



STRATHMORE BUSINESS SCHOOL

MASTER OF SCIENCE IN AGRIBUSINESS MANAGEMENT

MMA 8110: THE AGRO-INDUSTRY VALUE CHAIN & POST HARVEST MANAGEMENT

Date: Thursday, 9th November 2023

Time: 3 Hours

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

Section I (30 marks): Answer **ALL** questions in this section.

1. Briefly, enumerate two reasons why the Russia – Ukraine war affected the global grain supply chains. **(4 marks)**
2. Why is mapping the three flows (financial, material and information) critical to value chain competitiveness? **(4 marks)**
3. Explain the purpose of upgrading in value chains. How may value chains be upgraded? **(4 marks)**
4. Describe the role of ethylene (ET) in postharvest technology, especially in ripening versus storage. **(4 marks)**
5. Explain the statement “It is value chains and NOT businesses that compete!”. **(4 marks)**

Section II (30 Marks): Attempt any **THREE** questions.

6. Consider the sorghum value chains championed by the East Africa Malting Limited and as described in the Orr et al. 2013 case. Farmers (producers of sorghum), aggregators (offtake from farmers and supply sorghum grain to EAML), and distributors (transport of finished product to sale points) only accrued less than 20% of the total value created. How would each group upgrade their services to capture more value? **(10 marks)**
7. The COVID-19 pandemic presented big challenges to global food supply chains. Food supply chain issues caused by the COVID-19 crisis included impacts on consumer behavior, as well as logistical and organizational changes to food supply chains. Discuss

why short value chains were seen as better at absorbing disruptions and shocks. What other coping mechanisms could be put in place to forestall future effects on businesses.

(10 marks)

8. Despite a boom in global commodity prices and growth in earnings across the world, African commodity markets remain disorganized, unstable and inefficient. This means earnings from exports remain sluggish, moving the continent to become more of an import market. Explain why most modern market access and export structures have failed to take off in much of Africa, giving specific examples. **(10 marks)**
9. With respect to supply chain design, explain why demand forecasting and network optimization are critical to efficient performance of the supply chain. How does supply chain length affect the inventory model used? **(10 marks)**
10. In all the IGAD states (Kenya, Uganda, Sudan, South Sudan, Ethiopia, and Djibouti), harvesting, primary handling, and storage were identified as the critical loss points (CLPs) for grains. For milk value chains milking, primary handling and storage were identified as the CLP. In contrast, fruit and vegetable losses are high during on-farm handling, marketing, and distribution. How can supply chain design and innovative collaboration be utilized to reduce post-harvest losses? **(10 marks)**

Section III (40 marks): Answer ALL the Questions in this section.

UNGA WARS: Supply chain sustainability in maize systems. *Read the fictional story below and answer the related questions.*

Okwiri sat at the corner of his house, his back resting on his mud-walled hut and the hard verandah floor biting into his worn trousers. He stared intently at his kabambe phone, his heel digging into the ground in front of him. A thick slimy phlegm shot from his dry lips, landing unceremoniously at his feet. He looked at it disinterestedly, his jaws chewing ferociously at a peeled lusiola tree branch. Aah, I need a new brush, he thought, flinging the now heavily mangled stick across the yard. He was in a bad mood, and even the family dog Junior didn't dare approach him. He wagged his tail apprehensively from a distance, his eyes locked on the mad stare from his owner. Okwiri could not believe what he was reading! A text message had just arrived from his son Nadebu in Mombasa. The government subsidized Unga had just hit the shelves in the local dukas, and everybody was rejoicing. A two-kilogram pack of flour was now retailing at Kenya Shillings 92 in all stores. The SMS read "As part of the Government's food subsidy programme which seeks to reverse the recent rise in prices of essential food commodities; It is notified to the public that effective Wednesday, the government has partnered with various millers to offer white maize flour at subsidized rates across the country". And that wasn't the worst part. To ensure that these prices are maintained, the government had allowed maize imports as a matter of emergency to avert a national disaster. "Disaster my foot", Okwiri hissed. "Oh God, I am finished". He couldn't believe his eyes. He swept his gnarly fingers across his face, a cold sweat running down his brow, and let

out a loud sigh, which sounded more like a growl from a wounded pig. Junior whimpered and moved a step back. Things were bad. Six billion shilling was what the government was spending to subsidize a few importers and millers. “Do you imagine what that money could have done had it been given to farmers to buy inputs at the beginning of the season”? Okwiri shouted, pointed at a non-existent government official.

The mid-afternoon sun was hot, as was characteristic of this time in Magombe village. The heat from the ground radiated hot air, which made things in the distance seem to waltz lazily in response to an imaginary drumbeat. Only that the rhythm also made the eyelids feel heavy, an unwilling partner in the ride to slumber land. Most villagers were taking naps under the protection of mango trees in their bomas, their wide and majestic canopies providing shade and enviable coolness. But Okwiri was not sleepy today. His rumbling stomach did not give him peace of mind to indulge in sleep. It was as if needles were playing hide and seek on his body, everywhere. The sugarless porridge he had eaten in the morning seemed to have disappeared to some unknown place too early. He was glad his youngest son and daughter were in school and weren't coming home for lunch. There was nothing to eat today. Even the cockroaches and flies in the kitchen were wondering what wasn't cooking. This time round, times were hard. The hunger season had come back to tease them again.

The irony of it was that his granary was full with supplies of maize and sorghum. His problem was that he couldn't sell his stock at a price below his input costs. Since he got training from Kilimo Biashara, an agribusiness company helping farmers to farm smarter, he was very conscious of the costs of his inputs and profit margins. The middlemen had been hounding him to sell, but their prices were too low for him to accept the offer. He knew that a few months after the harvest, the glut would be over, and he could sell his grain stocks at a good price. But now, all those hopes had suddenly vanished with a single stroke of the government's “pen”. The local member of the county assembly had informed them that the government had declared the drought a national disaster and ordered for maize and sugar to be imported, given that only the Western and Rift regions had food stocks. The rest of the country suffered a failed crop. Now, there was this maize from Mexico and even more from Uganda. The situation was so bad that Kudedi, his cousin in Kitale, couldn't not sell his truckload of maize to the National Cereals and Produce Board grain silos because they were already full. Okwiri was too far away from any NCPB silo and no government approved warehouse was available in a 30km radius.

Okwiri consoled himself that his case was not as bad as his neighbor Okuloki. Okuloki was so angry that he had decided to burn all the sugarcane after reports reached him that the sugar factory wasn't going to buy any cane this year. His cane was overgrown at 22 months and all that waiting had been in vain. He had borrowed a lot of money to send his sons to a boarding school in Kakamega. He knew that if the sugarcane miller paid him for his 10 acres of cane, he would have enough money to pay back his loans and buy a few more dairy cows he had been craving. But that was not to be. In fact, it was said that the factory had imported so much sugar that it didn't have to crush any cane for the next two years. Rumour had it that the sugar was not fit for human consumption and had some rare metals like mercury and lead. “Eish! was that even possible, with all the regulatory bodies and safety checks at the Mombasa port? Aah. In these places, people talk

and it probably was not true, just a figment of imagination from disappointed farmers”, Okwiri mumbled under muted breath.

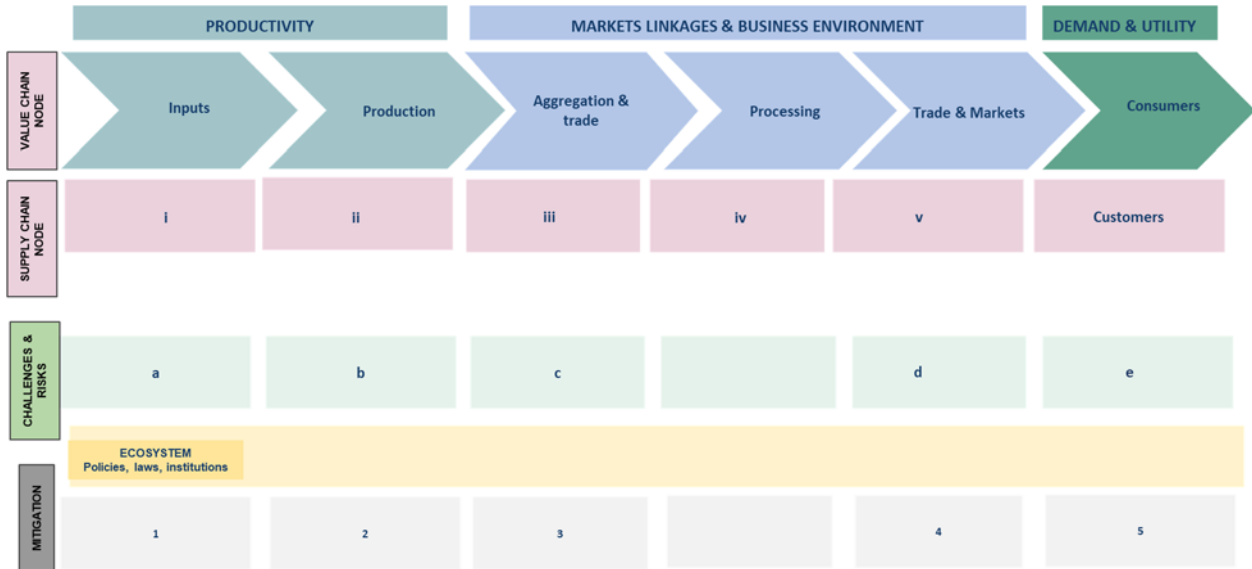
As Okwiri swatted a fly, his mood became even more pensive. An evil spirit was haunting the land, he thought to himself. They needed to call the elders for a cleansing ceremony. It had been three years of disaster after disaster, and the village was at breaking point. First was the longest drought they had seen. That was tough. The drought was so bad they had to survive on meals of immature pawpaw and local vegetables, to lubricate the journey for the cassava ugali. A few people harvested beans but nobody harvested any maize. Then came the army worms. They appeared from nowhere and nobody seemed to know what to do. Some people sprayed ash, others were using bitter herbs but nothing seemed to work. Even those who bought chemicals recommended by the government over the radio were not spared. The worms were so destructive, they ate most of the grain crop. Only Nangoma got something. She is a witch you know. Very active at night. I hear she used to work on her maize farm at night, spraying this and that. Clearly it must have been some secret potion which she didn't want people to see during the day. But she was generous, so everyone left her alone. However, her harvest, 30 bags from her one acre was decimated by Osama, a crazy beetle that destroys stored maize and dried cassava. The farmers in the village couldn't afford those fancy polythene lined bags that keep Osama away. This year the weather was kind. Actually, most of homes in the village had a bumper harvest. Everyone was excited, even when they heard that a lot of cheaper maize was coming in from Uganda. Given the demand, their crop would still fetch a tidy price. And then the boat sank. Just when villagers thought they had finally cheated hunger! Okwiri was angry. “I just want to take care of my family. Have enough food for the year and sell the excess, get enough money to send these kids to school. Now what”!

Okwiri had been an excited man this year. He had planted early, because he had decided not to wait for the subsidized fertilizer from the government. It always came late and sometimes it did not work. Many farmers had become skeptical of that fertilizer because their crops always yielded less than those who bought from the local agrovet. This year, he didn't want to take chances, especially after his Kilimo Biashara training. He was determined to make it. He had planted two acres, one and a half acres on maize and half an acre on sorghum. He had harvested 40 bags of maize and 10 bags of sorghum. He was pretty happy with his efforts and expected to have some good profit. Now it was all gone.

Okwiri stood up and lazily looked at his flock of Kienyeji chicken. A wry smile pursed his lips for a fleeting second as he sized up the big cock chasing a cockroach from the house. You are going to be dinner today, my friend! That was a wise decision his wife had made, buying the chicken. They had been their one constant stream of income for a couple of months now. The initial 20 birds she had bought had grown to 70 in a few months and sales from the eggs had ensured that his wife wasn't bothering him with requests for money to buy soap, salt and sugar. “Bwana, I have never seen so many eggs in my life”, Okwiri chuckled, smiling for the first time to expose his perfectly set and extremely white teeth, walking briskly towards his house. In the last 2 months, the family had been reluctantly forced to slaughter at least two chickens a week to supply their food requirements. A pot of boiled *kuku* mixed with the ubiquitous local vegetables was a delicacy in the village. Now, there were only a handful of laying birds left. “No wonder we don't have any

sugar left. We are eating the bank account” he reminisced with disgust as he banged the door behind him.

11. Given the passage above, consider the figure below and answer the following questions.



- List the corresponding supply chain nodes (i to v) given the value chain nodes in the diagram above. **(5 marks)**
- Describe the risks and challenges that actors in the Maize value chain are facing at each of the supply chain nodes (a, b, c, d, and e) as described in the passage. **(5 marks)**
- For each of the risks and challenges enumerated above, provide possible mitigation options to ensure a sustainable supply chain. **(5 marks)**
- What ecosystem challenges are described in the passage and how do they affect the stability of the supply chain? **(5 marks)**
- What upgrading strategies could the farmers typified by Okwiri employ to insulate themselves from supply chain risks while also capturing maximum value from the supply chain. **(10 marks)**
- What determinants of sustainability could hinder achievement of sustainable supply chains despite the best efforts of the actors involved? **(10 marks)**