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Factors Affecting Small-Scale Livestock Farming in Kenya

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ABSTRACT

Purpose: This study aims at examining the factors influencing small-scale livestock farming in Kenya.

Methodology: A majority of the small-scale livestock farmers in many counties were past their youthful years, with most respondents cited at above fifty years. A sample of small-scale livestock farmers was selected, using the Proportionate Stratified Random Sampling technique. An Ordinary Least Square (OLS) multiple regression model will be used to determine the factors that affect livestock numbers in Kenya.

Findings: The study found out that 56% of the farmers in some counties showed the most aggression in seeking out livestock farming related information from many other sources other than from their counterpart farmers. These farmers quest for extensive information on dairy farming was also highlighted by their expansive peer to peer networks.

Unique Contribution to Theory, Policy and Practice: Counties should make more commonage land available to the small-scale livestock farmers in order to cope with the increasing population of emerging farmers. Commonage land management should be strengthened. Small-scale livestock farmers should be trained to make reserves such as hay and silage so they can conserve surplus forage in rainy seasons. Government should provide subsidies for purchase of breeding stock and dosing products. Distribution policies that will ensure that all smallholder cattle and sheep farmers at grassroots level benefit should also be put in place.

Keywords: *Small-Scale Farming, Livestock Farmers, Farming Policies*

INTRODUCTION

Livestock is globally one of the mainstays of the agricultural communities. It provides 50 percent of the value of agricultural output globally and one-third of the value in developing countries (Mbindyo, et.al, 2020). Livestock farming makes a distinct contribution to the social and economic development of the rural masses. In many African countries as well as in Kenya, many rural households earn a living from livestock farming and consider keeping livestock as a store of wealth. Several factors contributed both positively and negatively to changes in livestock numbers. Some of these factors are economic growth and increased incomes (Achmad, et.al, 2019), increase in demand for livestock products arising from rapid growth in human population and urbanization, developments in breeding, nutrition and animal health, rapid technology innovations, changing food preferences, changes in climatic conditions and genetic improvements.

Gitau, (2013) added that socio-economic and environmental factors such as population growth, urbanization and economic development, changing livestock market demands, impacts of climate variability and science and technology trends contributed to the changes in livestock numbers. According to Montshwe, (2006), global livestock production is expected to double by 2050, growing faster than any other agricultural sub-sector. Livestock farming has great potential to alleviate household food insecurity and poverty especially in the communal areas of the world, including Kenya. According to Groher, et.al (2020), livestock production is an indispensable part of the solution to global food security, and a reasonable amount of the world's food supply comes from systems of which livestock are an important part. Considering the importance of livestock systems for food security, and their potential to impact on poverty, livelihood, health and nutrition as well as the environment, the livestock sector still receives limited attention in the global agriculture and food debate.

Small-scale livestock systems play a very important role in supporting rural livelihoods. In small-scale systems, livestock fulfil many functions in addition to producing meat, milk and eggs. Functions include provision of fertilizer, fuel, draught power and transport; a means of savings and investment; a buffer against crop failure; and diverse cultural and religious roles (Seré, et.al, 1996). In sub-Saharan Africa and South Asia, smallholder livestock farmers contribute more than 80 percent of the global livestock production, using foods that are not palatable to humans (i.e. grass, fodder and waste) for their livestock production (Martínez-García, et.al, 2013). Therefore, this study aimed at investigating the socio-economic factors that affected livestock numbers. The overall intention of the study is to examine how smallholder livestock farmers in the Free State can reduce their vulnerability to factors affecting the livestock farming.

These wide variations of livestock development indicate an important reason why so many people are deficient in animal protein for human food, but they also indicate the possibility of overcoming these deficiencies (Maina, et.al, 2020). Most conventional farm management studies intended to increasing livestock production have commonly sought reasons for these variations in terms of

land-size, labour, and capital inputs, husbandry and ecological areas. Such studies have tended to exclude the important dimension of human element (Van den Berg, 2013). This is a key factor in livestock production because of the importance in decision-making. The ecological and economic factors are significant in livestock production, but to be fully productive these resources have to be organized, operated, manipulated and developed.

Improvement of agricultural resources depends upon rational decision-making which in turn is influenced by ecological and socio-economic characteristics surrounding the farming population. It is thought that the removal or minimizing of barriers (disparities) limiting optimum livestock development in west Kenya is a function of understanding the ecological and socio-economic factors (Maina, et.al, 2020). Both factors influence the complexity of human beings and consequently dictating their development path.

LITERATURE REVIEW

Groher, et.al (2020), indicate that differences in livestock production have their roots in geographic and climactic factors. The interaction between ecology and livestock introduces a distinct set of animal environments which are considered hereby reference to climatic stress, feed, water supply and disease hazard.

Cain, et.al (2007) presented an analysis of livestock production systems in tropical Africa with more than half of the livestock population located in arid zones and a further concentration occurring in the highlands. The observed distribution pattern and productivity is profoundly influenced by diseases in tropical Africa. The prime example is trypanosomiasis which excludes all except trypan tolerant breeds. The control or eradication of trypanosomiasis or of the tsetse flies (Glossina spp) which transmits the disease will open up to 10 million km 2 of land to livestock in the higher rainfall areas. Landform and soil characteristic determine the occurrence of stock watering points without which there would be no livestock production. Some of the influences effect all livestock species equally, while others such as terrain affects some species more than others.

Achmad, et.al (2019) show that different breeds vary considerably, in their ability to withstand reduced water intake or the intake of water at different intervals. The general finding is that Bos taurus need more water than Bos indicus types under same environmental conditions. This result has been explained by differences in the number of sweat glands per unit area. Working on the comparison of Afrikander and exotic beef cattle in Tanzania, found that the former lost 1.5 percent of their body weight if left 24 hours without water and suffered no loss in appetite, while exotic animals suffered 15 percent loss in live weight and 24 percent decline in food intake (Kipserem, et.al, 2011). Three-quarters Ayrshire cross Zebu steers consumed 68.4 percent more water than Zebu cattle at 1.5 years of age and 39.2 per cent more at 3.5 years. Where a farmer has both exotic and indigenous stock and water is limiting then preference must be given to the exotic cattle.

Under East Africa conditions where water is limited in amount and frequency of availability, low productivity could be the result of restricted water intake through its effect of reducing food intake (Gitau, 2013). Water intake increased with increasing ambient temperature. At high ambient temperatures, milk yields of lactating Holstein Friesians decreased and water intake increased, suggesting an inverse relationship. The animals also ate less at high temperatures. The upper critical temperature of these animals was found to be 77*F (25*C). Consideration of the climatic data for most smallholder areas in the high areas of Kenya suggests that for part of the year at least grade dairy cattle are affected in the same way (Achmad, et.al, 2019). In temperate climates positive relationships exist between climate components and water intake when relating water intake and ambient temperature and daily hours of sunshine. High levels of free water intake by animals in feedlots during summer months. Gitau (2013) also recorded double water intake requirements for East Africa short horned Zebu heifers in Uganda during the dry season.

As water is of vital significance in the homeothermy of animals, it is obvious that any means of controlling the climate to give better comfort to the cow in the hot dry season in the tropics will reduce water intake requirements. For example, Cain, et.al (2007) found that the provision of shelters for feedlot cattle in summer reduced water consumption. In another work on grade and pedigree Jerseys at the Kenya coast where animals are subjected to a stressful climate for at least 6 months of the year, and the water intake in the dry season was 58.7 per cent higher than in the wet season, and the provision of shed trees and other factors, likely to provide better cow comfort could reduce water consumption of animals by 21 per cent below that of animals in "open" pastures.

Kipserem, et.al (2011), noted that water intake was increased by the presence of salt in water and showed a difference between Brahman and Hereford cattle. Only in the latter breed was intake per unit of live weight reduced and live weight gain significantly increased when drinking water was cooled from 31.2 to 18.3 and found that livestock drink less of the cooled water than those given warm water. There was a difference in water intake between a rotational and set stocking system, the latter having higher rates of intake. This is probably related to water content of offered herbage, the former system possibly offering to the animal a more constant supply of young herbage with high water content (Omiti, et.al, 2009). There was a higher intake of water by animals whose feed and water sources are widely separated. The difference could be explained by a greater requirement caused by the expenditure of energy and production of heat involved in travelling the long distances.

Groher, et.al (2020) has shown that the resulting crossbreds between indigenous and exotic cattle have come under severe nutritional stress from feed supplies and diseases resulting in much lower performance and frequently a shorter life than expected. The half breed of first generation animals were most promising and much better than their indigenous dams and compared favorably in growth and in weight for age with the breeds of their sires in their respective home countries. The

higher grades, the second, third and higher Filial (F) generations, however failed to maintain the initial improvement and deteriorated progressively often to below the level of their original indigenous maternal ancestors.

Omiti, et.al (2009) noted that many breeds of introduced Bos taurus cattle have the additive generic merit to respond for both milk and meat production characters when environment stresses are minimal. In sub-saharan Africa, however, economic and technological factors generally do not permit sufficient modification of natural environments to realize as high percentage of the genetic potential as can be exploited in temperate zones. The Kenya Development plan points out that with increasingly continuous reduction of grazing lands in the high and medium potential areas large animals may become uneconomic. Dairy farming is not only labour intensive but also does not require such capital or land. As small farmers are under-employed and have little of the other two factors it is thus argued that dairy farming is eminently suited for small farmers (Gitau, 2013). Increasing livestock production will be particularly important in West Kenya where rural population density is highest in the country.

Pricing policies in developed countries (DCS) which successfully stabilize incomes often have opposite effect in LDCS. Pricing policies for livestock meat can have distributed benefits which accrue to the urban and growing industrial sectors (Groher, et.al, 2020). Furthermore, producers who would invest to commercialize livestock production have less incentive to do so. The government's efforts to establish effective pricing policies have not been successful because they do not account for the environment in which producers make their marketing decisions. Livestock are held for various reasons by the producers such as a convenient repository of wealth. This value is greater in many respects than the commercial market value, one that in most cases is an administered price by the government (Maina, et.al, 2020). Increasing marketing efficiency provides additional incentives for expanded livestock production. However, saturation of milk in the local market can be a disincentive to the livestock farmers.

METHODOLOGY

The study was conducted on forty seven counties of Kenya. Prior to the interviews, a complete list of all small-scale livestock farmers with at least 30 herds will be requested from the Department of Agriculture in all the forty seven. These farmers will form the groups that will interviewed using questionnaire as a research tool. A sample of small-scale livestock farmers will be selected, using the Proportionate Stratified Random Sampling technique.

An Ordinary Least Square (OLS) multiple regression model will be used to determine the factors that affect livestock numbers in Kenya. This is a mathematical modelling approach that can be used to describe the relationship between a continuous dependent variable and several independent variables (Gitau, 2013). Ordinary least square multiple regression is one of the major techniques used to analyze data, and it forms the basis of many other techniques (Achmad, et.al, 2019).

Ordinary least square multiple regressions is particularly powerful as it is relatively easy to check model assumptions such as linearity, constant, variance and the effect of outliers (Groher, et.al 2020).

FINDINGS

It was found out that males are more in involved in livestock farming of improved breeds than their female counterpart. A larger portion of the respondents also affirmed to being married. It was perhaps the transition rates from one level of education to the other than started setting the counties.

A majority of the small-scale livestock farmers in many counties were past their youthful years, with most respondents cited at above fifty years. This would however prove to be a blessing in disguise as 65.0% of farmers here had ten or more years' worth of experience in dairy farming. Most counties registered low acreage of land under dairy farming. About 80.0% of respondents in these counties had committed below two acres of land to livestock farming.

The study found out that most of the livestock products for example milk in most of the counties is sold almost entirely at the rates of Kshs 20 – 30 a litre. Only 1.7% of farmers sold the same at between Kshs 30 – 40 and this is explains why most of the farmers sell their milk to neighbors and/ or local shops. All this put together has an effect on overall production since good marketing structure encourages more production among the small scale farmers.

The study found out that 56% of the farmers in some counties showed the most aggression in seeking out livestock farming related information from many other sources other than from their counterpart farmers. These farmers quest for extensive information on dairy farming was also highlighted by their expansive peer to peer networks as a majority of them were cited as having networked with more than three peers on dairy farming related matters. On the other hand, 44.0% of the farmers in other counties sourced most of their dairy farming related information from the media as well as other farmers. As would be pointed out later, an increased awareness level in livestock farming by local farmers directly affects the output levels.

The study found that many farmers aggressively pursued the adoption of quality dairy breeds such as Friesian (45.0%), Ayrshire (36.2%) and about 1.7% stocked the Gunsey breeds. The output levels of these breeds was also boasted to a larger extent by their fairly advanced breeding stages with about 40.0% of breeds rated as Appendix or Pedigrees.

CONCLUSION

Farmers who kept few numbers of livestock in a previous year were able to make enough income from livestock sales to increase or rebuild their stock in following year or years after. Planted pastures negatively affected livestock numbers. It can be concluded that the majority of the smallholder cattle and sheep farmers in the province depended on natural veld for grazing, and it was only farmers who had planted pastures that were more likely to cope better with feed and

feeding-related problems as planted pastures could be used to relieve the pressure on the natural veld, reduce the quantity of conserved feed and thereby improve the performance of the livestock.

RECOMMENDATIONS

Counties should make more commonage land available to the small-scale livestock farmers in order to cope with the increasing population of emerging farmers. Commonage land management should be strengthened. It is also recommended that policies that provide guidance on how different groups of farmers should utilize the same commonage land should be strictly applied. Small-scale livestock farmers should be encouraged to engage in camp systems and practice rotational grazing. This will reduce overgrazing and uncontrolled breeding, as dividing land into camps will allow male and female animals to be separated and ensure that mating is only allowed when conditions are favourable.

Small-scale livestock farmers should be trained to make reserves such as hay and silage so they can conserve surplus forage in rainy seasons. They should also be advised to plant fodder plants to reduce pressure on the natural veld, and also to introduce legumes into their pastures in order to produce forage throughout the year. Farmers can also increase the land's productivity by establishing fodder grass and fodder shrubs along contour bands.

Extension and veterinary services should be strengthened. Extension officers should be well distributed and well equipped with necessary resources, which will enable them to increase their coverage in terms of the numbers of farmers they reach. Extension officers should give timely and professional advice on overall management practices which will assist farmers to improve their livestock activities as well as their standard of living.

Government should provide subsidies for purchase of breeding stock and dosing products. Distribution policies that will ensure that all smallholder cattle and sheep farmers at grassroots level benefit should also be put in place. This should enable smallholder cattle and sheep farmers to cope with the high transactional costs associated with purchasing equipment and facilities (e.g. windmills, crawl pens, head clamps, dipping tanks, veterinary drugs and feed supplements).

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