

## **Influence of Socio-Economic Factors in the Production of Sheep and Goats among Pastoralists' in Wajir County.**

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### **Abstract.**

In the North Eastern part of Kenya, pastoralism is the main economic activity for most of the households. Culturally the households are used to keeping livestock as their main means of livelihood. As the inhabitants in these areas increase in population, the contribution to food security of large ruminants lessens and small ruminants that have less competition for arable land predominate. The lack of new-fangled and context-specific knowledge of the ménages on production and marketing of goats is many a time a major limitation to productivity enhancement in small ruminants. The main objective of the study was to find out the influence of socio-economic factors on the production and marketing of goat and sheep in Wajir County. The study utilized the descriptive survey research design. It specifically targeted Wajir County since the population of the county predominantly depends on pastoral nomadism as the main source of livelihood. The target population for the study consisted of 90,108 pastoral households. A sample size of 384 households' selected using systematic sampling was used. Stratified sampling ensured that all households had a chance of being included in the sample. An ordinary least squares regression model was used to determine the Socio-economic factors affecting productivity of sheep and goats. A significant regression equation was found ( $F_{6, 375} = 130.325$ ,  $p < 0.05$ , with an  $R^2$  of 0.676. Infrastructure of the area, education of the household head, extension service provision and condition of the road were found to be significant. The study recommended that having seen the importance of long standing customary social networks, policies should address the need to revive such linkages, either through measures to help end the conflict with the neighboring tribes or through allowing a greater degree of movement of people and stock across borders. There is also need for substantial investment in key infrastructure such as roads, trekking routes, and markets. Markets enable sales and exchange of livestock during drought and famine. Apart from diversifying the pastoral economy, policy-makers should pursue development policies aimed at penetrating the rural areas in the Wajir County where the majority of pastoralists live. This will also improve on the extension service delivery.

**Key words:** *Socio-Economic, Production, Marketing, Sheep, Goats, Pastoralist.*

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### **Introduction**

Pastoralism in the Horn of Africa is one of the most important economic activities from which millions of people derive their livelihoods. Sub-Saharan Africa contains one-half of the world's pastoral people

(Fratklyn, 2001). These pastoralists live in the marginal areas of the continent often with variable rainfall both in space and time resulting in low resource base or uneven and unpredictable levels of forage productivity. This environment offers

limited opportunities for subsistence activities apart from keeping livestock (Coppock, 2001). The people raise domestic animals including cattle, camels, goats, sheep and donkeys, which are used for milk, meat, blood, transport and trade.

Kenya is a country in Africa which houses most of the pastoral communities especially in the North Eastern region of the country. The pastoral production system in this region and elsewhere in Eastern Africa is said to be under a critical situation in the sense that it has become unable to support the basic needs of people whose very survival is strongly linked to the performance of this sector. This dismal performance is attributed to several interrelated factors including population growth, recurrent drought, conversion of rangelands into other uses, weak governance, increasing insecurity, political and economic marginalization, policy and program related constraints to mention but a few (Mkutu, 2001). Most of these factors are anthropogenic and thus the study looks at the socio economic factors influencing production and marketing of sheep and goats in Wajir County.

The last few years have seen a major rethinking of some of the hallowed assumptions of range ecology and range-management practice. The usefulness of terms such as "vegetation succession", "carrying capacity" and "desertification" is being reassessed, particularly for the dry rangelands which are dominated by highly variable rainfall and episodic, chance events such as drought. There are common myths that pastoralists accumulate livestock in an irrational way, and at the same time are resistant to new ideas of development. This is a tendency to refer to pastoralists as if they have remained the same for hundreds of years, without recognizing the fact that they have also changed socially as a result of external influence. In the recent past, it has been realized that pastoralists (producers and

livestock traders) are willing to sell their stock if an advantageous market and marketing system exists which they can easily access and be involved in.

This study will not cover the whole of North Eastern but it will only cover Wajir County. Wajir County was selected for the study because over 80% of the residents are pastoralists. They also keep a large number of sheep and goats which are highly adaptable to a broad range of environments. They have a short generation cycle and high reproductive rates which lead to high production efficiency. Goats are more effective at grazing selectively and the efficiency of converting feed into milk is higher than in the dairy cattle (Winrock International, 2006 cited in Rege, 2009). As population pressure increases further the role of large ruminants reduces and small ruminants that constitute less competition for arable land predominate (Jahnke, 2009). Sheep and goats, kept in the vast geographical locations, diverse socioeconomic and cultural settings and a range of farming practices play immense role in the livelihoods of rural farms.

The knowledge of the socio economic factors which influence production decisions at the farm level has been inadequate. Description of the production systems is useful in the design of development strategies, in particular for identifying target populations and priorities and opportunities for development (Fernandez-Rivera, Tsegahun, Lemma, Sebsbie, Mekoya, Sileshi, 2008). Attempts to improve the prevailing animal husbandry systems in the rural settings necessitate a better understanding of the components of the production systems and its operations, the present limitation, potentially feasible improvements and the opportunities to develop more human capital productive system (Adugna, 1998).

Development strategies should be geared to address pastoralists' real problems and constraints to help them expand their production and attain self-sufficiency. This, in turn, requires careful and detailed analysis and understanding of pastoralists' circumstances and practices before carrying out development activity. This, unlike the *onesize-fits-all* strategy provides information on location-specific production conditions and improvement options appropriate to particular systems. This is mainly because most smallholder and emerging pastoralists are faced with a range of technical and institutional factors influencing production. Whereas the marketing infrastructure is poorly developed, smallholder and emerging pastoralists lack supportive organizations that represent and serve them.

These factors reduce smallholder and emerging pastoralists' incentives to participate in formal markets. A reduction in formal market participation, in turn, makes it difficult for these pastoralists to shift into commercial farming and thus, a reduction in economic development. With these facts in mind, this study analyzes the influence of socio-economic factors on the production of sheep and goats in Wajir County.

This study aimed at generating information that can be used in redesigning or modifying plans for viable livestock marketing interventions in Wajir County.

## **Materials and methods**

The study was undertaken in Wajir County. Wajir County is a county in the former North Eastern Province of Kenya. Its capital and largest town is Wajir. The county has a population of 850,000 and an area of 55,840.6 km<sup>2</sup>. The county has four constituencies: Wajir North, Wajir West, Wajir East and Wajir South. The target population for the study consisted of 90,108 pastoral households. Based on the Yamane 1968 sample size formula, a

target household population of 90,108 yielded a sample size of 384 respondents. Therefore, the study had a sample size of 384 respondents' pastoral households. Stratified sampling ensured that all households in Wajir County have a chance of being included in the sample.

The 384 households' respondents were distributed proportionately per administrative sub-counties. Systematic sampling was then used to get the individual subjects (pastoralists) to be used in the study. This study employed questionnaires and interviews as the main tools for collecting data. The selection of these tools was guided by the nature of the data to be collected, objectives of the study and the time available. The questionnaires consisted of closed-ended questions, as they are easy to administer and analyze. Open-ended questions also were used to assist the researcher get a greater depth of response. Observation and focus group discussion were also used in data collection. The data collected from primary sources was coded and entered into the *SPSS* computer software. The data was checked for consistency and completeness and then analyzed. The data collected from primary sources was coded and entered into the *SPSS* computer software. The data was checked for consistency and completeness and then analyzed.

Descriptive and inferential statistics were used to analyze the data. Correlation analysis was used to establish if there is any associative relationship between the variables. Ordinary Least Squares model was also used to analyse the socio economic factors postulated to affect productivity.

Ethical consideration was sought from the relevant authorities.

## **Results and Discussions**

Ordinary least squares regression model was used to determine the Socio-economic

factors affecting productivity of sheep and goats. A significant regression equation was found ( $F_{6, 375} = 130.325$ ,  $p < 0.05$ , with an  $R^2$  of 0.676

Participants predicted that productivity of sheep and goats is equal to  $29.615 + 3.836(EDULEVEL) - 0.029(AGE) + 0.077(PURPOSE) + 5.790(ROADCOND) + 3.952(EXTSERVCE) + 6.298(INFRASTRUCTURE) + \mu$

Infrastructure of the area, education of the household head, extension service provision and condition of the road were the socio-economic statistically significant factors affecting productivity of sheep and goats in Wajir County.

Tables 4.6, Table 4.7 and Table 4.8 show the results

**Table 4.6 :Model Summary of the socio-economic factors affecting productivity of sheep and goats**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Sig. Change	Durbin-Watson
					R Square Change	F Change	df1 df2		
	.822 <sup>a</sup>	.676	.671	7.41364	.676	130.325	6 375	.000	2.401

a. Predictors: (Constant), Infrastructure of the area, education of the household head, reason of keeping livestock, extension service provision, condition of the road, age of Household head

b. Dependent Variable: productivity of sheep

**Table 4.7: Anova table of the socio-economic factors affecting productivity of sheep and goats**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	42977.688	6	7162.948	130.325	.000 <sup>b</sup>
Residual	20610.796	375	54.962		
Total	63588.484	381			

a. Dependent Variable: productivity of sheep

b. Predictors: (Constant), Infrastructure of the area, education of the household head, reason of keeping livestock, extension service provision, condition of the road, age of Household head

**Table 4.8: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	Std. Error	Beta	
(Constant)	29.615	6.298	4.702	.000
education of the household head	3.836	.321	.374	.000
age of Household head	-.029	.100	-.013	.775

reason of keeping livestock	.077	.572	.004	.134	.893
condition of the road	5.790	.773	.326	7.489	.000
Extension service provision	3.952	1.332	.152	2.967	.003
Infrastructure of the area	6.298	.654	.361	9.625	.000

## Discussions

Education level of the household head was found to be statistically significant with the expected positive sign. Educated pastoralists were found to be more productive. These results corroborate with Saito and spurling's (1992) work on developing Agricultural Extension for Women Workers. The authors argued that education is a crucial factor for skill development and enhancing effective production and marketing decisions. They were of the view that education is an instrument for bringing about an attitudinal change. In case of an innovation the most educated are mostly the innovators and the less educated take long before they adopt the technology (Saito & spurling, 1992).

The results are also consistent with other studies which were done in Swaziland by Macleay and Swart (1998) and found that 4 years of primary education increased the productivity of pastoralists by 8.7% overall and by 10% in cases where modernization was prevalent. Nearly all elements of agricultural development are based on improvement in efficiency of labor force, which are in turn the product of education (Saito & spurling, 1992).

The authors also argue that formal education enhances one's ability to receive, decode and understand information and that information processing and interpretation is important for performing or learning to perform many jobs. Such high levels of education connotes high level of awareness and ability to understand, process and respond

appropriately/make informed decisions based on the information given.

The above finding is in line with that of Mwaura et al (2013), in their study on African leafy vegetables, who found out that 72.2 percent of pastoralists had attained secondary level education and above while about 10.8 percent were uneducated. Maurice et al (2009) in their study of Production Risk and Farm Technology Adoption in Rain-Fed, Semi-Arid Lands of Kenya, found out that education of the household head increased the probability of a farm household adopting terracing.

This is because through education, household heads who are the primary decision-makers are more capable of accessing, analyzing and assimilating information regarding the various technologies, their advantages, and the dangers of not adopting them if they are better educated. Masuki et al., (2003) concurs with Maurice that increase in education level catalyzes the process of information flow and exposes pastoralists to a wider field of knowledge thus promoting adoption of the new technologies.

The high level of literacy/education reflected by the above results is expected to positively affect/influence the productivity in Wajir County in many aspects of live as it enhances how individuals seek, access, perceive, and understand issues and phenomena so as to

make informed decisions. From the above studies, education serves to either increase prior access to external sources of information or enhance the ability to acquire information through experience with new technology. Educated persons also are better able and willing to acquire information about potential innovation and to make rational evaluations of the risks involved in trying such new innovations (new inputs, crops or methods).

Educated pastoralists may also be more aware of the benefits of modern technologies and may have a greater ability to learn new information hence easily adopt new technologies/innovation. Also educated pastoralists are able to interact more effectively with support institutions such as credit and extension agencies, because they can understand processes of transactions, requirements and keep records properly thus increasing the likelihood of accessing and obtaining such services. Furthermore, increased literacy and numeracy also help pastoralists to acquire and understand information and calculate appropriately input quantities as required in the modernizing or rapidly changing societal environment.

Age of the household was not significant. However, in existing literature, there is contention on the direction of the effect of age on productivity of individuals. One assumption is that younger pastoralists are more likely to adopt innovations than older ones and thus higher productivity. This line of argument is supported by Biwott & Chepchumba, (2016) who found out that young pastoralists were more alert to obtaining information from various sources that discuss several ways of improving their vocation than older pastoralists who were found to seek access to such varying sources of information by joining Faith Based Organizations (FBO). Conroy (2005) found out that younger pastoralists are likely to take up new

technology than older pastoralists given that they are of higher schooling and have more contact to innovations. Gockowski and Ndoumbe (2004) found out that age of the household head had a significant negative and elastic effect on adoption decisions with younger pastoralists being more likely to adopt intensive mono -crop horticulture than older ones.

The other assumption is that older pastoralists are more likely to adopt innovations than younger ones thus increasing their productivity. Ashenafi (2007) found out that older pastoralists are likely to adopt new technology due to their experience or reject it all together. Age is depicted here to signify more exposure to production innovations/technologies and greater accumulation of physical and social capital and large family sizes. Thus, studies show that there is no conclusive evidence on the direction of influence of age on agricultural productivity. In this study there was no relationship between the age of the house head and productivity. This study agrees with the argument supported by Conroy (2005) who holds that command of age on farmer's productivity is indecisive.

Condition of the road was significant. The productivity of pastoralists where roads are good was found to be more productive. The variable infrastructure was also found to be significant. The study's overall empirical results indicate a significant link between rural infrastructure and sheep and goats productivity. Electricity and roads are significant determinants of agricultural productivity. This is consistent with Gilberto (2012) study on the Impact of Infrastructure on Agricultural Productivity. He found various constraints imposed on agricultural growth by inadequate infrastructure. Rural roads provide the important connectivity with growing markets adjacent to rural areas; they also lessen input costs and transaction costs of rural producers and consumers. Access to

electricity creates various off-farm income-earning opportunities for rural households which boost agricultural productivity.

The variable 'extension' was statistically significant. It was found that the pastoralists who got extension service were more productive than the ones who did not. This study is consistent with Biratu, Gizachew and Kabede (2008) work which aimed at understanding the impact of extension on the livelihood of farming communities and diversity of local crop varieties in Guduru district, East Wollega zone of Oromiya regional state. They found out that Pastoralists with extension service were significantly more productive ( $F = 14.657, P < 0.001$ ).

### **Conclusions and Recommendations**

The study found out that several socio-economic factors affect productivity of goats in the area. Extension service provision, Education level and infrastructure are the significant factors affecting productivity. Respondents' age, marital status and income control did not yield any significance in reference to productivity of sheep and goats.

The study concludes that, although the level of optimism that was expressed by the respondents coupled with other factors such as level of education, high acceptability of new breeds of sheep and goats, the youthful population that is ready to adopt, there is need for the various institutions charged with the promotion of pastoralists to put in place the necessary structures and ensure a supportive environment that takes into consideration the varied needs of the respondents.

The study recommends that various stakeholder should put strategies in place to help accelerate wider adoption of available improved technologies and innovations in the area. In addition, stakeholders should in jointly promote

technologies with wide ranging utilization and options so as to enhance increased uptake of the same among resource-poor pastoralists. The government also needs to come up with programmes that would provide information and train pastoralists on the trends that are taking shape on farming in the region and globally. Furthermore, agricultural promotions need to be targeted well among potential adopters considering that study has revealed the nature of pastoralists that are well placed to increase productivity.

### **References**

- Adugna. (1998). Causes of pre-weaning mortality in sheep and goats in the Central Mali agro- pastoral system. In Wilson, R.T. and D. Bourzat (eds.) *Small Ruminants in African Agriculture*. Ethiopia: Addis Ababa; International livestock centre for Africa.
- Ashenafi, G., (2007). *Triticale Crop and Food Security, and Determinants Influencing the Adoption of Triticale: Example from the Amhara Region, Ethiopia*. University of Kassel, Germany Tropentag.
- Biratu, G. (2008) *Agricultural extension and its impact on food crop diversity and the livelihood of farmers in guduruGuduru, Eastern Wollega, Ethiopia*. Retrieved from [http://www.umb.no/statisk/noragric/publications/master/2008\\_biratu\\_gizachew\\_kebede.pdf](http://www.umb.no/statisk/noragric/publications/master/2008_biratu_gizachew_kebede.pdf)
- Biwott, D. K. & Chepchumba, T.C. (2016). Determinants of Small-scale Horticulture Farmers' Decision to join Farmer-based Organizations in Nandi County, Kenya. *International Journal of Economics, Commerce and Management* 4(4), 1171-1184 .
- Conroy, C. (2005) *Participatory livestock research: A guide*. London: ITDG

- publishing Federal Ministry of Agriculture (FMA) <https://dirp4.pids.gov.ph/ris/dps/pidsdps1212.pdf>
- Coppock, D.L. (2001), *Pastoralism and Agro-pastoralism: past and present. In Pastoralism and Agro-pastoralism which way forward?* Retrieved from [agris.fao.org/agris-search/search.do?recordID=ET2007000210](http://agris.fao.org/agris-search/search.do?recordID=ET2007000210)
- Fernandez-Rivera, T, A, Lemma S., Sebsbie, A., Mekoya, A., Sileshi, Z. (2008, November 10-12). National goat research strategy in Ethiopia. In: Merkel RC, Abebe G, Goetsch A.L. (eds.). *The Opportunities and Challenges of Enhancing Goat Production in East Africa*. Proceedings of a conference held at Debub University, Awassa, Ethiopia.. Retrieved from [www.luresext.edu/?q=content/national-goat-research-strategy-ethiopia](http://www.luresext.edu/?q=content/national-goat-research-strategy-ethiopia)
- Fratklyn (2001) *Indigenous chicken production and marketing systems in Kenya: Characteristics and opportunities for market-oriented development. IPMS (Improving Productivity and Market Success) of Kenyan Farmers*. Project Working paper. ILRI Nairobi, Kenya
- Jahnke, H. E. (1982). *Livestock production systems and livestock development in tropical Africa*. Germany: Kieler WissenschaftsverlagVauk, Kiel, Germany. Retrieved from [pdf.usaid.gov/pdf\\_docs/PNAAN484.pdf](http://pdf.usaid.gov/pdf_docs/PNAAN484.pdf)
- Gilberto, M. L. (2012) *The Impact of Infrastructure on Agricultural Productivity* .discussion paper series no. 2012-12 Retrieved from
- Gockowski, J., & Ndoumbe, M. (2004). The Adoption of Intensive Monocrop Horticulture in Southern Cameroon. *Journal of Agricultural Economics* 30(3), 195-202.
- Macleay, F & Swart, T, (1998). Factors affecting choice of cash sales versus Forward marketing contracts. *Agribusiness*, 14(4), 299-309.
- Mkutu J. (2001). *Effect of breed, physiological state, age, sex and season on levels of some blood constituents in sheep*. (Thesis), University of Science and Technology, Kumasi.
- Masuki, F. G., Khamaldin, D. M., Siza, D. T., Filbert, B. R., Amon, Z. M. & Nuhu H. (2003). *Smallholder System Innovations Programme, Soil-Water Management Research Group*, Sokoine University of Agriculture, Morogoro, Tanzania.
- Maurice, J., Wilfred, N., & Mahmud Y., (2009) *Production Risk and Farm Technology Adoption in Rain-Fed, Semi-Arid Lands of Kenya*. Retrieved from [https://www.researchgate.net/publication/46534164\\_Production\\_risk\\_and\\_farm\\_technology\\_adoption\\_in\\_the\\_rain-fed\\_semi-arid\\_lands\\_of](https://www.researchgate.net/publication/46534164_Production_risk_and_farm_technology_adoption_in_the_rain-fed_semi-arid_lands_of)
- Mwaura S.N., Muluvi A.S. & Mathenge M.K. (2013 September 22-25). *African Leafy Vegetables and Household Wellbeing in Kenya: A disaggregation by gender*. Paper presented at the 4th International Conference of the African Association of Agricultural Economists, Hammamet.
- Rege, J.E., Tembely, S., Mukasa-Mugerwa, E., Sovani, S., Anindo, D., Lahlou-Kassi, A., ...Baker,



R.L. (2009). Effect of breed and season on production and response to infections with gastro-intestinal nematode parasites in sheep in the highlands of Ethiopia. *Livestock Production Science*, 78(2)159–174. Retrieved from <https://cgspace.cgiar.org/handle/10568/29202>

Saito, K.A. & Spurling, D.(1992). *Developing agricultural extension for Women Workers; World Bank USA*. Retrieved from <http://documents.worldbank.org/curated/en/312551468741892116/pdf/multi-page.pdf>