying that they have the highest number of poor people than their

counterparts. These findings show that scheme 2 fatteners are wealthier than scheme 1 fatteners. The higher number of wealthier people in scheme 2 could be caused by high initial and working capitals that enabled them to purchase valuable feeds for further and better value addition of animal quality for skim markets. . In overall, Chi-square test at ($p<0.001$) indicates that participation in scheme 2 fattening enterprise improved the living standards of the feedlot vendors compared to their counterparts. Lack of capital for more value addition of the animals in scheme 1 fatteners could be among the factors which caused them to raise animals at low competitive level. This could be due to lack of credit from the financial institutions as reported by the majority of respondent and key informants. To illustrate this scenario, Kar (2011) advocates that high working capital is an essential component for maintaining a successful and competitive cattle fattening enterprise. The author further clarifies that Lack of cash to purchase inputs is a major barrier to poor livestock keepers escaping poverty. This is due to the fact that available credit does not reach those who need it the most and with whom it could have the greatest impact. This scene is attributed by application of inappropriate screening procedures and criteria to determine creditworthiness (ibid). However, slight difference in wealth accumulation between scheme 2 and 1 fatteners indicates the fattening enterprise is relatively beneficial in both schemes. This is because the respondents in both schemes had valuable assets. A few to mention include , better houses, Television, bicycles, motor vehicles, radios, TV sets, and concrete floors, shops and tamed animals like sheep, goat, cattle .and fowls.

Table 6: Economic status of respondent

Wealth index quintiles	**Scheme 1**		**Scheme 2**	
	n	**%**	**n**	**%**
Top rich	12	17	18	25
Middle group	23	32	34	47
Poor	37	51	20	28
Total	72	100	72	100

Chi-square is significant at ($p<0.001$)

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

From the result of this research it can be concluded that

(i) A good amount of income accumulated by the fatteners in small, medium and large scale fattening schemes in both schemes reveals that the fattening business could shift this community from low income to higher income earners. Further still, the accrued revenue in scheme 2 implies the scheme could be the best alternative for improvement of the beef industry and livelihoods of all stakeholders involved in the fattening business

(ii) The huge investment capital in the fattening schemes entails that fatteners could flourish if will get credit from the formal financial institutions like banks or from semi-formal financial institutions such as NGOs. Furthermore, the fatteners could flourish if will get grants from the government to lower the cost of inputs and other operational costs.

(iii) Huge amount of valuable assets like TV sets, and wealth accumulated by scheme 2 compared to those in scheme 1 as shown in PCA asset and wealth indices implies scheme 2 fatteners are wealthier than their counterparts. However, impressing observation in this study revealed that there was congruence in possession of assets and housing characteristics between scheme 1 and 2 fatteners, though at different ranks.

(iv) It was therefore concluded that cattle fattening enterprise is a better enterprise for income generation, poverty reduction and food security.

(v) Value addition of the animals using cottonseed cake recipe animal feeds as practiced in scheme 2 is a better means of raising the animals for accrued income generation, attainance of export market and commercialisation of the livestock industry.

4.2 Recommendations

From the findings of this study, the following recommendations are made:

(i) The congruency in wealth accumulation between scheme 1 and 2 indicates the fattening enterprise is profitable and could be practiced in a wide area for better living conditions, income generation and climbing out of inherent poverty.

(ii) Superiority of scheme 2 in most economic variables suggests that investing in that scheme is likely to alleviate the cyclic poverty.

(iii) Government interventions could be an immediate attention for provision of grants supportive services like veterinary drugs, chemotherapeutics, prophylactics and extension services like training the lotters on feed formulation, improved production, entrepreneurial skills and marketing strategies

(iv) Local governments, Municipalities and the central government could facilitate availability of better domestic and export markets for the value added feedlot cattle in wide scope of the country.

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