



Strathmore
UNIVERSITY

STRATHMORE UNIVERSITY BUSINESS SCHOOL

MASTER OF MANAGEMENT IN AGRIBUSINESS

END OF SEMESTER EXAMINATIONS

MMA 8103: FARMING SYSTEMS

Date: Friday, 13th September 2019

Time: 3 Hours

Instructions

1. This paper consists of three sections. Read **ALL** instruction for each section carefully before attempting any question.

Section I (20 Marks): Answer **ALL** questions in this section

Question 1(Compulsory) (20 Marks)

- a) The land tenure system and the associated land utilization pattern is a key consideration when evaluating production efficiency. Name some of the main challenge's related to land utilization that result in poor per unity productivity in Sub-Saharan Africa and possible remedies that can be used to overcome them? **(5 Marks)**
- b) How does globalization contribute to food security challenges in Africa? **(5 Marks)**
- c) What is the difference between integrated farming systems and mixed farming systems? **(5 Marks)**
- d) Soil and water management are invaluable in maximizing farm productivity. Discuss strategies that smallholder farmers can use to ensure optimal production by managing soil nutrient balance and water availability. **(5 Marks)**

Section II (40 Marks): Answer **TWO** questions in this section

Question 2 (20 Marks)

I: Read the following passage and answer the associated questions

Maize is the main staple food in Kenya, accounting for 65 percent of total staple food caloric intake. It is an important source of carbohydrate, protein, iron, vitamin B, and minerals. Recently, the country has become unable to meet its requirements for maize. Production of maize in Kenya averages 40 million 90kg bags, against a demand of 52 million bags. Given an estimated per capita

consumption of 125 kg/capita/year, a population of 38 million adult equivalents, the effective demand stands at 53 million kg. The land area under maize cultivation is estimated at 1.5 million Ha (KALRO 2019), and yields at 2 MT (22 90 Kg bags), this implies an additional 910,000Ha be added to meet demand or a yield increase of 1.5 MT (13 bags)/Ha be achieved. During normal to good years, Kenya's national production may cover as high as 98.5 percent of the estimated consumption (self-sufficiency ratio) (Table 1). Self-sufficiency ratio may decrease to as low as 62 percent in drought years as was the case in 2009. However, such years are not frequent. The self-sufficiency ratio for Kenya tends to hover between 70 and 80% compared to Tanzania (121%) and Uganda (115%).

Despite the fact that Kenya has the highest fertilizer utilization rate in the region, yield are not increasing at commensurate rates compared to its neighbors. The country is facing extreme pressure with price distortion from surpluses and bumper harvest in neighboring countries such as Uganda and Tanzania. Additionally, there is ample land in areas designated sufficient for maize farming such as more than 400,000 acres in Galana Kulalu, Kimwarer, and Arror.

The main policy instrument that the government applies to stabilize market prices of maize is purchase and sale of grains through the National Cereals and Produce Board (NCPB) combined with discretionary use of tariffs. This in effect stabilizes consumers' prices by lowering the price of maize flour at the retail end, but often is a price disincentive to producers with net effect that producers often are discouraged from investing in productivity improvements.

- a) The Farming systems in East Africa are generally similar. Why is Kenya struggling to produce enough maize to meet its annual requirement while Tanzania and Uganda enjoy surpluses every year?? **(5 Marks)**
- b) What farming system transformations need to be put in place to ensure that Kenya becomes self-sufficient in Maize production? How will these transformations lead to self-sufficiency in the staple food? **(10 Marks)**
- c) Discuss why the current government policy used to stabilize maize prices is flawed and what alternative strategies could be more effective in achieving price stabilization **(5 Marks)**

Question 3 (20 Marks)

II: Read the following passage and answer the associated questions

“Ever since the first industrial revolution led to a surge in international trade, Africa has remained largely on the sidelines of the global economy. The main beneficiaries of early globalization were today's advanced economies, where industrial technologies emerged. This, in turn, led to the “great divergence” in income levels between the Global North and South. To be sure, globalization has brought benefits to Africa. Rising incomes elsewhere in the world have increased demand for African commodities and natural resources, boosting national economies. Globalization has also supported knowledge transfer, enabling African countries to improve living standards by “leapfrogging” to new technologies. But myriad challenges have far outweighed such benefits. For one thing, globalization has contributed to premature deindustrialization. Because advanced

economies can now produce goods more cheaply, African countries have found it difficult to develop local industries that create jobs. Moreover, some multinational corporations operating in the region are dodging taxes through sophisticated—and legal—accounting mechanisms such as profit shifting, depriving governments of much-needed resources for economic development”.

Extract from Ngonzi Okonjo-Iweala and Brahim Sangafowa Coulibaly. 2019. Making Globalization work for Africa. May 30 2019. Brookings.edu.

<https://www.brookings.edu/opinions/making-globalization-work-for-africa/>

- a) Is the African farmer ready for the food system of tomorrow? Discuss, giving at least 3 examples **(3 Marks)**
- b) Smallholder farmers in Africa are at the greatest threat of adverse effects of globalization.
 - (i) How is global trade skewed against the African smallholder farmer?
 - (ii) Recently, an emerging resistance to global corporate control of the food system has seen pressure mounting for the UN to pronounce a declaration of rights for small-scale food producers. These rights are geared at helping protect small-farmers across the world from violence, persecution and loss of land. In spite of any declaration, will the smallholder farmer survive the rapid urbanization and technology change in the next 20 years? **(10 Marks)**
- c) Recent mergers and acquisitions in the agricultural sector have shone a spotlight on the growing dominance of a few corporations in the global food system. There is no single African entity involved, placing the food choice options of millions of African consumers under the control of others. What **THREE** potential actions should African governments and communities undertake to ensure continued food sovereignty? **(7 Marks)**

Question 4 (20 Marks)

III: Read the following passage and answer the associated questions

Nutrition security refers to ensuring the access to food that is nutritious as well as sufficient. This concept is increasingly being used nowadays to stress the importance of the quality of food for people of all ages. Nutrition and food safety interlinked, particularly in countries and regions where food supplies are insecure. When food becomes scarce, hygiene, safety and nutrition aspects are often ignored as people shift to less nutritious diets and consume more 'unsafe foods', which inevitably pose a health risk. As a measure of prevention, efficient food safety interventions are required through coordinated action throughout the food supply chain. Taking these into account, national food safety systems should not only cater to improving health in countries with insecure food supplies, but they should also focus on effective preventive measures against contamination and health hazards transmitted via the food supply chain. There are many obstacles to building efficient food safety systems and nutrition security, not least the lack of political awareness. Food safety as a health problem is still rarely acknowledged by decision makers in many of the developing countries, and this viewpoint is often given little priority by major donors as well.

Extract from (<https://www.frontiersin.org/research-topics/10095/food-safety-and-nutrition-security>).

- a) Discuss, with examples, how the current smallholder production model in Kenya predisposes consumers to food safety concerns? **(7 Marks)**
- b) Describe an ideal nutrition-sensitive food system that is sustainable and practical in view of current realities in Africa. **(3 Marks)**
- c) In a continent where food sufficiency is the major problem, why should governments focus on Nutritional security alongside food security? **(10 Marks)**

Section III (40 Marks) Answer ALL questions in this section

Question 5 (40 Marks)

Read the following passage and answer the questions provided

Joseph Koech is a distressed farmer. He cannot believe how his fortunes have changes in the last 10 years. As a prosperous dairy farmer in Meteitei, Nandi county, his herd of pedigree dairy cattle were a constant joy, not only because they were a sight to behold, but also because of the amount of milk he received from them. His best cow produced 50 litres at peak production, while his average across all his 8 cows was 31 litres per day, a fact that evoked wonderment and envy from his neighbors. Most of his neighbors sought to buy heifers from him, with all future heifers booked for the next 2 years, the high price tag not a deterrent. They happily paid a deposit of Kes. 100,000, being 40% of the total price for a 1-year old heifer. He is a hard worker, waking up as early as 4am to milk his cows, prepare feeds for the day and fetch water for his animals. He used to deliver his milk religiously to the coolers at Metkei Farmers Dairy Cooperative. The cooperative sold bulk chilled milk to either Brookside dairies or New KCC, the two largest processors in the country. However, constant reduction of the buying price has been a great demoralizing factor. From a high of Kes. 35 to the Kes. 23 he now gets. He felt it wasn't fair at all, given the backbreaking work it takes to produce milk.

Joseph is one among the 2 million smallholder dairy farmers in Kenya. He is an elite among his peers, his level of production being atypical. More than 80% of the milk produced in Kenya and East Africa comes from farmers with an average cow herd of 5 each producing on average 6 liters of milk. Smallholder dairy farmers in the East African region have endured low cow productivity that has persisted for decades. Generally, production levels in Africa are the lowest compared to any other continent in the world. This is despite the fact that an increasing number of exotic breeds continue to find their way into various countries in the region, either as semen or live animal imports. However, the introduction of potentially highly productive animals to low input systems has been blind to the fact that these animals have high nutritional, physiological and management demands, which smallholder farmers simply cannot meet due to a limited resource base. As a consequence, many animals are reared in environments and systems that are inappropriate for maximal productivity.

These problems are compounded by poor application of dairy best practices, given the lack of an effective extension service. The government has largely reneged on its task of providing extension services to farmers. As such, much of extension service provision has been relegated to NGO benevolence, donor funded projects and private for-profit companies or individuals. In cases where extension services have been fully privatized and are provided on a demand basis, the costs associated with procuring such extension services are a barrier to many smallholder farmers. This, combined with the low productivity of the cows ensures that farmers obtain lower income and their households do not benefit nutritionally as milk yields are low. As a result, year-on-year milk yields in the country have been increasing at levels lower than seen in other regions of the world. This problem affects over 1,000,000 smallholders' households across East Africa, who directly depend on dairy farming for their livelihoods. The implications of reduced productivity affect the wider society as well due to the high cost of dairy products. Because of the increasing and unmet demand for dairy products, and the need for imports to fill this gap, the price of milk and dairy products in the formal markets is generally prohibitive for a large segment of the population. The scarcity of milk and milk products is reflected in the low per capita milk consumption in East Africa at less than 40Kg/year, (except Kenya at over 100Kg/year). As a result of these challenges, and in an attempt to bridge the productivity gap, most East African countries are net importers of milk and milk products. However, most of these inflows end up in Kenya, given the high milk consumption.

The biggest irony is that every year, thousands of litres of milk are discarded because farmers do not have enough buyers to sale to. A milk glut is experience in the 4-month period between May and August. This is mostly after the rains and a lot of grass is available to feed the 5 million dairy cows in Kenya. The two main firms — Brookside and New KCC — process on average of 1.2 million liters of milk daily. However, much of their processing capacity lies idle in the months between September and March. Generally, most of the feeds used in the dairy industry are made from maize and other crop byproducts such as cotton and sunflower seed cake, soybean cake obtained after processing for human food needs. This makes the feeds quite expensive. Additionally, most of these feed ingredients are imported into Kenya. The current has low self-sufficiency in every major input required for feed production. The cost of production for a litre of milk for most farmers' ranges between Kes. 20 – 27, such that most of them do not break even when the large processor buy milk at between Kes. 23 and 26. That has fueled the recent farmer protests. Recently, the Kenya Dairy Board came up with regulations banning farmers from selling raw milk. This was one among a slew of proposals that was going to force most producers to sell only to processors. Direct sale to customers often results in farmers receiving 2 or 3 times the price paid by the processors. This is why farmers prefer to sell raw milk to neighbors, local markets and shops. More than 70% of all traded milk is sold through informal channels by middlemen, who collect from farmers and deliver to cooling plants, collection centers or far flung customers. In many cases, the handling of milk during this bulking process exposes the milk to poor hygiene and inappropriate processes reducing the quality of milk, especially because quality checks are not done on milk received from individual farmers. The risk of disease

such as mastitis and other contaminants such as antibiotic residues and banned preservatives is high. These are some of the reasons that the Kenya Dairy Board was keen to see reforms in the sector.

Cashflow is one of Joseph's biggest problem. He has little opportunity to diversify his activities because he is the main caregiver of his animals and has no additional land. His biggest cost is feed purchases and like most smallholder farmers, given that his animals feed requirements, outstrip what he can grow on his small plot by 80%. Joseph has a Rhodes mower and baler that he won when he came 1st runners up at the National Farmers championships in 2013. He leases the equipment out to farmers who need it, since he has no land to grow grass. Farmers pay him Kes. 30 per bale, which they find affordable compared to the industry average of Kes. 60 per bale. He doesn't supervise the baling since that would require him to leave his farm for extended periods and he doesn't have someone to delegate the work to. However, on average a total of 1000 bales are produced using his machinery in each of the two harvesting seasons in his area. Joseph is at a crossroads with his dairy business. He plans to quit because he is not breaking even on his milk costs, and believes the industry is no longer sustainable given the very low milk prices. However, he is finding it hard to quit because that's the only thing he knows, having no other skill set. At 60 years old, he doesn't see any chance for retraining into a new career. He has lost a lot of weight fretting about this.

- a) What type of production system is Joseph running? **(6 Marks)**
- b) What options for sustainable intensification can Joseph adopt to increase his productivity? **(6 Marks)**
- c) Advise Joseph on what he should do to make his farm profitable. **(20 Marks)**
- d) Describe the actions that the Kenya Dairy Board should take in order to support smallholder farmers like Joseph. **(8 Marks)**