

Introduction

According to the Malthusian Theory of Population, food supply increases arithmetically while the world's population increases geometrically, simply meaning that food supply increases slower than the rate of population growth. Emphasis on the development of agriculture is therefore of importance, considering that the world needs to produce 50% more food to feed 9 billion people by the year 2050 according to estimates. Within the agricultural industry lies animal production as a sector, and within which lie livestock farming and fisheries. Although livestock farming and fisheries play an important role in improving global food security, there are adverse effects arising from animal farming. The aim of this report is to provide an analysis of the animal production sector within agriculture, with specific focus on livestock farming and fisheries or aquaculture. The report will give an overview of the non-local scenario before delving into the situation prevailing in Kenya. It will include the regulatory authorities that exist in Kenya, the competitive environment which will include players within the sub-sectors, the challenges and the opportunities for improvement and investment.

General Situation

In 2014, the European livestock farming scene saw France, Germany and the United Kingdom dominate according to a European survey. This was based on data collected on bovine animals (cattle), pigs, goats and sheep. The European success story has been contributed to by the encouragement of controlled pastoralism and lowered human influence. However, there is still the practice of applying scientific management practices to control diseases and increase production. Globally, the United States is placed as the world's largest beef producer, the second

largest pork producer and a significant player in the global poultry production scene. This has largely been driven by strict policies regarding feed quality and grading, with the US Food and Drug Administration's Center for Veterinary Medicine regulating all animal feed ingredients. Additionally, government involvement is limited to emergency measures such as interventions in the event of natural disasters. Israel is involved in the dairy production aspect of livestock farming, with up to 90% of the dairy cattle registered by the Israel Cattle Breeders Association. There is also the provision of insemination services based on database information to ensure high quality dairy cattle production. Farmers have also formed groupings to avail production knowhow to more dairy farmers and to centralize production operations in the country via Centralized Multi-Farm Developments.

East Africa is largely known for its agricultural prowess. The world's demand for food and other agricultural products is expected to rise dramatically as the global population increases. It is estimated that up to 70% of the world's rural dwellers rely on livestock production to earn a living. Despite this, barriers such as poor livestock breed selection, exposure to diseases and low-level livestock production and treatment techniques have impeded the growth of the livestock production sub-sector within the agricultural industry. Fisheries is yet another agricultural sub-sector whose full potential is yet to be harnessed. Fish and crustaceans are an important source of protein and a viable alternative to traditional red meat. Even so aquaculture around the world which also encompasses the capture of wild fish has only gained traction in selected regions. In addition to food security reasons for animal production, by-products such as skins, hides, milk and eggs serve to avail raw materials for other manufacturing processes as well as providing

farmers with additional income streams, further underscoring the importance and multifaceted role of the sub-sector.

Africa in its entirety catches less than 10% of global fish caught and it is involved in less than 5% of global fish farmed, the result of which is a largely unexploited sub-sector. This has been occasioned by a combination of factors and a deficiency of knowledge on proper aquaculture practices, as well as a traditional reliance on and bias towards cattle, goat and sheep rearing. Application of traditional fishing techniques and the limited nature of fishing technology have further served to slow down efforts to exploit fisheries.

The Situation in Kenya

Livestock Farming and the Competitive Environment

Kenyan livestock farming is primarily composed of bovine animal rearing, beef and dairy cattle in particular as well as poultry farming, all of which are done both on a commercial and small scale basis. While some of the small scale livestock farming is done by farmers in and around their homesteads, a large percentage is done by Kenya's pastoral communities on a nomadic basis. These include, most notably, the Maasai and Turkana communities who migrate occasionally in search of pasture and water as well as to market their cattle, primarily for beef, skins and hides. Ranching is common in the Rift Valley region, with Kajiado, Narok and Samburu containing the most ranches respectively. Other regions include Nyanza, Eastern and Coast areas. Common beef cattle reared in Kenya include Charolis, Hereford and Boran.

Dairy farming is most prevalent in Central Kenya where the climate is most conducive. The main breeds reared in the country are Friesian, Jersey, Guernsey and Ayrshire. Milk processing is a booming sector locally, with the largest processors being Brookside, New Kenya Co-operative Creameries (NKCC), Githunguri and Sameer processing 1.5 million kilograms daily.

Leather, hides and skins as by-products of livestock farming account for about KES 10.6 billion of revenue contributions to the Kenyan economy and provide over 22,000 jobs both directly and indirectly. Leather footwear and tanning sub-sectors account for the majority of consumers of the aforementioned products, with 14 tanneries in existence in Kenya and an additional 8 expected to be set up. These include African Lily, Rift Valley Leather, Gonzala Leathers, Bata Shoe Limited, Sagana Tanneries and Leather Industries of Kenya, among others.

Poultry farming is also part of livestock farming in Kenya, with commercial and small scale levels being practiced. Chickens, geese, turkeys and ducks are the main birds kept. The chicken market has seen great success, with broiler and egg chicken being reared. Specific breeds are KARI Improved Kienyeji (improved indigenous) chicken, Kenbro and Kuroiler. Major establishment dealing in poultry products include Kenchic, Muguku Poultry Farm, Ziwani Poultry and Ecochicks Poultry Limited. Poultry farmers are represented by the Kenya Poultry Farmers Association, formed in 2002 and registered in 2005.

Pigs, goats and sheep are also reared in the country, but their economic impact still drags behind cattle and poultry. Notable institutions dealing with pork are Farmer's Choice Limited, Ndumboini Farm, Lyntano and Kabati slaughterhouses.

Fisheries and the Competitive Environment

Aquaculture in Kenya is done on a small scale basis, with fishing activities most prevalent at the Coast and in the Nyanza region. Inland, fish farming is done through purchase and rearing of fingerlings obtained from fish farms. Notable fish farms include Muthatari Fish Farm, Malindi Fisheries Station, Njoro Fish Farm, Mwea Aquafish Farm and Jambo Fish Western Kenya Limited.

While in the Lake Victoria and Indian Ocean areas fishing is an important means of making a living, it has been adopted inland as an entrepreneurial venture. With training from international organizations such as the Food and Agriculture Organization (FAO), individuals have set up ponds within their homesteads from where they rear fish for both domestic consumption and for sale. This is especially so in rural areas where land is in relative abundance.

In much smaller proportion is the rearing of ornamental fish, which are reared by individual farmers on a small scale basis. Gold fish are the most common ornamental fish, often being sold to large retailers.

The most suitable fish species for rearing in Kenya and the most sought after by consumers are the Nile tilapia and the African catfish.

Challenges

Unpredictable Climate

The climate in the country has been unpredictable in recent times, a factor aggravated by the global issue of global warming. This has led to unreliability of investing in livestock farming due to the risk of suffering losses occasioned by water shortages and pasture degradation. Such adverse weather conditions are also detrimental to livestock health due to added exposure to bacteria and heat stress among other factors. Fisheries is also impacted negatively due to the risk of ponds either drying up or becoming flooded, and thus needing additional protective measures.

Knowledge Constraints

Although livestock farming is traditionally inherent in Kenyan culture, it is practiced mostly in small scale, under humble conditions. Farmers have limited knowledge on the best farming methods and how to best take care of their livestock. Fisheries enjoy even less prominence, with most farmers shying away from aquaculture. There is little knowledge available on how to go about aquaculture and this has served to limit its growth potential in the country.

Technological Constraints

The livestock production methods applied locally, though serving the purpose intended, are inefficient in keeping up with global trends. The same applies to fisheries, with largely rudimentary fishing technology. Most local fishing activity is done by means of fishermen's rowing boats which yields considerably low amounts due to limited catches.

Disease and Pest Prevalence

Due to Kenya's tropical geographical location, the conditions are conducive for the prevalence of pests and diseases affecting livestock. Some of these include trypanosomiasis or sleeping sickness, caused by tsetse flies which are not only dangerous to livestock but to human beings as well. Ticks also spread East Coast Fever to livestock while lice and fleas cause livestock and poultry stress and this leads to reduced productivity.

Unprocessed Exports

Agricultural exports account for more than half of revenue inflows into the country. However, while processed exports earn more revenue, East African nations only do a fraction of processing prior to exportation. This phenomenon has spread to livestock production and products. Kenya, for instance, only processes 16% of its agricultural exports. This is very minimal, compared to Tanzania's 27% and Uganda's 34% as at 2015. This leads to loss of value addition earnings, denying the country significant income while generating more job opportunities.

Opportunities*Expansive Education*

Due to the increased interest in aquaculture by individuals and farmers seeking to diversify their income streams, there is an opportunity for concerned government agencies such as the ministry and international institutions to make information available. By so doing, not only will new market entrants have knowledge on how to go about their activities, it will also avail additional experience to practicing farmers and individuals. Several local farmer education campaigns and

programs have also been launched to take education to the grassroots level. These include the *Shamba Shape Up* and the online *Mkulima Bora* initiatives.

Additional Marketing

In Kenya, most meat is bought up by the Kenya Meat Commission, with limited market information and opportunities for export. With additional government and foreign organization involvement through marketing campaigns, local as well as foreign appeal for local meat can be increased. The same applies for products such as leather, skins and hides, a large percentage of which is only made use of by local entities. Towards this end, FAO and the European Union have sought to raise the nation's appetite for fish consumption through *the Eat Fish for a Better Life Campaign*. The various agricultural trade fairs which take place annually also avail an opportunity for livestock farmers and aquaculture farmers to showcase their products to a wide clientele base as well as obtain knowledge on improved farming methods.

Financial Support

Compared to Asian countries and Israel, Kenya lags behind in terms of fisheries and livestock farming respectively. While Japan uses advanced technology in its commercial fishing expeditions such as its Shinei Maru No.66 hybrid trawler, Kenya still relies on traditional wooden vessels which not only limit catches but also put fishermen's lives at risk. In 2011, the Government of Kenya received a KES4 billion grant from the World Bank aimed at boosting the country's fishing sector. In 2015, small-scale dairy farmers got additional assistance through a \$25.14 million funding, partly by the Bill and Melinda Gates Foundation and the Family Group Foundation and Heifer International Kenya. Channeled correctly, such funds are sufficient in

acquiring new and better fishing vessels as well as incorporate improved rearing practices such as those in place in Israel.

Health Benefits

With modern lifestyle diseases, dietary diversification has become necessary. The World Health Organization's findings of red meat being associated with increased cancer exposure has provided white meat markets with added relevance. Poultry and fish farmers can thus take advantage of this to boost their sales globally. On the other hand, red meat is more easily available and considerably cheaper than white meat, and has its own health benefits. The added sense of health consciousness has the potential to make livestock farming a highly competitive and possibly increasingly lucrative sector.

Regulation

In Kenya, the agricultural scene in general is regulated by the Ministry of Agriculture, Livestock and Fisheries. The ministry is concerned with formulation and monitoring of legislations, representation of agricultural state corporations, supporting research initiatives, information management related to agriculture and the control of pests and diseases. The ministry is the highest regulatory authority in matters agriculture in Kenya. It is also involved in the regulation of hides and skins and their trade as per the Hide, Skin and Leather Trade Act Cap 359 of the Laws of Kenya.

Dairy farming and product handling in Kenya is regulated by the Kenya Dairy Board. The board was established in 1958, under the Dairy Industry Act Cap 336 of the Laws of Kenya. Included

in its regulatory function portfolio are premises inspection, premises licensing, quality and safety surveillance, review of dairy standards and management of related imports and exports.

Aquaculture in the country is regulated by the Aquacultural Association of Kenya which operates under Section 10 of the Societies Act of the Laws of Kenya. Not only does it lobby for improved policies and legislation affecting aquaculture in Kenya, it also builds capacity, promotes networking and helps in marketing its members' products.

The Agriculture, Fisheries & Food Authority (AFFA) is a statutory and regulatory body established by Section 3 of Agriculture, Fisheries and Food Authority Act of 2013 of the Laws of Kenya. The body is involved in the regulation of agricultural products which include fisheries but exclude livestock products in Kenya. It also ensures best practices are followed as provided for in the Fisheries Act.

Conclusion

Livestock farming in Kenya, with all its sub-sectors, is still yet to be fully exploited. There lie opportunities, more so because of the largely rudimentary technology in application. Crop farming has had more global recognition and has therefore been better developed than livestock farming. With the adoption of policies to increase consumption of locally made products such as footwear and fashion accessories, the leather, skin and hides sector is also poised to grow tremendously. Financial assistance and awareness campaigns are necessary to not only provide leverage but also allow farmers to be more creative and effective in their farming practices. Opportunities in ornamental fish farming still lie unexploited, and the encouragement of Kenyan households to diversify their diets and venture into poultry and fish consumption on a larger

scale are also rife. With improved management of funds from international donors, the government can supplement its contribution to livestock farming and fisheries and attain a healthier and more financially endowed population, the equivalent of global competitors.

