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17

The role of small and medium agrifood enterprises in rural transformation

The case of rice processors in Kenya

FAO AGRICULTURAL DEVELOPMENT ECONOMICS TECHNICAL STUDY

17

The role of small and medium agrifood enterprises in rural transformation

The case of rice processors in Kenya

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Preface

The 2021 United Nations Food Systems Summit's call to produce concrete actions for transforming agrifood systems towards greater efficiency, resilience, inclusiveness and sustainability (United Nations, 2021a) emphasized that "….small and medium size enterprises (SMEs), have an important role and responsibility in transforming our food systems which goes beyond the agrifood sector and includes energy, finance and many others" (Wasfari 2021). To raise the profile and importance of agrifood SMEs in agrifood systems transformation, Summit organizers launched a number of initiatives including the Small Business Agenda and the 'Best Small Business: Good Food for All' competition (United Nations, 2021b).

This study contributes to the increasing visibility that agrifood SMEs are receiving in rural and agrifood systems transformation global and national discussions. It brings insights into the realities of agrifood processors in sub-Saharan Africa, including a look at the challenges faced, as well as the resourcefulness small firms in the agrifood system have shown in growing their businesses while operating under difficult business conditions. The findings presented are also aligned with FAO's new Strategic Framework which seeks to support the 2030 Agenda through working towards more efficient, inclusive, resilient and sustainable agrifood systems for better production, better nutrition, a better environment and a better life.

The research on the topic is motivated by several details. Despite the role that post-farm gate small and medium agrifood enterprises (agri-SMEs) can play in rural transformation and rural-urban connectivity, until recently, there has been little attention paid to these businesses in policy and academic circles for the sub-Saharan African context. Agri-SME is an heterogenous term, encompassing an array of entrepreneurial activities of varying sizes and structures, covering storing, transporting, collecting and processing agrifood products. As such, these enterprises carry a lot of responsibility and accountability for ensuring the supply of safe, nutritious and sustainably produced food for people living in rural and peri-urban communities, in addition to their role as employers of much sought-after off-farm rural jobs. Agri-SMEs account for a major share of rural jobs and contribute significantly to the total value added in developing countries. Their contribution to rural poverty reduction is evident from the role they play in connecting farmers to markets and providing employment opportunities to unskilled poor people and vulnerable groups such as women or youth. Further, the findings in the report underscore that agri-SMEs can constitute an important source of local service provision to the agrifood sector in rural and peri-urban areas. Their local embeddedness means that they have extensive knowledge of the agricultural commodities available, and local food consumption patterns. They are, therefore, well equipped when offering products on the domestic market that are affordable and that respond to the dietary preferences of local communities.

Against this background, several important questions arise. Without the economies-of-scale and competitive advantages of large businesses, how do agri-SMEs survive and grow in challenging environments? How are their business models shaped by evolving trends in agrifood markets? How does their business model impact rural transformation? Given the sector's potential to alleviate poverty, how can policymakers and development actors better support agri-SMEs in African food value chains? Guided by these questions, this report aims to expand knowledge on agrifood SME processors, while also providing qualitative evidence that contributes to policy and programme designs to better support these enterprises to play their role in transforming rural areas and agrifood systems.

This report is meant to provide policy guidance on how the existing attributes of these enterprises might be further leveraged to contribute to a rural and agrifood systems

transformation that is sustainable in all its dimensions – economically so that enterprises can grow and compete with imported food products, while contributing to thriving local and national economies; socially in terms of the multiple types and grades of off-farm employment that is offered, ensuring that employment is decent and contributes to social security insurance policies; and is environmentally sensitive so that the pressure that business activities place on local biodiversity and natural resources and the green-house gases emitted from their operations are measured and targets put in place to drive down impacts. A fourth sustainability dimension can also be considered that supports agrifood enterprises in their role of adding and retaining the nutritional value of agrifood products, thereby contributing to Kenya's National Guidelines for Healthy Diets and Physical Activity (2017), while also encompassing food safety and quality practices.

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Acronyms

Agri-SME	small and medium agrifood enterprise
CARD	Coalition for African Rice Development
EAC	East African Community
ERC	Energy Regulatory Commission
FAO	Food and Agriculture Organization of the United Nations
GAP	good agricultural practices
GDP	gross domestic product
HAACP	hazard analysis and critical control points
HR	human resources
ICT	information and communications technology
ID	identity document
IRRI	International Rice Research Institute
KAAA	Kenya Agribusiness and Agroindustry Alliance
KAM	Kenya Association of Manufacturers
KEBS	Kenya Bureau of Standards
KEPSA	Kenya Private Sector Alliance
KES	Kenyan Shilling
KeRRA	Kenya Rural Roads Authority
KNTC	Kenya National Trading Cooperation
MSME	micro, small and medium enterprise
NCD	non-communicable disease
NGO	non-governmental organization
NHIF	National Hospital Insurance Fund
NIB	National Irrigation Board
R&D	research and development
SACCO	Savings and Credit Cooperative Organization
SME	small and medium enterprise
ToT	turnover tax
USAID	United States Agency for International Development
USD	United States Dollar
USDA	United States Department of Agriculture
VAT	value added tax
WB	World Bank
WHO	World Health Organization
WRS	Warehouse Receipt System

Executive summary

Small and medium agrifood processors play an essential role in achieving pro-poor growth and inclusive rural transformation; evidence shows that they significantly invest in rural areas; link smallholders with increasing urban demand; generate employment opportunities for the rural poor and vulnerable groups such as women and young people; and drive the modernization of agrifood value chains (Barrett, Reardon, Swinnen and Zilberman, 2020; Reardon *et al.*, 2019). Small and medium food processors play an important role particularly in linking farmers to markets considering that they receive 95 percent of total smallholder supply in Africa (Reardon *et al.*, 2019a). Given that the agricultural sector in sub-Saharan Africa provides 53 percent of total employment (ILOSTAT, 2021) and 15.5 percent of gross domestic product (GDP) (World Bank, 2020), promoting the growth of agri-SMEs can yield important returns in terms of poverty reduction and rural development. However, despite their pivotal role, the post-farm segment of agrifood value chains has been generally neglected in economic research (Barrett *et al.*, 2020) and also by policymakers or development practitioners who tend to focus on enabling farm-level production. It is for this reason that the Food and Agriculture Organization of the United Nations (FAO) has been dedicating research to better understand the policy and technical needs of these enterprises.

This publication is an output of FAO's recent efforts to learn from Kenyan rice processors about their everyday realities, challenges and creative approaches to dealing with various business environment constraints. Rice is the third most consumed cereal in Kenya, after maize and wheat (IRRI, 2020), with forecasts indicating that rice consumption will experience an annual increase of 8 percent, propelled by the growing preference for convenience foods, especially in urban areas (Gitonga, 2020). Despite these positive outlooks, domestic rice millers cannot currently take full advantage of growing opportunities, which puts them at risk of exclusion from the rapid market growth. There are a number of factors constraining growth that are well documented in the literature and include: a lack of access to credit and appropriate financial products; weak infrastructure, especially in rural areas; an absence of adequate support services, particularly in food safety, marketing and technology. As a result, growth in demand will continue to be served by rising imports, ultimately aggravating the pressure placed on the national balance of payments' deficits and overall economic development that is inclusive.

Against this background a systemic appraisal of Kenya's business enabling environment for agrifood small and medium enterprises (SMEs) was cross-fertilized with an analysis of the business models of three rice millers in the Mwea rice producing region in Central Province. The objective of the analysis is to identify policy options that foster commercial growth, while also contributing to inclusive and sustainable rural transformation. The three SME business models appraised represent different business strategies for rice milling in Kenya. However, together they have in common a growth-oriented outlook of the entrepreneurs, and a quest to capitalize on the growing demand for rice in the country. Examining the business models of the three rice millers systemically alongside the policy environment allowed for several conclusions to be formulated with respect to business operations and policy areas. In doing so, the report elaborates on the multifaceted business arrangements of agri-SMEs, linking the findings to the external policy, institutional and infrastructural environment, including to farmers, the customer base and the rural spaces within which these firms operate.

The assessments were carried out using a multidisciplinary agrifood systems approach, which appraised challenges and opportunities related to procurement, operations, logistics, finance, marketing and sales, human resources, and strategic partnerships. The results are designed to inform policy frameworks and programmes targeting agrifood enterprises

operating in the rice sector but are also relevant to the agrifood sector as a whole. The Kenya case allows for the formulation of several conclusions and lessons in relation to each specific business element or development-specific area, as described below.

Procurement. The millers interviewed struggle to procure paddy due to the number of artisanal processors and traders who have proliferated as a result of major public investments in farm inputs and improved farm practices in the Mwea area. More specifically, the lack of microfinancing for farmers especially creates opportunities for middlemen to satisfy their short-term finance needs in exchange for paddy at the farm-gate, including advancing credit to farmers without the need for bank-accounts or any type of collateral. Viable options for addressing this bottleneck include tools such as the warehouse receipt systems (WRS) that stabilize cash flow, or contract farming mechanisms that introduce lead-firms to improve value chain coordination and access to finance, which has been successfully employed in the rice sector in other countries in the region (Adabe, 2017; Ba *et al.*, 2019; Bellemare, 2012; Ilie and Kelly, 2021; Maertens and Vande Velde, 2017).

Logistics. Findings from the assessments show that the role of logistics between the farm and factory gates are also an underserved area of support and investment by the public sector. The result of this is varying, often sub-standard, grades of paddy supplied to mills through a range of actors (e.g. millers and traders) that provide transportation in the form of motorbikes, pick-ups or donkey traps, but also provide additional services such as drying on tarpaulins on the side of roads, bagging, loading, weighing, micro-credit and even extension. Once the paddy leaves the farm, its quality and safety are compromised due to inadequate transportation, storage or drying practices and facilities, and it could be at risk of being rejected at the factory gate, which would create net losses for on-farm investments in quality and safety already made upstream. The assessment in the report also notes that those enterprises that are most concerned about building a brand will, in the absence of compliance with good post-harvest practices, invest in direct provision of these services to farmers in order to secure the quality of paddy needed.

Better collaboration between public institutions supporting the sector, such as the National Irrigation Board, the Ministry of Agriculture and the Ministry of Industrialization, and more developed trade and enterprise could result in cross-fertilization among those programmes that operate between the farm and the factory. Integrated programmes could be designed to leverage the investments made by millers, transporters and other micro-service providers along the chain with respect to upscaling capacity in good post-harvest practices, including targeted downstream investments in related infrastructure and technologies. Raising the profile and formalizing the role of post-harvest actors in the rice sector strategy development will strengthen the delivery of the inbound logistic services provided by these actors and may even contribute to less fragmentation, a consolidation among micro-enterprises and lead to new start-ups.

Operations. The appraisals also discuss the centrality of milling technology to the competitiveness of the rice milling business model. Findings show that there is a general lack of technology-related knowledge, compounded by a lack of advisory services available, creating purchasing experiences that have resulted in malfunctioning and irreparable machines. With the right environment in place, the purchase of modern machinery and equipment costs of production can be reduced, alongside reductions in rice losses and improvements to the safety and quality of the final product. The use of appropriate machinery also had implications for the environment by way of more efficient use of water and energy utilities. Policy options include introducing advisory services with respect to purchases of machinery and equipment, ensuring the availability of spare parts and maintenance services for imported machinery, and raising awareness about the latest technology available and trainings in calculating expected returns on investment.

Marketing and sales. Rice millers in Kenya face difficulties competing with imports, particularly on price due to high operational costs and market imperfections. The practice of blending different qualities and varieties of milled rice makes the end product more affordable, but compromises the quality and reputation of national rice compared to unblended higher quality imports. With the growth of incomes and the middle-class in Kenya, consumers are becoming more discerning and sophisticated, which can lead to a preference for imported rice brands. Reducing the high percentage of unblended rice in domestic brands can be addressed such as by adopting a coordinated package of policy, infrastructure, branding and capacity building investments. While more research is required, the preliminary findings shared in this report reveal that the causes of high levels of blended rice are due to a diversity of different types of milling technologies in operation, a high proportion of artisanal milling technologies serving, and competing in, the market, combined with weak post-harvest practices and a lack of market intelligence available to millers. Weak collaboration in the sector, first among millers and secondly between millers, farmers and traders, means that national brands struggle to compete on the supermarket shelves with imports.

Finance. This report describes the many enabling reforms Kenya has introduced to support the growth of SMEs, including agri-SMEs, with many positive results. However, there are persistent gaps, particularly for agri-SMEs, in accessing flexible and affordable sources of formal finance and capital investments to catalyse sustainable growth. The introduction of tools such as on- and off-farm mechanization leasing programmes to upgrade activities along the value chain can be supported through coordinated packages of regulatory reforms and infrastructural investments to allow undercapitalized actors to grow their enterprises without having to rely on large capital investments. The cess[1] levied on agricultural commodities is also highly controversial and considered too high by the millers, with the literature calling for an assessment on cess practices and their impact on the revenue streams of counties.

Human resources. Findings on human resources describe how millers offer a range of skilled, semi-skilled and unskilled job opportunities. Skilled mechanical engineers are considered the most important employees for milling operations, due to the need to keep the machines working at full capacity, particularly during harvest season. During the high season, the millers depend on a high number of casual workers, who are susceptible to a number of occupational safety concerns such as carrying overly heavy loads, respiratory problems from exposure to bran dust, and a lack of workplace protective clothing. Policy reforms that allow casual employees to pay into, and benefit from, social security, while also retaining flexibility for the employee and employer, will contribute to fostering decent employment within the sector in addition to reducing vulnerability in the rural areas where the mills operate. Gender pay parity also remains a concern, with the findings showing that women are currently paid less than men for jobs requiring similar qualifications and skill levels.

Partnerships. Finally, there are a number of public entities, particularly the National Irrigation Board, supporting investments in Mwea. However, this support is hindered and splintered due to a general lack of collaboration along the chain. Despite the high numbers of millers in Mwea, attempts to formalize a rice millers association were shown to be unsuccessful, with the chain interaction characterized by general distrust and unwillingness to share information or collaborate to achieve mutually beneficial goals. Support by the public sector to foster better collaboration would, no doubt, accelerate their goals, and improve the likelihood of success for the public interventions and investments outlined under Kenya's national rice sector strategy and customized for the Mwea constituency.

[1] Produce cess is a form of levy charged on domestic agricultural trade. Revenue raised from cess is directed at improving the production and distribution of the taxed commodities (Bayesian Consulting Group, 2016).

Overall, the case study showcases that, developing an adequate business climate for the growth of agri-SMEs is critical not only for creating commercial value but also for rural development purposes. The rice millers investigated in this study are already making such contributions: filling in the gap in the market for rural services by providing affordable storage or transportation; creating advantageous employment opportunities; linking farmers with increased demand for rice; or offering a nutritious product on the local market. Nonetheless, as this study reveals, there is significant scope for improving their business enabling environment which would eventually allow them to further strengthen their contribution to the rural transformation of Kenya.

1 Introduction

1.1 Background

The post-farm segment of agrifood value chains has been long overlooked by researchers and policymakers despite its importance for the pro-poor growth of developing countries (Barrett *et al.*, 2020). Growing demand for food has been generally addressed by the development community by directing investments towards farm-level production but "equally critical are the supply chains that connect farmers to urban markets" (Reardon, 2016, p.7).

Small and medium processors, distributors, transporters and other logistics providers in the agrifood sector have been significantly investing in creating markets for farmers in Africa and will continue to play a key role over the next couple of decades (Reardon *et al.*, 2019b). In sub-Saharan Africa, where agriculture accounts for 53 percent of total employment (ILOSTAT, 2021) and 15.5 percent of gross domestic product (GDP) (World Bank, 2020), promoting the growth of agri-SMEs can result in important returns in terms of poverty reduction. Rural areas can particularly benefit since about 40 percent of rural non-farm employment in the region is provided by agrifood businesses (Dolislager *et al.*, 2019). Further, it is also these companies that are more likely to hire vulnerable groups such as women or young people (Dolislager *et al.*, 2019), thereby contributing to multiple sustainable development objectives. The food processing segment of agrifood value chains in developing countries has important contributions in terms of export earnings, industry restructuring and dietary aspects (Wilkinson, 2004, 2008). Small and medium food processors' role to linking farmers to markets is indisputable; in Africa, these receive 95 percent of total small farm supply, either directly or through other SME wholesalers (Reardon *et al.*, 2019a). Additionally, the need for home food preparation is relieved by the availability of processed food, allowing women to dedicate more time to non-farm employment (Liverpool-Tasie, Adjognon and Reardon, 2016).

The fact that domestic markets in Africa have expanded considerably over the past few decades (six to eight-fold) and will continue to enlarge in the future (Reardon *et al.*, 2015), means that food processors have important commercialization opportunities that they can tap into. To support the development of agrifood processors and allow them to take advantage of market growth, governments can focus on alleviating the constraints in their enabling environment (Reardon *et al.*, 2019a).

It is against this background that FAO is analyzing the business models of small and medium agrifood processors in different countries of sub-Saharan Africa. Looking at internal firm dynamics to determine the challenges and opportunities they experience, in order to identify policy and technical support that can foster the creation of a business climate conducive to the development of rural economies. This technical study is one of such country outputs and presents the findings of research conducted on three rice processors in Kenya. Ilie and Kelly (2021) is another such country output, presenting the findings of research conducted on rice processors in Senegal.

The rest of this paper is organized as follows: the next section introduces the methodology of the research and its limitations. Sections 1.3 to 1.7 provide the context of this study including an overview of the enabling environment for agribusiness in Kenya; of the rice sector and its characteristics; and of the three rice millers interviewed. The next six sections examine each business component described above, looking at various themes which emerged from the analysis; more specifically, the second, third and fourth sections follow the

flow of the product from farm to processing facilities, looking at the procurement, logistics and operational practices of the firms. The remaining four sections explore the finance, marketing and sales, human resources, and partnerships of the millers. Finally, the last section of the report will present conclusions, also highlighting areas for further research.

1.2 Study objectives and methodology

The aim of this study is to analyse business environment for rice millers in Kenya to derive lessons for policymakers and development organizations that could inform investment and business to enabled reformed support for these enterprises. The analysis focusses on aspects of the business enabling environment of the millers with respect to their potential contribution to rural development objectives including rural investment, decent employment, nutrition, food safety and quality, as well as farmer-market linkages. The study's conceptual model builds on Porter's Value Chain framework, adapted to fit the business models of agri-SME processors in sub-Saharan Africa and to include various priority areas of FAO that are relevant to the activities undertaken by these enterprises (Kelly and Ilie, 2021).

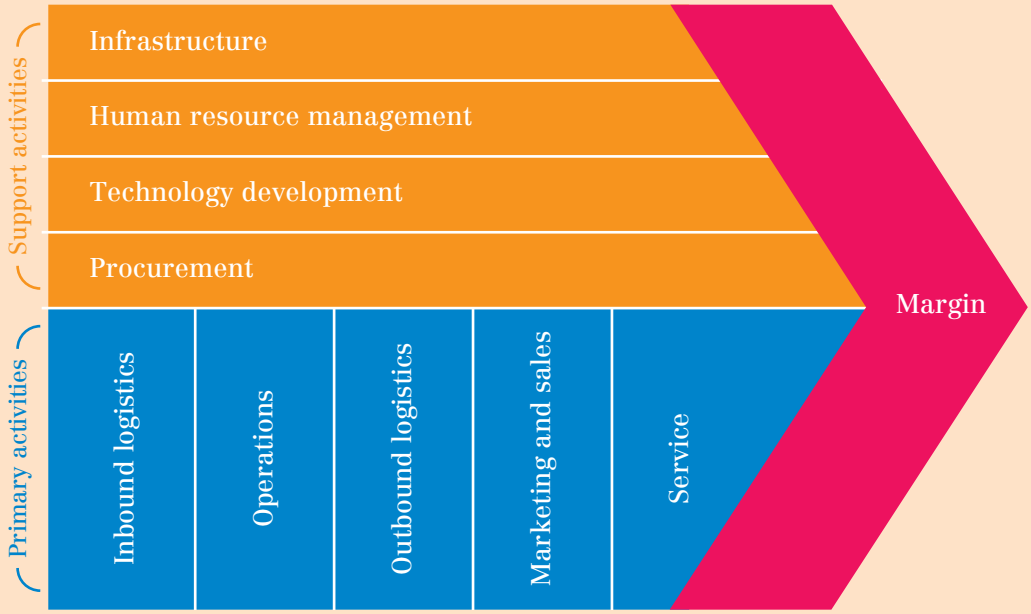
The research process incorporates three complementary stages, each of them guided by the conceptual framework described below. In the first phase, desk research was conducted to assess the policy and institutional environment for agri-SME processors based on publicly available policy papers and reports. The second stage of the research consisted in semi-structured interviews with the owners or managers of three selected rice millers in Kenya. Sampling was, in this case, purposeful and based on the need to obtain thick and detailed information from the participants. As such, the three millers were chosen by national experts in Kenya's rice industry who were knowledgeable about the willingness of the companies to share their experiences. For the purpose of this study, other criteria in selecting the enterprises included being a small or medium firm, based on the national definition of an SME, making profits, and having been operational for at least two years. Data was then analysed inductively, by drawing out patterns and themes from the respondents' insights. This stage of the research, including the interview protocol, is described in detail in Kelly and Ilie (2021). The third stage of the research consisted of deriving descriptive statistics from the World Bank Enterprise Surveys in order to understand how the general experience of agri-SMEs in the country compare with the three interviewed processors.

This paper brings together the outputs from these three research stages, more specifically the policy assessment, the business model analysis and the descriptive statistics, to provide a detailed overview of rice milling SMEs and generate lessons, recommendations and ideas for further research.

The subject of the study is the enterprise and, as such, a conceptual framework is required to enable firm-level analysis. Porter's value chain framework (1985) was selected as the basis for firm analysis as it allows for insights on interdependent activities from raw material acquisition through production and the sale of a product to a customer. In *The Competitive Advantage of Nations*, published in 1989, Michael Porter stated that "firms gain competitive advantage from conceiving of new ways to conduct activities, employing new procedures, new technologies, or different inputs."

Porter's value chain involves five primary activities: inbound logistics, operations, outbound logistics, marketing and sales, and service. Support activities are illustrated in a horizontal column across all of the primary activities. These are procurement, human resources, technology development and firm infrastructure as shown in Figure 1.

FIGURE 1 Original Porter's value chain framework



Source: Porter, M. 1985. *The Competitive Advantage: Creating and Sustaining Superior Performance*. New York, Free Press.

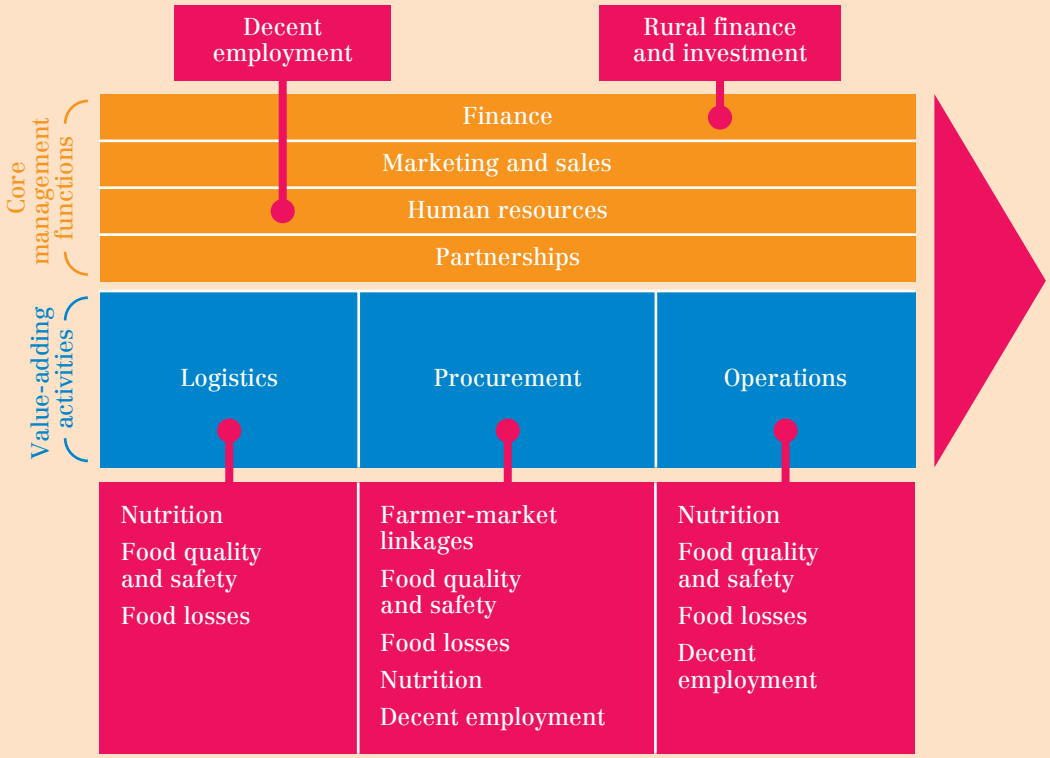
From a business corporate perspective, the objective of a value chain model analysis is to identify cost reductions, competitive differentiation, increased profitability and business success factors, increased efficiency, decreased waste and, ultimately, higher-quality products at lower costs.

To complement FAO's programme of work on agrifood systems, the authors have adopted Porter's model to facilitate firm-level business analysis of small and medium sized food manufacturers across different business units in order to inform the enabling environment for agrifood businesses. A second aim is to link relevant sections of the model to public sector policy areas (nutrition, employment, food safety, farmer-market linkages, access to finance, etc.) to understand the policies required to enhance the role of agri-SMEs in the transformation to sustainable agrifood systems.

The adaptation of the model is a "work in progress" and can be further exploited to encompass additional priority areas for agrifood systems development, including more in-depth environmental sustainability considerations, innovation and digitalization, and the role of consumers in the transformation of sustainable agrifood systems. Firm internal infrastructure has also not been addressed due to the general absence in agri-SMEs in the African region of specific divisions or roles assigned to aspects such as legal matters, marketing and sales, or quality management. Finance, originally an infrastructure sub activity, is treated independently as a business component since the way in which agri-SMEs access, use and manage financial resources is such an important aspect of their business model and a critical priority in their day-to-day practices. Services has also been removed from the adapted version, given the lack of relevance of this aspect of the business to food manufacturing firms, particularly less sophisticated small firms in developing economies. Additionally, partnerships have been introduced as a component in the adapted framework since many agri-SMEs in sub-Saharan Africa dedicate important efforts to developing relationships with various actors to compensate for weaknesses in inputs or support service markets.

The adapted model (see Figure 2) also diverges from the original with respect to the clustering of procurement, finance, marketing and sales, human resources and partnerships under core management functions; some of these were labelled support activities in the original framework. Logistics (inbound and outbound), and operations, which are clustered under value-adding activities, were originally labelled primary activities. Table 1 provides an overview of each segment of the adapted framework and its relevance to food manufacturing and agrifood systems policymaking.

FIGURE 2 **Adjusted Porter's value chain framework to reflect the business model of a small and medium agrifood enterprise and links to FAO priority areas**



Source: Kelly, S. & Ilie, E.T. 2021. *Engaging with small and medium agrifood enterprises to guide policy-making. A qualitative research methodology*. Rome, FAO.

Adapting the model to the food sector presents challenges in analysing activities related to nutrition, food safety and quality as these are not limited to one element but depend on activities across the supply chain.

For instance, ensuring the safety of food starts with the farm and ends with the consumer. It depends not only on the value-adding activities of a food manufacturer but also on all the suppliers and buyers across the value chain. In addition to the other actors involved in the commodity's broader chain, processors can help manage risks by adhering to good food safety practices and controlling critical points across their own value chain to prevent and eliminate food hazards. This is to prevent the market release of unsafe food, which is often not detectable by human senses.

Food quality, on the other hand, refers to those attributes of a product that affect its value to the customer or consumer, including colour, origin, flavour and presentation (FAO and WHO, 2003). Like safe food, high-quality food forms the basis of a nutritious diet (FAO, 2019a).

A nutritious diet provides protection against malnutrition as well as non-communicable diseases (NCD) such as diabetes (WHO, 2018a). Rising incomes and urbanization have led to changes in diets, which now include more animal-sourced foods, sugar, fats and oils, refined grains and processed foods. This creates a whole new set of challenges for policy since this "nutritional transition" can cause increases in obesity and NCDs (Hawkes, Harris and Gillespie, 2017).

Manufacturing has a major impact on the nutritional content and quality of food, having the potential to retain, add or deplete nutritional value. The nutritional content of food can be affected on-farm, for instance, by planting specific crop varieties that are high in nutritional value, and that will also be influenced by how a product is handled as it moves through the commodity and the firm's value chain. Ensuring the integrity of the nutritional content of food requires the commitment of all actors across the chain, including food manufacturers. Policy and institutional actors can intervene when incentives for producers to invest in nutritious food are missing, or when demand for food does not coincide with a healthy diet (FAO, 2019b; WHO, 2018a). Similar to food safety and quality, logistics and processing activities by millers can determine the nutritional content of a product. Investments in this area are influenced by demand and consumer awareness around diet quality.

Since investments by food businesses in food safety and quality, including nutrition, implies costs, voluntary practices as well as government oversight to ensure adherence to regulations, policy and interventions are key tools for ensuring the supply of competitive, affordable, high-quality, safe and nutritional food products by agri-SMEs in the market.

TABLE 1 Description of the business model components of small and medium agrifood enterprises

Procurement
Procurement involves a series of activities and processes that are necessary for an organization or firm, large or small, to acquire the necessary products or services from the best suppliers at the best price. For a food manufacturer, such products and services include agricultural food commodities, packaging, storage equipment (crates, etc.), technical equipment for processing and technical maintenance. Processes related to procurement include developing contracts, both formal and informal, with farmers or traders supplying agricultural commodities; identifying the best prices and conducting research; and/or tendering for the acquisition of processing technology or other machinery needed by the food processor. Insights on the procurement practices of food manufacturers in developing countries is an important area of research for FAO since it informs several priority areas related to the integration of small farmers and small enterprises into agriculture and food value chains. For example, how and why companies choose particular procurement strategies (e.g. procuring directly from farmers or through traders or farmer organizations or a combination of strategies) and the types of related services they provide, such as credit advances or inputs through contract farming, can shed light on the farm-level or close-to-farm support that the public sector can provide to improve farmer-to buyer-linkages. Related activities and insights are also important for food safety, nutrition and rural finance. For instance, farm-level production, as well as post-harvest and procurement practices, will have implications for eventual food safety standards and the nutritional content of the final product. In addition, information on the challenges faced by companies in relation to their suppliers, be they farmers, traders or farmer organizations, can also inform the policy reforms that would enable rural business or agro-industries to grow.

TABLE 1 (cont.) Description of the business model components of small and medium agrifood enterprises

Logistics
Logistics refer to activities related to the flow of materials and information such as transportation, warehousing, procurement, packaging and inventory management. The efficacy of logistics is critical for developing the agrifood sector because it has a direct impact on the quality, freshness and safety of the products, as well as access to markets. Logistical activities largely depend on infrastructure, which is typically weak in the rural areas of developing countries. However, supplier-to-buyer capacities and ingenuity in designing and managing logistical processes can address shortcomings and be reinforced by integrating public and private sector services such as training in post-harvest handling for farmers and traders. Food safety compliance, certification and other enabling environment processes controlled by the private sector, for instance, on quality assurance related services (pest control or transport) will all have an impact on the end value of a food product.
Operations
Operations is a term often used in management literature to describe a wide range of activities that are relevant to manufacturing, including supply and distribution, maintenance and production processes. In this paper, the term will strictly cover those "in-house" activities that add value to the final product, such as primary and secondary food processing. Equipment, automation, technology, employee skills, plant layout and adherence to operational protocols, including biosecurity (e.g. hazard analysis and critical control points (HAACP) and employee task assignments) are the main factors influencing these activities. As in the case of logistics, operational activities are highly dependent on infrastructure, level of technology and appropriateness, which are especially weak in rural food manufacturing companies. Operations are also one of the main channels through which agri-SMEs influence the safety and quality of food, and the nutritional content of the final product. The design of factory operations will also impact occupational health and the safety of staff. Operations are highly pertinent for assessing aspects of energy consumption and sustainability, which have not yet been integrated into the study.
Finance
Access to finance is a long-standing and often cited obstacle to the growth of SMEs across all types of economies. In sub-Sharan Africa, the problem is compounded by a general lack of financial resources for SMEs. The absence of a reliable stream of affordable finance can inhibit innovation, growth and employment creation. Financial planning and management are related issues. The extent to which rural-based companies are equipped to manage short-term finance and allocate funding on a weekly, monthly and annual basis plays a major part in long-term business success. These insights are also important for understanding the role of small food manufacturers in upstream and downstream value chain finance, and how food value chains are financed beyond formal financing institutions. Examining access to finance and the financial management capacities of SMEs is important to understand the type of financial support and capacity building that small companies need to start-up, grow and effectively manage their resources, ultimately enhancing their ability to invest in rural areas and contribute to reducing poverty.

TABLE 1 (cont.) Description of the business model components of small and medium agrifood enterprises

Marketing and sales
A company's marketing and sales strategy is key to bridging the gap between consumer needs and the food products competing for market share and enhancing relationships with customers. Marketing tools include, for example, the intelligence to understand market trends and needs, product advertising (branding, publicity, business-to-business networking), and marketing strategies (the four Ps – product, place, price and promotion). Marketing ultimately drives sales by raising awareness of a company's value proposition. The characteristics of SMEs force these smaller companies to promote their businesses in a way that is significantly different from that of larger companies. SMEs often lack strong branding, market intelligence and the power to influence consumers due to modest marketing expenditures. However, they can often respond more quickly to changing market circumstances due to their inherent flexibility and small size. Marketing by SMEs is generally arbitrary, informal and more likely to be shaped by the firm's internal culture, such as the managerial style of the owner. Person-to-person relationships and networking, for example, are often employed by SME owners to build contacts and initiate business contracts. Small companies often do not have the resources to carry out big market intelligence activities or campaigns to develop markets for their products; they are primarily engaged in responding to market demand. This is important when considering market development for more nutritional foods, for example. Large companies will have the resources to create market demand for these products, while SMEs will have to rely on public sector collaboration to create demand. A better understanding of the internal and external factors shaping the day-to-day marketing and sales strategies of agrifood SMEs can help to identify best practices and bottlenecks related to capturing market share and strengthening the competitiveness of the domestic food market relative to imports or developing markets for more nutritional or sustainably produced food products.
Human resources
The purpose of the human resources (HR) division is to ensure that a company or organization utilizes its employees to their fullest potential. HR management is primarily concerned with the company's policies and strategies related to employee-benefits and wellbeing, taxes and social insurance, employee recruitment, training and performance appraisal. The extent and range of HR activities depend on the size and formality of the company. HR in larger companies also concern themselves with organizational change and industrial relations. HR is considered a source of competitive advantage when the knowledge and skills of employees are applied to the company's activities. The HR component of a company does not only rely on internal procedures but is also largely influenced by public policies around social welfare and national education standards. Given that SMEs collectively employ a significant number of people in rural areas, the design, scope and implementation of HR policies at the enterprise level can have a significant influence on creating decent employment opportunities. Decent employment is defined by FAO as "work that provides a living income and reasonable working conditions (FAO, 2019c)," and is built on four main pillars: full and productive employment, rights at work, social protection and the promotion of social dialogue (ILO, 2019).

TABLE 1 (cont.) Description of the business model components of small and medium agrifood enterprises

Rural areas in particular are subject to poor working conditions as jobs are mostly informal, with no contracts or protection and requiring long working hours with low and unstable incomes. These issues are compounded for the most vulnerable people: children, women, migrant labourers, the elderly and disabled. For these reasons, examining HR issues can help to identify current weaknesses or strengths related to decent employment practices and provide cues on what can done to improve HR practices for better rural employment opportunities.
Partnerships
Partnerships are not included as an activity in Porter's value chain framework but they have been added to the adapted framework for this study due to the efforts that agri-SMEs in Africa invest in developing relationships with various actors in the absence of adequate business and rural services. In the context of a poor enabling environment, partners, such as development agencies, bilateral donors and foundations, non-governmental organizations (NGOs) or government institutions, can compensate for various weaknesses by providing training, access to finance or can act as mediators in transactions. Partnerships may, for instance, focus on improving procurement linkages to farmers, with partners allocating resources towards building the capacity of smallholders to produce a consistent quality supply.

Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

1.3 The business enabling environment in Kenya

With an economic growth rate of 5 percent in 2021, Kenya is the 2nd fastest growing economy in the East Africa region (AfDB, 2021) Its achievement is largely the merit of a stable macroeconomic environment, good investor confidence and a resilient tertiary sector (World Bank, 2020a).

Kenya is a top reformer in enabling the business environment, currently occupying the 56th place in the World Bank's Ease of Doing Business ranking, up 24 places since 2017. Notable improvements are: reducing the number of licences needed to set-up a business, which have decreased from 300 to only 11; upgrading its regulatory practice for resolving insolvency; enhancing its online system for paying taxes; or implementing an online land rent financial management system (International Trade Centre, 2016; World Bank, 2019, 2020b). Kenya has also dedicated important efforts to enabling the environment for SMEs, which is recognized as a priority area for development (see Box 1).

Despite the positive economic trajectory and improvements in its investment climate, the country is still challenged by underdevelopment issues such as inequality; poor governance; weak firm productivity; or a gap in the skills offered by the education sector and those demanded by the market (World Bank, 2020a).

The manufacturing and agricultural sectors in particular, which represent the backbone of the economy, are generally characterized by low performance, meaning that job creation has not kept up with the increase in population. Historically, Kenya has performed well in agricultural productivity (World Bank, 2013), which has grown constantly but slowly since 1961 (Birch, 2018). Most notably, agricultural sector growth has been responsible for the largest share of poverty reduction between 2005 and 2015 (World Bank, 2018b). Recently,

however, productivity in several agricultural sectors has started to decline. One example is maize, where yields per hectare in 2014 were lower than in 1994 (World Bank, 2018b). Some of the main barriers to agricultural productivity are a lack of access to adequate extension services, lack of access to agricultural finance, land degradation and climate change events. Additionally, the government's interventions in cereal markets, particularly in the supply of inputs, has diverted resources away from investments that might hold more potential for improving productivity (Birch, 2018).

BOX 1 Enabling the environment of Kenyan small and medium enterprises

Today, formal and informal SMEs employ more than 80 percent of Kenya's working population and contribute about 34 percent to its gross domestic product (GDP) (ITC, 2019). The Government has increasingly recognized the importance of SMEs in its policies including the country's 2015 Industrial Transformation Programme. The policy hopes to push the manufacturing contribution to GDP up to more than 15 percent (from the 11 percent of 2015) by building on five pillars:

- develop export-oriented sectors (including tea, horticulture and coffee);
- establish a food processing hub (through agro-processing of imports and fish processing);
- invest in infrastructure;
- support sectors that provide non-industrial jobs (such as IT and tourism); and
- grow SMEs by supporting "rising stars" and building capabilities (Kenya Ministry of Industry, 2015).

SMEs are also a priority under the Government's nationwide development strategy known as Kenya Vision 2030. As part of its third Medium-Term Plan 2018–2022, the Government seeks to support SMEs through various measures such as by establishing the National Credit Guarantee Scheme to support access to credit. More specific recommendations to boost the competitiveness of Kenyan SMEs are identified by the International Trade Center (ITC) and include improving the energy, water and information and communications technology (ICT) infrastructure outside Kenya's central region, introducing tailored innovative financial services, increasing the efficiency of logistics services, and investing in rural roads (ITC, 2019).

Sources: ITC (International Trade Center). 2019. *Promoting SME Competitiveness in Kenya*. Geneva; Kenya Ministry of Industry. 2015. *Kenya's Industrial Transformation Programme*. Nairobi.

It is not only agriculture that holds unexploited potential for economic development and poverty reduction but also industry. The contribution from the manufacturing sector to GDP was only 8.4 percent in 2017, a rate which has declined from 11.8 percent in 2011 (Kenya Association of Manufacturers, 2018). Food and beverage is the largest sector in the manufacturing industry, having contributed to about 3.5 percent of the GDP in 2017 (Kenya Association of Manufacturers, 2018). Food and beverages constitute the highest share of exports, which has increased from 40.84 percent in 2014 to almost 48 percent in 2018 (Kenya Association of Manufacturers, 2019). These are characterized by relatively low value addition, with the majority of total agricultural exports being sold as raw (Wamalwa and Were, 2019). Additionally, food imports have more than doubled from 2013 to 2017, largely as a result of the government's measure to allow duty free importation of maize to cushion against drought-related food shortages (Kenya Association of Manufacturers, 2018). Kenya's Association of Manufacturers identifies the following challenges that are specific

to food and beverage processors: lack of a prompt payment regulation, which creates cash flow issues and stagnates growth; lack of a level playing field for local manufacturers and foreign investors; high cost of credit; poor infrastructure such as roads, utilities and security; corruption; and high cost of healthcare (Kenya Association of Manufacturers, 2018).

1.4 Kenya's rice industry

Rice consumption in Kenya has outpaced other staples at a growth rate of 12 percent per year (Short, Mulinge and Witwer, 2012). More recent figures forecast an annual 8 percent increase propelled by a growing preference for convenience food, especially in urban areas (Gitonga, 2020). Today, rice is the 3rd most consumed cereal in Kenya, after maize and wheat (IRRI, 2020). Rice is cultivated by an estimated 300 000 small-scale farming households in Central (Mwea), Western (Bunyala), Coast (Tana delta, Msambweni) and Nyanza provinces (Ahero, West Kano, Migori and Kuria) (Republic of Kenya Ministry of Agriculture, 2008). In 1966, NIB was established by the Government of Kenya to spearhead the development of irrigation schemes and promote milling enterprises and rice marketing in the country. There are three main value chains in the Kenyan rice subsector: the integrated large farm chain, the highly concentrated chain on the NIB schemes, and the traditional market value chain which is non-NIB irrigated and rain fed production (Short, Mulinge and Witwer, 2012).

In May 2008, on the occasion of the Fourth Tokyo International Conference on African Development, the Japan International Cooperation Agency and the Alliance for a Green Revolution in Africa the Coalition for African Rice Development (CARD) initiative was launched. The initiative, aimed at doubling rice production in Africa, created a consultative group of African countries, development partners and international institutions engaged in rice research and development.

As part of this strategy, in 2008, Kenya launched its first National Rice Strategy for the years 2008–2018 (Rice for Africa, 2018). In recognition of the rising importance of rice as a staple crop for consumers, the strategy announced government intentions to intervene in support of the rice sector, for example by developing new varieties, improving infrastructure, and providing advisory services on rice production. Under CARD, Kenya also developed the 2016–2026 roadmap for rice seed development. It also developed action plans to enhance integration between the rice strategy and the Comprehensive Africa Agriculture Development Programme investment plans (Rice for Africa, 2018). To promote value-addition, it established several rice mills in western Kenya (Atera, Onyancha and Majiwa, 2018).

Despite these efforts, rice production has increased only marginally and has been declining since 2016 (see Table 2). Today, 85 percent of Kenya's demand is fulfilled by imports through private traders mainly from India, the Republic of Korea and Thailand (Gitonga, 2020).

TABLE 2 Rice production, consumption and imports (thousands of tonnes) 2011–2017

Year	2011	2012	2013	2014	2015	2016	2017
Domestic production	89	98	98	98	103	68	54
Domestic consumption	392	488	509	557	550	577	693
Imports	318	402	420	471	459	518	646

Source: Authors' elaboration based on data from the Kenya National Bureau of Statistics.

The CARD initiative is now shifting to its second phase (CARD2). Under this new phase, Kenya will soon launch its second rice strategy for the period 2019–2030 (Rice for Africa, 2018). At the time of research, the main interventions continued to mainly target production and include, for instance, the expansion of the irrigation schemes.

In his review of African Rice Development Strategies (based on CARD initiatives), Demont (2013) posits that Kenya's strategy is biased towards supply-shifting investments (see Box 2), with these kinds of investments considered insufficient to make local food competitive, particularly in import-biased food markets. Kenyan consumers have not yet developed strong a preference for imports but the challenge will be that of "gaining market share with local production before consumers have the time to develop preferences for imported rice" (Demont, 2013, p. 179); it is for this reason that the country needs a well-balanced mix of simultaneous supply-shifting and value-adding investments.

BOX 2 Types of investment in the rice sector identified in the literature

"[A]gricultural investment into the domestic rice sector can be roughly categorized into (i) supply-shifting, (ii) value-adding and (iii) demand-lifting investments. Supply-shifting investments include direct and indirect support for rural infrastructure, human capital development, R&D, extension, intensification and access to land, seed, credit, inputs and mechanization. Value-adding investments include direct and indirect support for processing and storage capacity, R&D, quality upgrading and governance, capacity building and branding, labelling, identity creation and certification. […] Demand-lifting investments into the domestic rice sector include direct and indirect support for market infrastructure, value chain upgrading, R&D, capacity building, market information systems (MIS) and promotion (of domestic relative to imported rice)."

Source: Demont, M. 2013. Reversing urban bias in African rice markets: A review of 19 national rice development strategies. *Global Food Security*, 2(3): 172–181. https://doi.org/10.1016/j.gfs.2013.07.001

Despite the competitive and growing rural services market, agricultural mechanization in the rice sector remains weak. Kenya was one of the first users of tractors in sub-Saharan Africa (Pingali, 2007) and today the country has the highest number of tractors in the region, reflecting its move towards large scale, commercialized farming (World Bank, 2014). In an effort to promote the use of efficient technology, the country established the Agricultural Mechanization Research Institute in 2015, along with the inauguration of Agricultural Technology Development Centers and Agricultural Mechanization Services (Kenya Agricultural and Livestock Research Organization, 2020).

Despite these efforts, stakeholders note that the sector has lacked a coherent agricultural mechanization policy (Kenya Network for Dissemination of Agricultural Technologies, 2016). Lack of agricultural credit and high costs of spare parts and servicing were also identified as constraints to the trade in heavy farm equipment such as tractors (World Bank, 2014). Mechanization in the country is also concentrated geographically in the Rift Valley and Western Lowlands, and its demand has emerged mainly in the wheat sector (Diao, Silver and Takeshima, 2016).

With respect to irrigated rice, demand for mechanized harvesting has emerged mainly in West Africa, which has the greatest rice area on the continent and where rice has historically been grown as a staple (Otenga and Sant'Anna, 1999). In Kenya, however, a study conducted in Mwea found that mechanization in the rice sector fares well in milling, transportation and

land preparation but is weak in weeding, threshing and fertilizer application, with actors expressing the need for more coherence in policy as imported machinery does not match the availability of spare parts and maintenance services; additionally, awareness about available machinery also seems to be low partly due to weak or a lack of extension services (Makini *et al.*, 2017). Another study found that 73 percent farmers in Mwea hire tractor services from the private sector, 6 percent use their own tractors and 2 percent use tractors hired from the National Irrigation Board (NIB) (Muhunyu, 2012). Additionally, 78 tractors were acquired and distributed between 2014 and 2017 to promote mechanization in the rice sector (Government of Kenya, 2018a).

The experience of other countries, such as Senegal, prove that the private sector itself can promote mechanization in the rice sector when there are synergistic partnerships between the government or development actors and the private sector. One potential tool for such schemes is leasing (see Section 5 for a more comprehensive discussion).

1.5 The Mwea Rice Irrigation scheme

Located at the base of Mount Kenya about 100 km from Nairobi, the Mwea region is the predominant rice producing area in Kenya and is home to the three rice milling enterprises analysed for this study and described in the next section.

Mwea is one of the seven national irrigation schemes currently managed by the National Irrigation Board (NIB). Cultivating irrigated rice began under the British colonial regime in 1955, and continued after independence under the auspices of NIB from 1966 until 1998 when its management was passed over to the farmers (Kabutha and Mutero, 2002). During the period under NIB's management, the board provided farmers with agricultural inputs and services on credit, while farmers were allocated a quota for their own consumption and were to deliver the rest to NIB. Farmers would then receive the profits from NIB after deducting the cost of inputs and irrigation services. These arrangements, however, were subject to several weaknesses. Water distribution was not efficient, leading head users to over exploit this resource. NIB offered a much lower rate for paddy than the market price, and farmers were also unrepresented in the scheme's management, which ultimately resulted in an upheaval and in the liberalization of rice farming (Njeru, Mano and Otsuka, 2015).

Today in Mwea, 5 000 small-scale farmers (according to a key informant) are served by the irrigation scheme, which they manage jointly as the Mwea Rice Growers Multi Purpose Cooperative (MRGM). The Mwea rice scheme is the largest in Kenya, producing about 80 percent of the country's total production of rice (Gitonga, 2020). Approximately 12 000 hectares are allotted to the Mwea irrigation scheme, which is fed by two rivers, the Nyamindi and Thibi. Out of these, about 10 000 hectares are dedicated to irrigated paddy farming (Kenya National Irrigation Board, 2020). Rice is grown as a monocrop, sowed between July and August, and harvested between December and January (Kabutha and Mutero, 2002; Ngige, 2004). At the time of writing, the Mwea irrigation scheme is undergoing expansion which is expected to be finalized in 2021 (Gitonga, 2019). The two predominant varieties are Basmati 217 and 370, known locally as "Pishori", and Sindano BW 196 (Ngige, 2004).

A survey of the Mwea scheme conducted in 2011 (Muhunyu, 2012) found that the lack of a structured market and access to milling facilities were causing low farm gate prices. At that time, 96 percent of farmers in the scheme reported that they sold their paddy unmilled; 24 percent sold to brokers at the farm gate, 39 percent sold to brokers at the marketplace, 1 percent sold to the national cereals board, 35 percent sold to the cooperative society, and the rest was collected by money lenders. The survey noted that women have registered low levels of participation in trainings for rice production, though they do dominate in

local retail or trading. The author also notes that the lack of drying facilities contributed to high production costs via losses, and creates a threat to food safety, making local rice less competitive than imports (Muhunyu, 2012).

1.6 Introduction to the three rice milling enterprises

Kenya's national definition refers to micro, small and medium enterprises (MSMEs) as those companies that have a maximum of 99 employees and an annual turnover not exceeding USD 8.25 million (see Table 3).

◆ TABLE 3 Kenya's definition of micro, small and medium enterprises

Size	Number of employees	Annual turnover limit USD	Equipment investment+capital USD
Micro	1–9	<5 000	Up to 52 000
Small	10–49	5 000 to <52 000	More than 52 000 but less than 0.21 million
Medium	50–99	52 000 to 8.25 million	Not specified

Source: Dutch Good Growth Fund. 2015. *Update on key challenges for the "missing middle" in Kenya*. Amsterdam.

Based on this definition, ET Rice and Terra Mill are small firms, while Shine[2] can be considered a micro venture. The Dutch Good Growth Fund (2015) provides a more detailed categorization of SMEs in Kenya based on their analysis of World Bank Survey 2013 data (see Box 3).

Based on this categorization, Terra Mill and ET Rice can be considered moderate-growth businesses. ET Rice also exhibits characteristics of "the parallel entrepreneur-owned" type of enterprises (see Box 3) as the rice mill is only one of the owner's multiple businesses, which will be discussed later. Shine Millers, however, has only been recently initiated and cannot yet be categorized according to this typology. It is worth mentioning that the business was not started out of necessity but because of the owner's entrepreneurial desire to seize market opportunity, similar to the other two millers. Opportunity entrepreneurship has been found to create more growth-oriented enterprises (Fairlie and Fossen, 2017) and we speculate that Shine will emerge as a small and (moderate) growing business.

The three enterprises are also at different stages in their lifecycle.[3] While Terra Mill and ET Rice have reached a certain level of maturity and can theoretically access various financial sources such as venture capital, private equity or development finance institutions to finance expansion, Shine Rice is at an early stage for which there are few avenues of capital available for such traditional SMEs to move to the growth stage (see Figure 3) (Dutch Good Growth Fund, 2015). The financing needs of the firms will be further explored under Section 5.

[2] Names of firms are fictitious in order to preserve anonymity.

[3] It is well known that business features, behaviour and needs vary according to which stage in the lifecycle a firm is in, which can be summarized most simply as birth/startup, growth, maturity and finally, renewal or decline (Miller and Friesen, 1984).

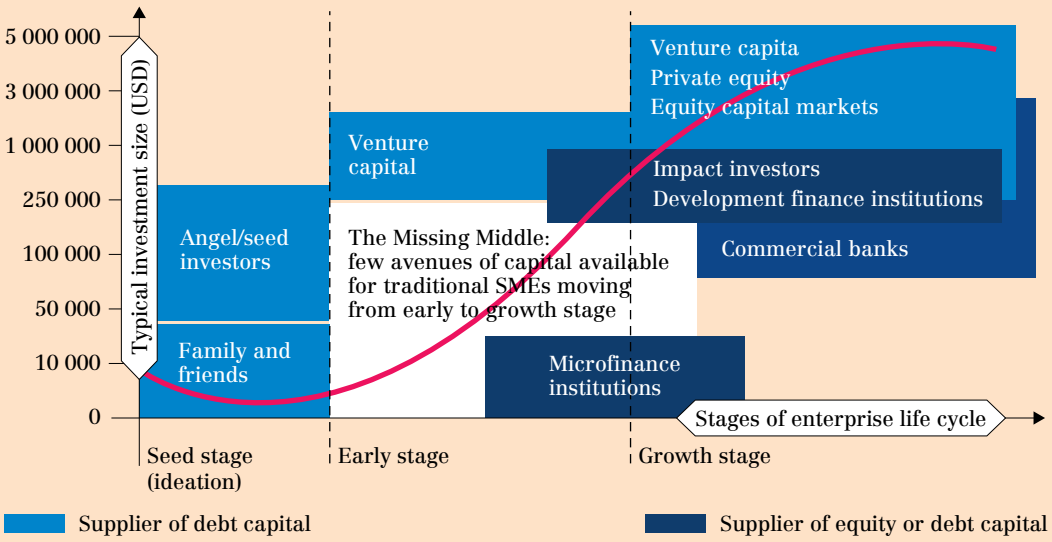
BOX 3 Categorization of Kenyan SMEs identified in the literature

The Dutch Good Growth Fund (2015) provides a more detailed categorization of SMEs in Kenya based on their analysis of World Bank Survey 2013 data, as follows:

- Gazelles: mature and high-growth businesses boasting high revenue, usually medium-sized and largely operating in the manufacturing sector.
- High-growth startups: usually micro or small in size, this segment represents only 7 percent of the sample and are mostly found in Nairobi's tech or financial sector.
- Moderate growth businesses: the largest number in the sample, experiencing incremental growth and operating in the agribusiness, manufacturing or trade sectors; they are often family businesses that have been operational for more than 10 years.
- Parallel and networks: those entrepreneurs starting multiple businesses (related or not) as they see growth in their first venture; they usually cross-finance their businesses because they see diversified activities as a strategy.
- Small and growing businesses: enterprises experiencing moderate growth, driven by market opportunity, often in the trade or services sector and have been in operation for more than five years, often led by teams with substantial experience.
- Successful necessity entrepreneurs: they own micro or small enterprises experiencing low growth and often benefitting from informal networks; however, limited business skills and a lack of systems often pose constraints on their growth.
- Necessity entrepreneurs: micro or small firms experiencing little to no growth, largely operating in rural areas, often not registered and focusing on subsistence or on generating income for the owner and family.

Source: Dutch Good Growth Fund. 2015. *Update on key challenges for the "missing middle" in Kenya*. Amsterdam.

FIGURE 3 Kenya's missing middle



Source: Dutch Good Growth Fund. 2015. *Update on key challenges for the "missing middle" in Kenya*. Amsterdam.

Within the rice sector, Ndirangu and Oyange (2019) estimate that there are about 16 medium and large-scale millers and 256 small-scale millers in Kenya. Small-scale millers use the simple one step process with a production capacity of 0.5 tonnes per hour.[4] The capacity of the medium and large mills varies from 1 to 22.5 tonnes per hour. The three interviewed firms fit into the medium-sized miller category, with an hourly capacity ranging from 2 to 4.5 tonnes.

All three millers compete with hundreds of micro scale enterprises looking to capitalize on the lucrative opportunity created by the irrigation scheme and the booming domestic consumption of rice.

1.7 Profile and growth trajectory

The three business models that form the basis of this analysis represent vastly different business strategies for rice milling in Kenya. What they have in common is the growth-oriented outlook of the owners and their quest to capitalize on the growing demand for rice in the country. Table 4 provides a brief overview of the millers.

TABLE 4 Overview of the three millers investigated

	ET Rice	Shine Millers	Terra Mill
Milling activities starting in	2011	2015	2005
Yearly turnover	USD 2.8 million	Figure not provided	USD 4.5 million
Hourly production capacity	5 tonnes (2 milling lines)	4 tonnes (2 milling lines)	4 tonnes (2 milling lines)
Number of permanent employees	28	4	40
Number of casual employees (up to)	0	12	160
Activities	Rice milling Sale of branded rice Production of animal feed from bran and grade 4 rice Production of husk briquettes (occasionally)	Wholesale of rice Production of animal feed and fertilizer Rice milling Drying services	Sale of branded rice Production of animal feed Agro-inputs store Agricultural services
Selling milled rice at (May 2018)	KES 160/kg (USD 1.42) (grade 1, branded)	KES 135–140/kg (USD 1.25) (generic)	KES 160/kg (USD 1.42) (grade 1, branded)
Main market	Supermarkets	Large national brands	Supermarkets

Note: Figures could not be validated or cross-checked with financial books.
Source: Authors' own elaboration based on interviews with the millers.

[4] In other countries, a capacity of 0.5 tonnes per hour is seen as a micro-scale operation (see, for instance, Ilie and Kelly [2021] for an analysis of rice millers in Senegal).

Terra Mill has the longest history in the community, as a cooperative representing most of the farmers in the region and being involved in rice production, processing and marketing. In addition to milling services and selling branded rice, they provide the widest range of services to their supplying farmers, often in exchange for paddy.

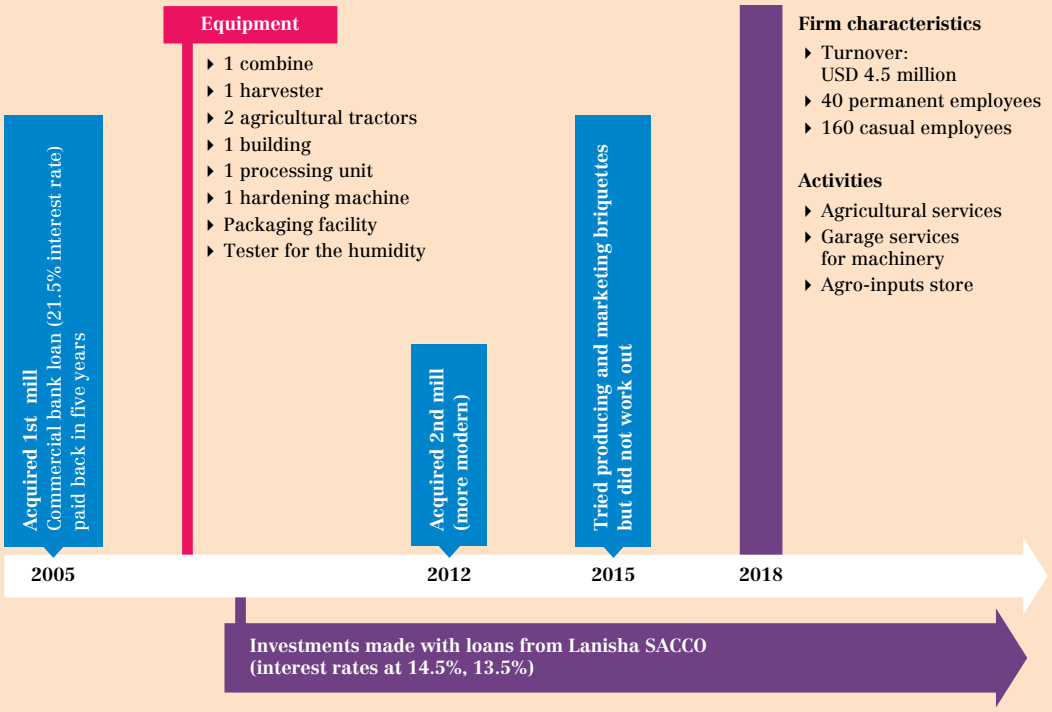
ET Rice was one of the first privately owned rice mills of its scale to be built in the Mwea irrigation scheme. Started in 2010, the original intention behind the investment was to create a brewery. The operation encountered resistance from the county government which refused to issue a licence for the operation despite a protracted court case. The owner then started milling maize before eventually switching to rice due to greater production volumes in the region. At the time of its establishment, ET Rice was only competing with a government-owned mill and some cottage enterprises. They built their strategy on services – providing a trading floor, transport services to farmers, drying, and free storage facilities. Since then, as production volumes have grown, milling enterprises have also proliferated throughout Mwea, and the company continues to strategize in order to grow its business in an ever-competitive environment.

During the mill's first year in operation it was serving roughly 200 local farmers. That figure has now increased to 560 consistent suppliers, comprised of farmers, traders and brokers (for the purposes of this case study brokers are those that interface between farmers and traders), though the owner estimates that 80 percent of the business is conducted with traders. The owner now considers his main investment need is to replace the old machines with more modern ones.

Shine Millers was launched in 2016 by a civil engineer who returned to Mwea after spending much of his adult life abroad. After a long absence he returned for a short visit, and seeing the positive potential of the new Mwea, decided to stay. His family operates other small enterprises in the region and the ability to collaborate with them to get his mill off the ground was appealing. Shine now purchases paddy to mill and then sell to some of the largest agrifood brands in the nation. Shine Millers, with its state-of-the-art facility imported from China and a trained engineer on staff, hopes to pursue a vertical integration strategy backstopped by access to superior technology. The new strategy would involve the micro firm entering into a joint venture with a Kenya-based biotech firm, in order to license a new, high performing variety of rice that would be grown exclusively by contracted out growers, with the objective of guaranteeing consistent high quality and unblended rice for their customers.

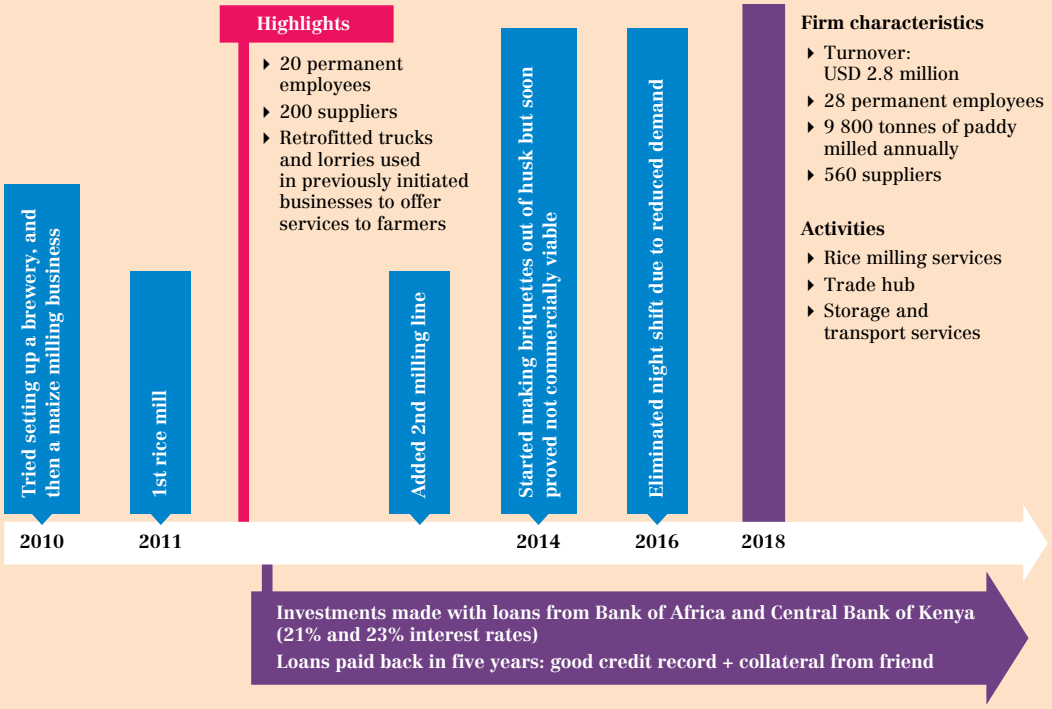
The three enterprises growth trajectory is depicted in Figures 4 to 6.

FIGURE 4 Terra Mill company timeline



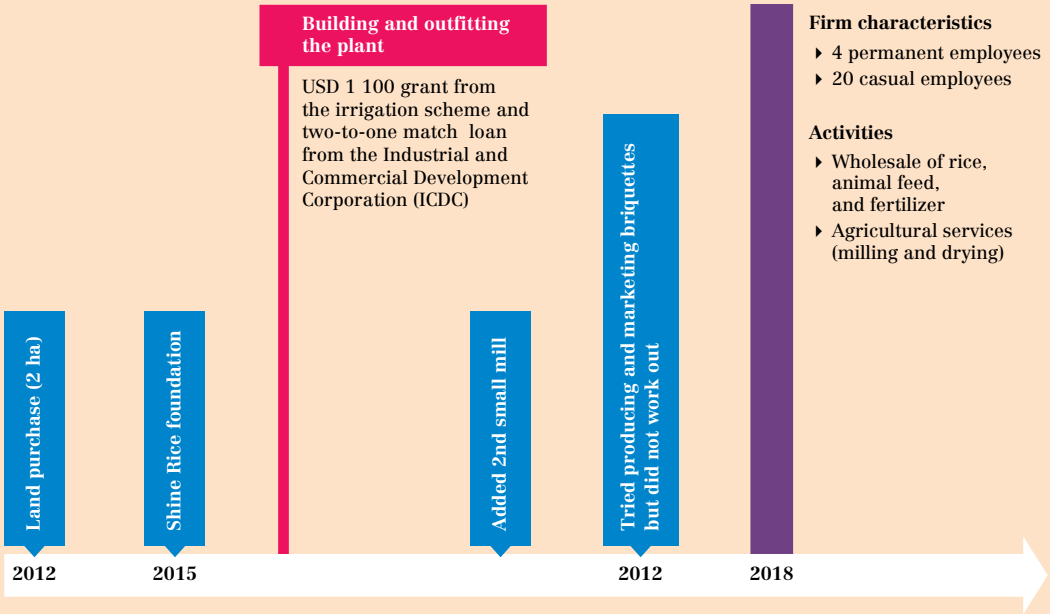
Source: Authors' own elaboration based on interviews with the millers.

FIGURE 5 ET Rice company timeline



Source: Authors' own elaboration based on interviews with the millers.

FIGURE 6 Shine Millers company timeline



Source: Authors' own elaboration based on interviews with the millers.

2 Procurement

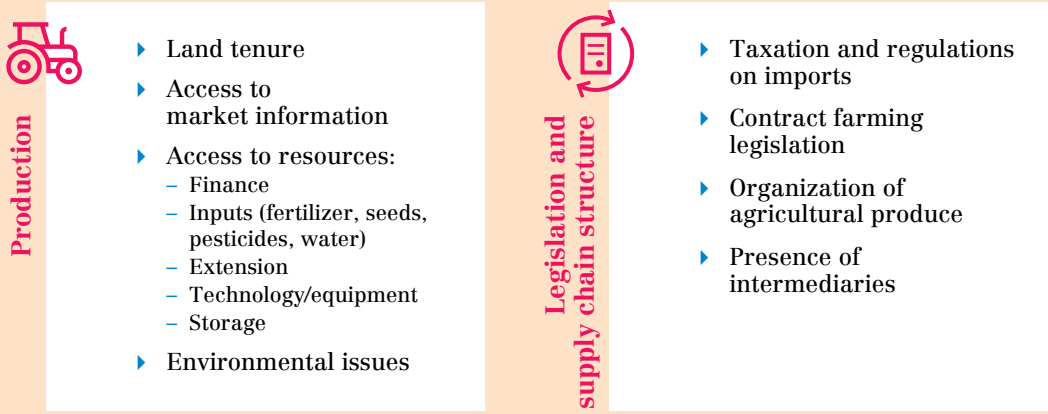
KEY MESSAGES

- Weaknesses along Kenya's rice value chain – including cash flow constraints, coordination among actors and poor technology – do not allow the sector to take off, despite supply-level investments and growing demand for rice in the country.
- Prevalent procurement arrangements currently in place involve farmers occasionally selling to millers directly, but in greater part to brokers and traders who come in the field to hoard the produce.
- Contract farming can be an effective way to strengthen vertical coordination in the chain but the millers cannot initiate such schemes because of their own financial challenges. Government intervention is needed to reduce transaction costs across the value chain.
- The rice value chain is characterized by weak cash flow, requiring government intervention and donors to acquire the tools for creating liquidity and easier access to credit. The experience of other countries shows that WRS could be a viable option in this case.

The procurement component of an agrifood manufacturer refers to any strategies or methods that the firm engages in to acquire the needed inputs, raw materials and services, at the right quality and for the best price. These acquisitions can include, for instance, raw agricultural produce, food ingredients, storage bags, packaging, factory equipment or services such as technical maintenance.

Any procurement activities are influenced by firm external factors such as farm practices, post-harvest handling, or supply chain structure including the presence of intermediaries, aggregators or cooperatives, all of these factors impacting on the quality and quantity of produce, as well as the price of the final product. Public infrastructure including roads or storage facilities, and the presence of service providers such as transporters are also key factors influencing a firm's procurement decisions. Figure 7 depicts the external factors shaping an agrifood firm's procurement strategy.

FIGURE 7 External factors shaping the procurement strategy of an agrifood manufacturer

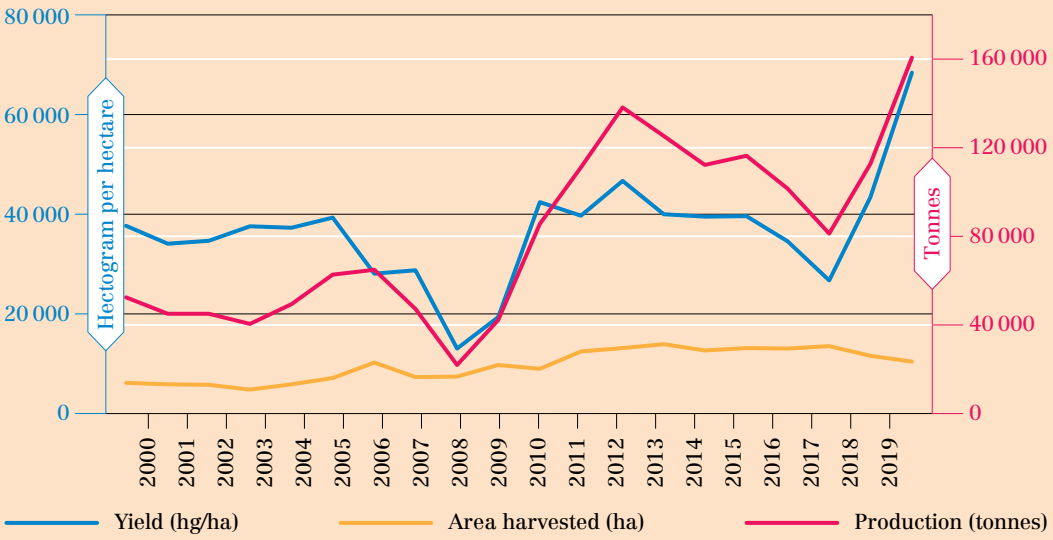


Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

2.1 Dealing with a shortage of paddy

Mwea has received important public investments in the primary production of rice, including the on-going expansion of the irrigated areas. Despite the government's efforts to increase yields by promoting fertilizer use, certified seed, and expanded irrigation, production of paddy has actually declined from 2012 to 2017 (see Figure 8). In 2016/2017, for instance, rice production decreased due to inadequate irrigation water because of the prevalent drought (USDA, 2017). Given the delays in the rehabilitation and expansion of the irrigation scheme, Kenya's rice production is expected to stagnate until at least2021 (Gitonga, 2019). Nonetheless, the past two years signal a potential recovery, as shown in Figure 8.

FIGURE 8 Paddy production statistics in Senegal

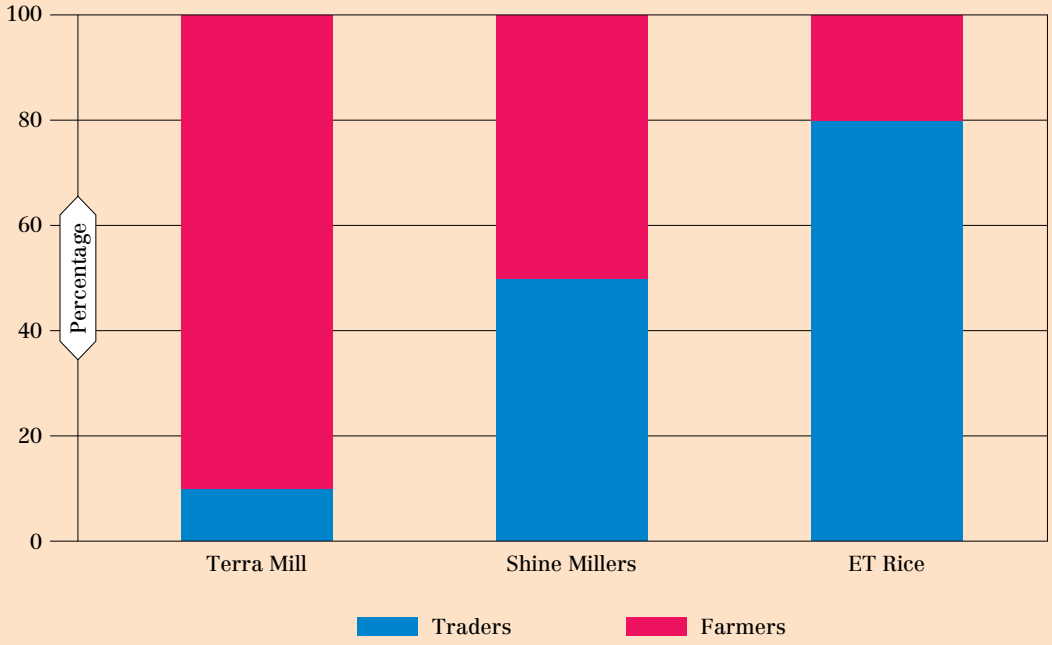


Source: FAO. 2021. FAOSTAT. In: *FAO*. Rome. Cited 4 December 2021. www.fao.org/faostat

Previous research has found that most of the installed capacity of the mills in Kenya was underutilized largely due to the lack of raw materials (Ndirangu and Oyange, 2019). This is also the main issue reported by the three mills in this study. In addition to the supply shortage, the sector is characterized by a large number of traders and middlemen who hoard the produce from farmers and offer it at market price to processors, diverting value for their own benefit and to the detriment of smallholders. As such, the aforementioned underproduction in the irrigation scheme along with weaknesses in the value chain – including the presence of many inefficient micro-mills – forces the companies to rely on traders for the procurement of paddy.

The procurement sources of the millers are depicted in Figure 9.

FIGURE 9 The procurement sources of the three millers



Source: Authors' own elaboration based on interviews with the millers.

The owner least connected to the local community said that this is considerably disadvantageous when it comes to securing supply, particularly in the low season between harvests. In Mwea, rural entrepreneurs with deep cultural ties in their local community have an advantage over "outsiders", as the owner of Shine Millers notes: "We had envisioned working directly with local farmers – but we didn't have the network or capacity to go out to the fields and secure sufficient supply to fulfil the orders." Shine Millers is attempting to initiate a contract grower scheme to assure supply prior to the harvest but how it will materialize is yet to be seen. As such, the miller currently lacks control over production, so Shine prefers not to pay its suppliers in advance in order to be able to reject the produce if the quality does not match expectations.

Despite having the deepest ties to this network, Terra Mill too must rely on traders and brokers from time to time to fill production shortfalls, going so far as to purchase milled rice from other enterprises to fill orders as a last resort. It was noted that farmers prefer selling to traders after paying their debt to Terra Mill for the services provided; this is because the middlemen offer a higher price on the spot, which helps farmers smooth any cash flow constraints.

Terra Mill's company leadership has worked with the Savings and Credit Cooperative Organization (SACCO) in Mwea to develop a wide array of pre- and post-harvest services for their contract farming scheme (see Box 4 for more information on contract farming in Kenya) including access to inputs, land preparation, use of combine harvesters and transport. All these services can be paid for in-kind with paddy, which has the added benefit of allowing the company to know in advance how much raw material they can expect, and at what time. Their model is predicated on receiving 15 bags of rice from each of their members during harvest. When the rice quality provided is poor, the farmer has to make up the deficit in the following seasons, but managers at Terra Mill report that this almost never happens. Terra Millalso provides credit for farmers in Mwea, though the credit is only available to its farmer members and offered under the form of inputs, with the crops serving as collateral.

BOX 4 Contract farming in Kenya

The literature indicates that contractual arrangements between farmers and private companies are common in Kenya. In terms of the legal framework, the country has measures on contract farming in product-specific legislation. Examples include the Kenya's Dairy Industry Act, aiming at regulating the entire dairy industry, including contracts between producers and processing and trading businesses; the Sugar Act, including detailed regulations and a standardized contract for use between growers and miller; and the Fresh Horticultural Produce Sales Act, which aims to serve as a guideline for drafting contracts between farmers and buyers for the sale of horticultural produce. Despite the advantages of contract farming, there is a lack of policy development and research to apply the approach to the rice sector. This is perhaps due to the fact that contract farming is mostly associated with high-value crops such as horticulture or high perishables such as dairy, and not for commodities that are hard to differentiate, such as rice.

Source: Pultrone, C. 2012. *An overview of contract farming: legal issues and challenges*. Rome, UNIDROIT.

ET Rice, on the other hand, deals with the shortage of paddy by focusing its business model on trading. The miller caters to the needs of its primary clients, the traders, by providing free storage (for the first three months) and a trading floor that is well situated in the most visible complex in the region with frontage directly on the road to Nairobi. Out of the 855 tonnes of white rice milled in a month, ET Rice sells about 600 tonnes under its own brand choosing paddy from "whoever's looks good". To maintain their supplier base for ET Rice branded rice, the company management states that they settle their accounts within three days of having rice delivered.

The millers report that it is difficult to find unblended paddy because the traders often mix Pishori with other varieties, which is an issue that only comes up at the milling stage. Shine has had to cancel certain procurement arrangements and has resorted to using the only supplier they trusted. Terra Mill, which procures 90 percent of its supply directly from farmers, does not experience this blending as a constraint except on occasions when they have had to reject paddy when the farmers have mixed ratoon crop with the original harvest. Blending can also occur after the milling stage and in this case various rice grades or varieties are mixed within a bag, which is offered at a lower price to cater to a wider range of consumers (see Section 6).

2.2 Price setting

The prevalent shortage of supply and growing demand in the country do not translate into high bargaining power for farmers around the price they receive from millers and traders. Rice producers are vulnerable due to significant fluctuations in farmgate prices, which are influenced by imports and international market prices. A 2016 study by the Marketing Department of Lake Basin Development Authority shows that rice is one of the commodities that exhibit the highest levels of year-on-year producer price volatility driven by "the varying availability of cheap Asian imports, tariff regimes, transport costs and distance to markets" (Atera, Onyancha and Majiwa, 2018, p. 69).

The millers appear to have some negotiating power around that price, and negotiations centre around the provision of other inbound logistic services. For example, at the time of research, Shine Millers paid KES 77 (USD 0.7) per kilogram of paddy at the gate of their facility. In contrast Terra Mill pays KES 63 (USD 0.57) but includes services such as transportation, and on and off loading. ET Rice was offering KES 70 (USD 0.67) at this time with transportation and offloading.

2.3 Banking with paddy in Mwea

Similar to other non-perishable crops (like cotton), the timing of imports and school fee schedules influence the availability of paddy on the market. Shine Millers reports that farmers in Mwea "bank with paddy". This is to say that the farmers who possess dry facilities will try to store as much paddy, for as long as possible, to take advantage of higher prices when these occur. Competition from cheaper imported rice not only place constraints on the demand side, but also on the supply side as farmers will choose not to bring their rice to be milled when rice from Pakistan or other Asian countries flood the market, causing a decrease in pricing. An important aspect of procurement for which this research has found numerous references is the influence that school fee schedules play in farmers' considerations about when to bring their products to market (for those who benefit from storage facilities). As confirmed by two of the companies, January and August often bring an uptick in paddy available in the area, as this is when fees must be paid. It is important to note that half the rural population reported that they pay school fees in Kenya in 2014 (Global Findex Database). This type of practice could pose safety and quality concerns since paddy needs to be stored in specific conditions and milled at an appropriate time (see Section 4).

Usually, the farmers' liquidity needs are addressed by traders who take advantage of this finance gap in the rural market, a role that cannot be undertaken by millers due to their own cash flow constraints. Most farmers require access to finance immediately after harvest; as a result, they sell the produce to traders and village-level aggregators who come to the field when the paddy is ready to be collected. Traders then sell the rice to millers at the prevailing market price, reducing farmers' margins to their own benefit.

Traders are also the second source of credit in the region after the Savings and Credit Cooperative Organization (SACCO); in this case, the crop is used as collateral and the interest rate is negotiable but can go up as high as 19 percent per month, as opposed to the 1 percent charged by the cooperative. However, in contrast to the cooperative, which advances inputs, the farmer is advanced cash that is then repaid in-kind. The farmers relying on credit from traders are also those who are worse off in terms of financial, physical and human capital (Njeru, Mano and Otsuka, 2015).

The millers recognize the importance of paying their suppliers on time but their own cash flow constraints (see Section 5 for a more in-depth description of the millers' financial needs) impedes them from taking on an active role in providing credit or other inputs.

To maintain their supplier base for ET branded rice, the company management states that they settle their accounts within three days of having rice delivered. Shine pays within the same day of delivery, which is particularly important since they do not benefit from strong ties with the local farmers. Terra Mill, however, pays its suppliers only after it collects paddy from all its farmers and sells the rice. The miller acknowledges that this strategy has cost the business as farmers often choose to sell their paddy to traders in the field or to other millers who offer quick payment, forcing Terra Mill in turn, to rely on buying paddy from outside the cooperative.

Alternative short-term credit mechanisms such as WRS have not yet been established in Kenya's rice sector (see Storage in Section 3.1).

2.4 Role of smallholder farmers cooperatives and unions

Terra Mill, being both a milling enterprise and a farmer's cooperative, offers interesting insights into sourcing arrangements. Their agreements with member farmers are flexible in that farmers are obliged to pay back any services rendered by the company with paddy, but are not otherwise contractually bound to sell to the company. Despite their proximity to each other as different branches of the same organization, the company still reports a series of challenges related to sourcing from their members. As discussed above, Terra Mill notes that due to the delay in payment, farmers often sell earlier to the traders and brokers who go to scout paddy in the fields.

Despite clear and defined policies in support of strengthening the cooperatives in Kenya's agricultural sector, Terra Mill feels that there is a lack of support and investment in this model to continue to play its role in protecting vulnerable populations and building capacities.

Kenya recognizes the importance of farmer-based organizations including farmer associations, farmer interest groups and cooperatives in its Agricultural Sector Growth and Transformation Strategy, which also views rice as a key strategic value chain. As such, new cooperatives in many commodity sectors, particularly in fresh produce, bananas and macadamia, are being set up (Government of Kenya, 2019). As discussed above, the government now focuses on expanding the irrigation scheme to increase production. There is currently no information on any potential initiatives related to strengthening cooperatives in the rice sector and empowering its members.

2.5 Conclusions

The three millers each take a different approach to addressing the shortage of paddy in the region. Shine Rice, for instance, has located itself in a more remote area to be closer to the farmers, but its strategy has not been as successful as hoped and the mill now procures half its raw materials from traders. ET Rice focuses on its service business with an emphasis on attracting traders as clients and also on procuring directly for their own brand when they bring good quality produce on-site. Terra Mill offers a wide range of services, including credit, to attract farmers; however, their inability to pay farmers on the spot means they must too often rely on traders.

Mwea's rice sector suffers from several interrelated challenges that do not allow the industry to fully take advantage of the growing demand. A lack of micro-financing for farmers who are also vulnerable to price fluctuations and are in need of immediate payments, especially when school fees are due, has translated into a business opportunity for traders who can easily hoard produce from the field. Simultaneously, investments in irrigation and agricultural production along with weak supply chains, have also led to the proliferation of

micro rice mills, filling the industry with inefficient players who divert produce away from more modern, commercially-oriented mills that are operating well below their capacity. These micro-type mills are characterized by poor technology, which also produces a poorer quality product.

Weaknesses in the supply chain, including cash flow constraints, have led to a proliferation of middlemen who often intermediate between farmers and processors. Tools such as WRS allow farmers to extend the sales period for paddy beyond the harvesting season, helping them to smooth their cash flow. However, the right legal and regulatory environment should be put in place for such schemes to work. These would also require certain preconditions (see Lacroix and Varangis [1996]). Kelly and Ilie (2021) explore the success of arrangements involving WRS and marketing contracts in the rice sector of Senegal. As discussed, the private sector is already trying to fill the gap in rural services by providing storage facilities, for example. However, storage conditions are currently not appropriate. Further incentives and training can be provided to develop a warehouse industry that considers the quality and safety requirements of rice (see Section 3).

Contract farming could constitute an effective instrument to strengthen vertical coordination in the chain, which is currently weak. This type of arrangement can "reduce food safety risks, prove compliance with corporate social responsibility criteria, and comply with statutory requirements of tracking and tracing" (Jia and Bijman, 2013, p. 34). In staple food chains, contract farming is theoretically difficult to be applied given that: price premiums are limited due to narrow possibilities for quality and value-upgrading; contract breaches are more likely because of the ease of storage and transportation due to low perishability; and the presence of many small buyers resulting in opportunities sales (Maertens and Vande Velde, 2017). Despite this, contract farming has started to emerge in cereal chains in sub-Sahara African countries, being backed by the demand for high-quality grains and national policies aimed at the modernization of domestic chains, along with support from development organizations (Soullier and Moustier, 2018). Contract farming in the rice sector has also proved to be an effective tool for value-chain development that is inclusive of smallholders, as demonstrated through research conducted in Benin, Togo, Madagascar, and Vietnam (Adabe, 2017; Ba *et al.*, 2019; Bellemare, 2012; Maertens and Vande Velde, 2017).

The three rice millers in Kenya, however, cannot engage in such arrangements because of their own challenges including financial constraints. More research is necessary to understand the advantages that might be conferred by working directly with a milling enterprise as a contract grower, as opposed to the arrangements currently in place in which farmers sell occasionally to the millers directly, but in greater part to brokers and traders. Out grower schemes have been employed with success in other irrigated rice schemes (see Ilie and Kelly [2021] for Senegal), but require backstopping in the form of tripartite agreements from public sector institutions and commercial lenders in order to be initially adopted by millers there.

Overall, the section shows that further supply-level investments should be accompanied by efforts to solve the bottlenecks along the value chain such as cash flow constraints or quality concerns (which will be covered in more depth under Sections 3 and 4).

3 Logistics

KEY MESSAGES

- Traders and rice millers are filling gaps in Kenya's rural services market, such as by providing storage or transportation.
- However, their role in ensuring the quality and safety of the final product is limited by weak regulation and infrastructure that translate into high costs and improper post-harvest practices such as poor storage.
- As such, supply-level investments require further investments down the chain to ensure that there is sufficient capacity to deal with increasing produce, and that actors are able to comply with food safety and quality standards while also providing a product that local consumers can afford.
- The millers could benefit from government or donor support both financially (e.g. to build proper warehouses) and technically (e.g. to implement good storage practices).
- Nonetheless, ensuring the safety and quality of milled rice requires the business to obtain detailed information on the practices of their suppliers and the origins of the paddy.
- Collaborative efforts between rice millers and the government are needed to conduct the more costly and complex chemical analyses required for a safe product.

Logistics activities are an essential component in the business models of agrifood firms as these are critical to ensuring the safety, quality and quantity of agrifood products. Such activities can include storage, transportation, packaging, inventory management or any kind of product-handling that occurs along the value chain. The efficiency of these practices largely depends on the quality of public infrastructure and the presence of service providers close to production zones. Similarly, the wider business enabling environment such as food safety compliance and certification processes will also influence the value that agrifood firms can add to the final product; these factors are summarized in Figure 10.

Not only timely harvesting and good agricultural practices influence the quality and safety of paddy and milled rice but also logistics activities, such as drying and storage, have an effect. Food safety issues specific to rice include contamination at unsafe levels by aflatoxins, pesticide residues and arsenic. Preventing food safety and quality problems related to rice requires good agricultural practices (GAP), including harvesting, drying and storage. While food safety is concerned with ensuring that food is not harmful to the health of the consumer, food quality is related to other attributes that might affect the value of the food, such as origin, colour, flavour, texture or processing method (FAO and WHO, 2003).

With respect to paddy, its quality is determined by the maturity of kernels, size and shape, fissures, or contaminants such as dirt or stones. With respect to milled rice, its quality is characterized by a high milling recovery, high head recovery and no discoloration.

An important safety issue characteristic to paddy and rice is contamination with aflatoxin (JECFA, 2018), a toxin produced by fungi that prosper in warm and humid environments (WHO, 2018b). Data on aflatoxin contamination of rice is mainly from developed countries; it is imperative that the risk of contamination in developing countries be assessed, especially in those countries with a high per capita consumption of rice (WHO and FAO, 2017). Controlling aflatoxins is complex and calls for an integrated approach across the whole value chain (JECFA, 2018; WHO, 2018b).

While the quality of rice is visible and can easily be detected by buyers and consumers, safety aspects require complex analyses methods that are not readily available and can be very costly. Generally, small food manufacturers in developing countries lack the motivation to invest in quality and safety as they believe that consumers will not pay for the increased costs (FAO, 2016).

FIGURE 10 External factors influencing the logistics of agrifood manufacturers

Logistics

- Infrastructure and access to support services:
  - Transportation
  - Storage
  - Cold chain
  - Packaging and traceability
- Legislation on food quality and safety

Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

3.1 Inbound logistics practices and costs

It is clear that paddy rice being a scarce and valuable commodity has greatly assisted in the proliferation of inbound logistic services in the region – drying, bagging and transporting or even extension services – which, whether provided by the mills themselves or independent rural entrepreneurs and day labourers, are offered at competitive prices to farmers and traders in Mwea. In this sense, agri-SMEs in the irrigation scheme are finding opportunities in the underdeveloped formal market for services – transportation, storage or extension – to make these available to suppliers and secure paddy for their operations. The costs of such activities are summarized in Figure 11.

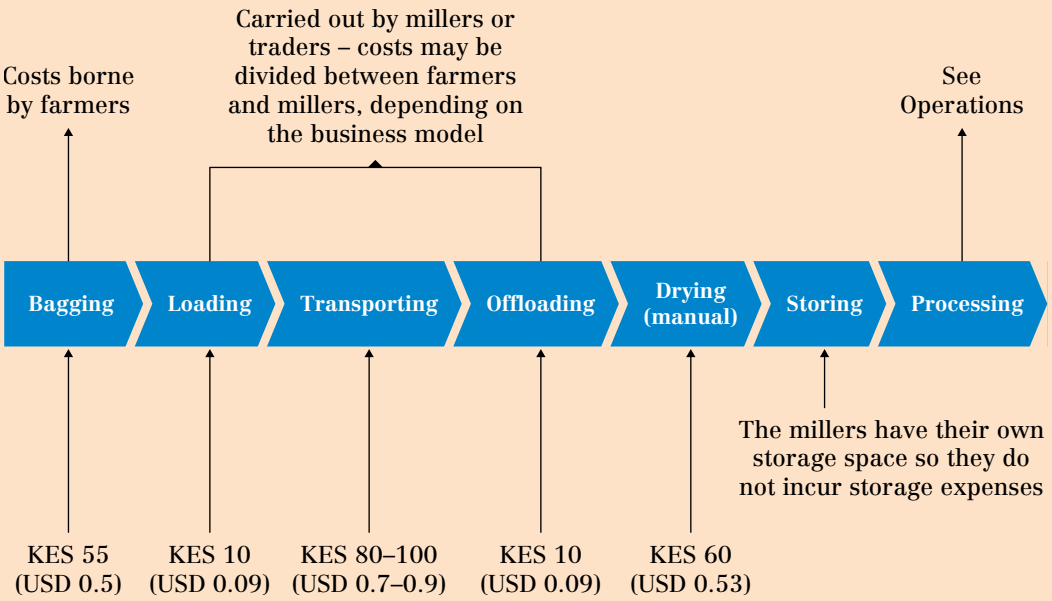
As discussed under Procurement, MGRM addresses competition for supply by offering land preparation (use of tractor), use of combine harvesters, a 70 percent advance on payment, transport and even assistance to pay school fees. They also send out staff to consult with the farmers and follow up in order to provide better customer care and maintain established relations with their suppliers.

ET Rice further incentivizes farmers and traders by offering free storage and transportation. Providing transport services is a key part of ET Rice's approach, which has hinged on creating a "one stop shop" service for rice farmers and other value chain actors. The ET Rice premises serve as a transport and trading hub. As a service to farmers, the company offers pick up, with the stipulation of a minimum of 20 bags of paddy for use of one of the company's four, three-ton pickup trucks, and 50 bags for the use of one of their

four, seven-tonne trucks. The miller also offers free storage to traders and farmers for up to three months and will start charging KES 100 (USD 0.9) per bag per month after this period.

As opposed to the other two companies, Shine does not offer transportation or storage but rather advisory services to farmers; the miller chose its location next to its suppliers, allowing for close collaboration to encourage good production techniques and obtain good quality rice.

FIGURE 11 Distribution of logistics costs for a bag of paddy



Source: Authors' own elaboration based on interviews with the millers.

Figure 11 depicts an estimation of inbound logistics-related costs for a bag of paddy and a maximum distance of 14 km from farm to factory. As such, the costs can reach KES 235 (USD 2.08) for 80 kg of paddy.[5] Transportation represents the highest inbound logistics cost accounting for 37 percent, followed by manual drying (28 percent), bagging (26 percent) and paddy handling (9 percent).

Transportation

Kenya's Logistics Index[6] was estimated at 2.55 (out of 5) in 2018, higher than the sub-Saharan average of 2.20 but lower than its own 2016 score of 3.21 (World Bank, 2018a). Infrastructure development has been a priority in the country; for example, the development programme known as Kenya Vision 2030 affirms that: "By 2030, it will become impossible to refer to any region of the country as remote" (Government of Kenya, 2007, p. 6). Rural infrastructure development falls under the remit of Kenya's Rural Roads Authority (KeRRA), which is responsible for constructing, maintaining and managing the rural roads network. Many KeRRA projects are made in collaboration with external donors such as the European Union. In Kiriyanga, Mwea's county covering the irrigation scheme, 248 km were either completed or in progress in 2016 (KeRRA, 2020).

[5] Figures provided are estimates and have not been cross-checked with the financial books.

[6] The Logistics Performance Index, measured by The World Bank, captures the quality of trade and transport-related infrastructure, on a scale from 1=low to 5=high.

Inbound transportation costs remain very high because of both the poor road network and the inefficiencies of the transportation system. For instance, transportation costs are 27.5 percent of the final market price of grains in the country (ReCAP, 2015). This is in contrast to the coffee sector where transportation accounts for 6 to 7 percent of the total value (Kiringai, 2011). A recent SME study found that 74 percent of surveyed agrifood firms were satisfied with the quality of logistics services but 65 percent noted that they are too expensive (ITC, 2019).

In Mwea, the NIB was initially responsible for transporting rice but after the liberalization of rice farming, farmers have been responsible for the scheme's tertiary infrastructure (Kenya National Irrigation Board, 2020). Transportation in Mwea's rice sector has more recently been undertaken by brokers and millers who have the ability to gather produce and take advantage of economies of scale. All the paddy is brought to Shine's mills in transport arranged by the brokers who charge KES 1 (USD 0.009) per kilogram of paddy. The going rate for onloading and offloading is KES 8 to 10 (USD 0.07-0.09) per bag,[7] which is done by the miller's casual workers.

Terra Mill owns a large truck and 10 trailers that can be used to transport paddy from its farmers who are all located within a 14 km radius of the mill. At times, however, they ask farmers to bring the paddy themselves, in which case they will pay an additional KES 100 (USD 0.9) per bag. During periods of heavy rainfall, the roads become impassable for the trucks, but the company is able to traverse them using tractors and trailers to haul the paddy. Staff labour is used to drive and offload the bags, the charge for which is KES 10 (USD 0.09) per bag. Terra Mill does not directly charge its farmers for transportation but pays its farmers less than the other millers to account for these costs.

ET Rice focuses its business models on the trading, so providing transportation is a key part of its approach to attracting clientele. As discussed, its premises serve as a transport and trading hub. As a service to farmers, the company offers pick up, with the stipulation of a minimum of 20 bags of paddy for use of one of the company's four, three-tonne pickup trucks, and 50 bags for the use of one of their four, seven-tonne trucks. In addition to the transport services available directly from ET Rice Millers, local donkey cart operators are allowed to station at the mill to transport paddy for a fee.

The experience of millers in the Mwea region challenges the often-repeated notion that transportation infrastructure is a major constraint to doing business in the area, as entrepreneurs refuted this as a challenge to their businesses. The most remotely located business, Shine, said that even during the height of the rainy season the road is traversable enough that it does not impede regular business operations. Terra Mill noted that at times the weather can be challenging for transportation but in these cases, their tractors with trailers can reach areas that the trucks cannot. On the outbound side, the highway into Thika and on to Nairobi is well maintained and unaffected by weather conditions.

Bagging

Terra Mill supplies to their farmers bags that can hold 80 kg of paddy, for which they charge KES 55 (USD 0.5) each. Shine also provides bags for use by the farmers and traders, however, they have made them at a lower gauge than the bags produced locally. These can hold 60 kg of paddy and cost KES 30 (USD 0.27) each. In addition to lowering the heavy burden for the workers, Shine prefers the smaller bags Shineas they reduce spoilage and loss. Previously Shine lost rice due to poor quality bags used locally that sometimes cannot bear the weight of the paddy.

[7] Generally, bags in Mwea are made for about 80 kg of paddy but can even go up to 100 kg.

Given its focus on transportation and storage, ETclients and suppliers at ET Rice use their own bags and are in charge of packaging the product.

Storage

The development of upgraded storage facilities and a functioning WRS have been a government priority in recent years. In 2014, the government launched an initiative to build 18 storage facilities, ultimately constructing 10 across several regions in the country, including the Mwea region. In addition, it operationalized 44 collection centres (out of 118 planned), and certified 6 warehouses offering WRS services (Government of Kenya, 2018). Recently, the government committed to creating new storage facilities and to rehabilitating old ones by using competitive bidding to allocate storage to private sector, and implement real-time digital monitoring of all stocks (Government of Kenya, 2019). Kenya does not currently have a legal framework for warehouse receipting but has recently drafted the legislation, which is currently being revised. Passing the warehouse receipt bill is identified as a reform that could potentially enhance access to finance and boost agricultural productivity (World Bank, 2018b); cash flow constraints experienced by both farmers and millers in the rice sector further emphasize this need.

As discussed, ET Rice places emphasis on its trading business; traders and farmers can store their rice for up to three months free of charge, after which they will incur a monthly fee of KES 100 (USD 0.9) per bag. Naturally, the mill prefers to work with clients who mill more consistently rather than take advantage of the storage, so they will cater more to retaining such farmers and traders and make storage decisions around this. Their storage capacity is estimated at 1 820 tonnes of paddy which is stored in bags placed directly on the storage room floor. There have been infrequent complaints from traders about spoilage of their paddy, which company policy stipulates will be reimbursed.

Shine can store about 100 000 bags of paddy but generally everything is processed within two days due to cash flow constraints (see Section 5). Terra Mill, on the other hand, states that the paddy can be stored at the mill for up to nine months in their storage space, which has a capacity of 60 000 bags of about 90 kg.

A lack of proper and sufficient storage in the rice sector of Mwea has been identified as a problem in previous literature (Mugane, 2010; Ndirangu and Oyange, 2019). Of the warehouses recently constructed through the government, they do not impact the business operations of the featured companies with respect to paddy storage. For two of the enterprises, providing storage services is a key part of their business model, helping them to attract and retain clients and suppliers. Speculatively, the penetration of more warehousing services – either provided by the public sector as proposed or by private providers – will affect the millers use of storage services as part of their profit models, either through competition or beneficially by helping smooth the effects of seasonality on supply and regularizing access to paddy throughout the year.

Service millers like ET Rice offer storage but also look to incentivize quicker turnover. When asked who is their preferred client, the management responded “someone who will mill right away”. However, in that facility, and likely in others in the area, the storage space was porous, and bags were kept directly on the dirt floor, raising safety and quality concerns. Proper storage of rice requires monitoring a number of factors, including moisture, temperature, mechanical or insect damage, aeriation and the presence of fungi (JECFA, 2018).

Drying

Drying is an important logistics activity on the inbound side as it has important implications for the safety and quality of rice; as such, paddy should be dried as soon as possible after threshing so that it reaches the ideal amount of moisture of 14 percent. Improper drying can result in moulds forming or in fissures in the grain, leading to higher breakage during milling. Drying can be done either manually, such as by spreading grains under the sun on the ground, or mechanically by using drying equipment (IRRI, 2013).

The labour requirements for this activity, when done manually, is one factor that makes farmers immediately sell their paddy at low prices to traders in the field (Makini *et al.*, 2017). In terms of costs, sun drying is estimated at KES 60 (USD 0.55) to KES 70 (USD 0.65) for a bag of approximately 60 kg. This is comparable to the fee charged by Shine for machine drying which is KES 1 per kg.

Terra Mill and Shine Rice both use a partially husk-fired furnace to dry paddy. This helps keep their rice free of contaminants when compared to the traditional method employed by independent labourers (not mill employees) at ET Rice (drying the paddy on tarps laid out in the sun outside the milling facility). In this case, drying is under the responsibility of farmers. Procuring a dryer is one of the main investment needs identified by ET Rice, which acknowledges the benefits that such a machine could bring. Currently, drying takes two days in the sun and even longer during cloudy days. A dryer would allow them to complete all tasks, including processing, within a day.

Nonetheless, Terra Mill states that they also have to dry the paddy in the sun before using the drier if the moisture level exceeds 15 percent, which can happen during the rainy season due to inefficient transportation or storage.

While this activity does offer a source of income for such workers – ostensibly those without access to land – it has an added disadvantage that relying on this method alone means ET Rice often cannot dry rice for days at a time during the rainy season.

3.2 Outbound logistics

Each mill has taken on varying levels of integration with respect to the outbound logistics side of their business model. Consistent with their strategy on the procurement side, Shine does the most post-milling transport themselves, using the family truck to take the produce to the large packhouses located 50 km away in Thika where buyers also sample the product. The founder of Shine Rice comes from a family of entrepreneurs running businesses in the area, which gives them a considerable advantage. As such, they are able to share the use of one truck for outbound logistics, a cost-effective approach. In this case, the fuel cost of delivering breaks down to KES 1 or 2 a bag.

ET Rice, with its focus on working with trading networks, does not take on any outbound logistics activities at all, but rather relies on their visibility in the community and strong brand association with Mwea Pishori rice to attract customers who purchase and transport generic rice themselves to urban retail outlets and wholesale markets. Concerning ET branded rice, however, most is sold from the retail outlets located on the owner's property adjacent to the main road, about 200 metres from the mill; the outbound transportation costs, as such, are minimal. ET Rice packages its milled rice in 5 kg polythene bags sourced domestically at KES 20 (USD 0.18). Alternative sacks are available for KES 15 but they are less attractive.

Terra Mill takes the popular approach of hiring outbound logistics services from outside. They are able to stock their two retail outlets in Mwea themselves, as well as wholesaling to brands who pick up in the region. To stock retail outlets and wholesale to major Nairobi-

based brands, they pay KES 15 000 (USD 137) per 10 tonnes delivered there. Terra Mill has its own packaging facility where rice is packed in bags of 1, 2 or 5 kg. They report that the costs of packaging in a branded bag of 1 kg is KES 17 (USD 0.15).

3.3 Conclusions

The efficiency of logistics represents a key element in developing the rice value chain, of which the millers in Mwea have become aware. Given the gap in the market of rural services, the millers have diversified away from their core business to compensate for various inefficiencies and have also leveraged their close position to the community. As such, along with traders and brokers, rice millers in Kenya have filled in the rural services market gaps such as in transportation and storage. Since the availability of technology at the farm-level in Mwea's rice sector is still weak, the government could tap into the millers' vested interest in obtaining good quality paddy to promote agricultural mechanization in the region.

Additionally, while the millers provide a strong value proposition for the logistics needs of farmers, there are still areas that impede them from fully fulfilling their role in providing an affordable and high quality local product to the market. For instance, improper storage practices have been observed and so, the millers could benefit from government support both financially (to build proper warehouses) and technically (to implement good storage practices). The farmers' need for micro-finance could also be addressed through a WRS, which would also require government supervision, as discussed in Section 2.

Recently, the government initiated an institutional rice buying initiative, designating the Kenya National Trading Cooperation (KNTC) as an anchor for procuring and distributing rice from the cooperative's mill to various national institutions (Kenya News Agency, 2020; KNTC, 2020). In this case, KNTC provides warehousing services as well as delivery to customers. It is yet to be seen what the implications of these arrangements are for the business of the millers in the region.

As discussed in the introduction to this section, there are important food safety risks faced by the millers at the logistics stage including procuring and handling paddy with unsafe levels of pesticides, aflatoxins or heavy metals. To assess such risks requires analytical techniques and expert know-how, neither of which is readily available to most rice millers. As mentioned, there are indications that drying and storage are not currently being done according to safety and quality requirements. Business owners and managers can obtain detailed information on the practices of their suppliers and the origins of the paddy. Collaborative efforts between rice millers and the government can further be established in this case to conduct the more costly and complex chemical analyses required for a safe and high-quality product.

4 Operations

KEY MESSAGES

- Equipment is an important factor underpinning competitive advantage in the rice sector, affecting the operational costs incurred by the millers and the quality of the final product.
- Nonetheless, purchasing machinery and equipment for the millers in the study has brought about such challenges as unreliable sellers. The provision of advisory services with respect to technology is an area of support that can be considered by donors or the government.
- The government can help the millers to become more sustainable by removing constraints in the enabling environment; for instance, high operational costs have discouraged the production of briquettes from leftover husks.
- Electricity represents one of the higher expenses for the millers; the sector could benefit from identifying feasible strategies for decreasing costs and increasing access to electricity particularly for small and medium manufacturers in rural areas.

For the purpose of this study, we refer to operations as those in-house activities that add value to the product, including the physical processing and the flow of the product through the manufacturing process. The availability of technology and skilled labour, as well as the quality of the physical infrastructure in the country (e.g. water or energy utilities) are among factors that can significantly influence these activities. Together with logistics, operations can have important implications for the safety, quality and nutritional content of the final product. Legislation on elements such as greening the operations of manufacturers, or food safety and quality certification can also provide incentives or disincentives to businesses, ultimately determining the value of the final product. Figure 12 depicts the main external factors impacting on the operations of agrifood manufacturers.

FIGURE 12 External factors shaping the operations of an agrifood manufacturer

Operations

- Access to equipment and technology
- Infrastructure
  - Access to electricity
  - Access to water
  - Sanitation
- Environmental compliance
- Legislation on nutrition
- Legislation on food safety and quality

Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

4.1 A year in the life of a factory

As discussed in Section 2.4, there are an estimated 16 medium and large-scale millers and 256 small-scale millers currently operating in the country. Small-scale millers use the simple one-step process with a production capacity of 0.5 tonnes per hour. Medium-scale millers have at least a rice milling chain or compound rice mill, drying yard, pre-cleaner, husker, de-stoner, grader, bucket elevators, weighing scale and a packaging unit. Finally, large-scale millers own at least a rice milling chain or compound rice mill, drying yard, mechanical dryer, pre-cleaner, husker, de-stoner, colour sorter, bucket elevators, weighing scale and a packaging unit (Ndirangu and Oyange, 2019). The three mills featured here fit within the category of medium sized enterprises.

In their first year in operation, ET Rice had one milling line, purchased in China, and employed 20 people. This was followed by a second line and eight more employees. However, as the competition for paddy increased, they were forced to eliminate their night shift, instead using overtime sporadically through the high season, which runs from September through the end of December. During this time, the mill runs 12 hours a day, six days a week, at full capacity. December is the busiest month; in 2017, for instance, they were able to produce 1 467 tonnes of rice. During the low season, the mill scales back to run just one line when there is enough rice. Effectively, the mill runs at 50 percent capacity from August through October. At the tail end of the high season, they are able to keep production elevated through June by the roughly 30 percent of farmers in the irrigation scheme who are double cropping.

For Shine, 2017 was the first season that the plant was able to produce consistently. During their first season in operation, problems sourcing electricity ruined their output. This was resolved by running their own line to the plant, but in season two a drought greatly reduced rice production in Mwea. Nonetheless, they still lack clarity about what a typical season might look like in terms of the volume of their throughput.

Shine invested in more advanced technologies for the mill to be able to supply larger brands – the main production line includes an additional machine for removing impurities, a husk furnace that powers a dryer, a new de-stoner, de-husker, separator, three polishers, the grader and an LED colour sorter. They also invested in a tester to help detect bad rice before it is packaged for a client. The facility can process four tonnes an hour. They also own a small-scale mill that they use to process small quantities as a service. During peak season, they operate 12 hours a day at full capacity.

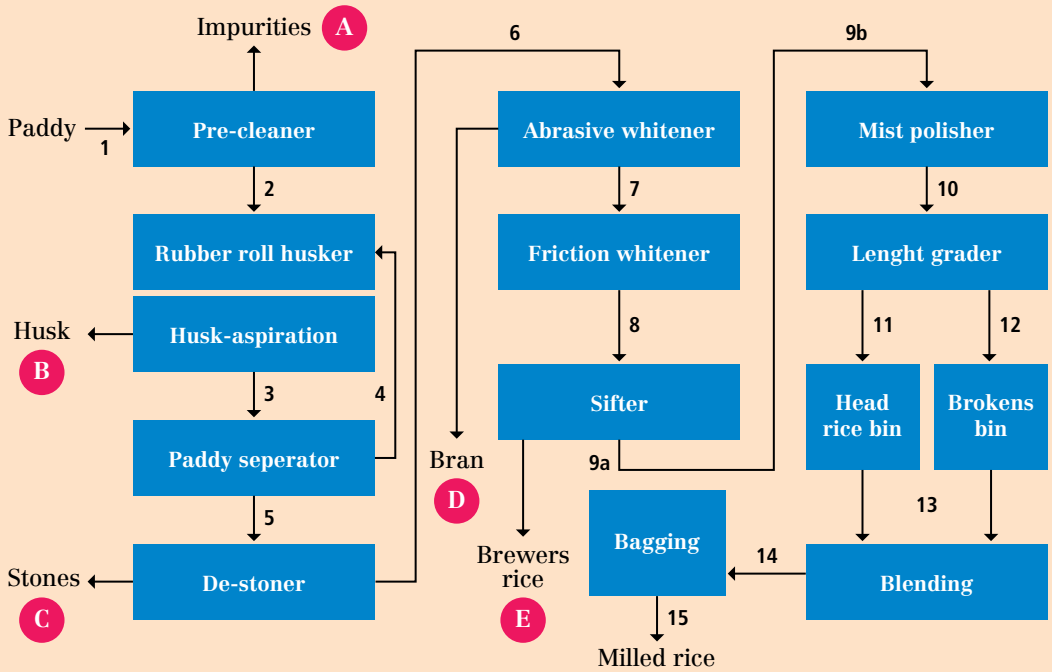
When demand is high, Terra Mill generally works on two shifts of eight hours each and can process up to 2 000 bags of paddy in a day, meaning around 160 to 180 tonnes; this falls to one shift during the low season when they process 300 bags a day, or an estimated 27 tonnes. Rice acquisition fluctuates from year to year, recently ranging from 36 000 bags to 50 000 bags processed across the year. They use specialized equipment to test the moisture content and quality of the grain, and they reject any paddy that does not meet their standard of a 40 percent recovery rate.

4.2 Milling equipment as a factor of competitive advantage

The modern milling process generally includes 11 functions and has the objectives to produce edible rice that is appealing to the consumer (free of husks and foreign matter), to maximize milled rice recovery and minimize grain breakage (IRRI, 2020). Figure 13 depicts the flow of paddy and processes undertaken by a modern mill.[8]

[8] All technical specifications in this section are drawn from IRRI's Rice Knowledge Bank (2020) unless otherwise stated.

FIGURE 13 The modern milling process carried out by a commercial mill



Source: IRRI (International Rice Research Institute). 2019. Producing good quality milled rice. In: *IRRI Rice Knowledge Bank*. Los Banos, USA. Cited 18 July 2021. www.knowledgebank.irri.org/step-by-step-production/postharvest/milling/producing-good-quality-milled-rice

The produce is first unloaded into the pre-cleaner (1), which removes impurities such as straws or empty grains. The paddy then moves to the rubber roll (2) where the husk (B) is removed by an aspirator. A mixture of brown rice and unhusked paddy passes to the paddy separator (3) where the latter is returned to the husker (4) and the former is forwarded to the de-stoner (5), which removes small stones (C). Following this, the bran (D) is removed from the paddy, first by abrasion (6), and second by friction (7), resulting in white rice (generally 8–10 percent bran removal), which moves to the sifter (8) where small fragments of grains are removed, a by-product known as brewers rice (E). While simple mills will then move the white rice directly to the bagging station (9a), more sophisticated machines will pass it to the polisher (9b) – there can be various degrees of polishing. Polished rice is moved to the grader (10), which sorts the grains by length, separating broken grains (12) and head rice (11) into different bins. These are then blended (13) according to the specifications pre-set by the miller. The custom-made blend is finally bagged (14) and sent to the market (15).

The Kenyan firms interviewed reported that there are great incentives to invest in upgraded milling equipment consistently capable of minimizing broken grains and ensuring other quality characteristics. As Shine is a wholesaler for larger brands with stringent requirements, they have to be more meticulous and have invested in better technology to monitor quality, such as an LED colour sorter and a grain tester. While consumers in Kenya who can afford to buy local Pishori rice (which retails for more than the Pakistani rice often dumped on the market) are primarily attracted to its rich aroma, the quality of the grains is still a factor for consideration – which favours the more recently installed mills with higher quality grading capability. ET Rice, which installed their first line in 2010, feels they are distinctly disadvantaged as a result and will soon need to make costly investments in a new milling line in order to keep pace. They also emphasize the need to buy a dryer which would allow them not only to decrease operational costs but also to attract customers.

The determining factor, with respect to upholding high food safety factors, appears to rest on how recently the milling line was upgraded – with Shine Rice and Terra Mill's milling lines featuring advanced equipment for checking the quality of paddy grains as well as machine dryers that greatly reduce the risk of contamination.

Despite being central to competitiveness, purchasing equipment has been a complex task for some millers. Two of the owners had to rely on their savings to travel to China in their quest to find good machines, either for milling or making briquettes. Without the right knowledge and given the lack of advisory services available, this can translate into a negative experience; three of the machines they bought quickly stopped functioning and could not be repaired. The owner of ET Rice now wants to purchase a pellet mill but is uncertain where to find a reliable seller.

4.3 Electricity

Four out of ten manufacturing firms ranked access to energy as a major constraint to business in the country (Were, 2016). In 2016, it registered an access rate of 56 percent, against the 87 percent of the world average, and with an annualized increase in access in the period 2010–2016 of 6 percent. However, if the access rate is disaggregated, access is only 16 percent in rural areas, where many agri-SMEs are located.

Despite notable gains in electricity generation and the diversification of electricity sources in favour of renewables, electricity costs remain among the highest in the region (Kenya Association of Manufacturers, 2019). In 2018, the Energy Regulatory Commission (ERC) announced new tariffs indicating a 30 percent increase in the cost of energy for the industry. The same announcement also indicated a 4.4 percent discount would be available for commercial and industrial consumers. Also, according to the Kenya Association of Manufacturers (2019), the government is keen to address manufacturers' concerns about the high cost of electricity. Government proposals in this regard include a deduction of 30 percent on corporate tax. How these conflicting tariff and tax regimes will play out practically for agri-SMEs has yet to be seen.

While high energy costs have driven some innovation in the sector, particularly attempts to use husk as an alternative fuel, electricity remains one of the main variable costs, and challenges associated with this are exacerbated by the lack of trust between entrepreneurs and the grid. Managers at ET Rice and Shine mentioned that the state power company takes advantage of an estimated readings system to gauge them on electricity. ET Rice notes that electricity is one of the more exorbitant overhead charges and that bills can reach KES 800 000 (USD 7 095) per month during the high season.

Shine, which has also experienced bad service in deliveries because of their remote location, invested in two smart metres and have their own line that runs out to the plant. This has proven reliable as they have only lost power once when the entire area was knocked down for a day. The miller now pays KES 400 000 to KES 450 000 (USD 3 548–3 991) per month for electricity during the peak season. Terra Mill pays KES 1.2 million (USD 10 600) for electricity on an average month. In the event of an outage, the mill has a backup generator.

4.4 Quality and safety

As analysis in the World Bank Enterprise (2018) survey indicates that, with respect to business regulations, Kenya official's efforts are more concentrated on non-agribusiness SMEs, which are the subject of more inspections by tax and non-tax officials alike. Of the SMEs that have received visits from non-tax officials, 42 percent are agribusiness, while the rest do not operate in the food industry.

Nonetheless, Terra Mill reports that they are certified by the Kenya Bureau of Standards (KEBS), and that keeping this certification current costs them about KES 31 000 (USD 275) per brand. Across their three brands they are paying KES 93 000 (USD 824) per year to stay compliant. ET Rice also sells under their own brand but have not disclosed any such high costs for KEBS. Rather, they reported that they pay an annual fee to the Ministry of Health, which is a more reasonable KES 2 500 (USD 22) to keep their health certificate current. Naturally, the two companies selling their own branded rice have more contact with these agencies. The Kenya Bureau of Standards has developed specifications for milled rice that are publicly available online (Kenya Bureau of Standards, 2020).

As they operate a strictly for wholesale business, Shine Rice avoids the costly inspection processes associated with brands. Rather than having to interact with KEBS, they have received visits from the local Public Health Authority, and an auditor from the Weights and Measures Directorate within the Ministry of Industrialization, Trade and Enterprise Development, has come once to check their digital scales.

While the millers do not have an employee dedicated to food safety working on the mill floor, they have access to training for all staff through public agency initiatives (see Section 8).

4.5 Use of by-products

Constraints in the enabling environment have not allow the millers to "green" their operations despite some efforts to do so. For instance, the question of what to do with the considerable by-products created by the milling process – paddy husks, bran and rice of unmarketable quality – has important implications for the environmental sustainability and profitability of the business. Most mills in the area sell off bran and yellow rice (which might be contaminated by aflatoxin) as animal feed at roughly KES 13 (USD 0.12) per kg, but the husks are more difficult to repurpose. Two of the mills in question, Shine and Terra Mill, are designed to use a part of the husk waste produced to fire their dryer and partially power the milling process. Shine has also found some innovative uses for these by-products by fermenting them with probiotic cultures into an effective fertilizer, which brings in additional revenue (KES 500 or USD 4.43 per bag). Both Terra Mill and ET Rice have tried, without success, to press husks into briquettes to sell to consumers for cooking and heating purposes. It is now generally understood that due to the high electricity costs associated with this process, it is too inefficient to produce a viable product, though many firms have tried.

4.6 Conclusions

The milling equipment is a factor underpinning competitive advantage, and using the latest technology is recognized as essential to satisfying consumer demand. Even more, the determining factor with respect to upholding high food safety and quality factors is also related to the technology used, as more advanced equipment allows for better quality control of the grains, and reduces the risk of contamination from using dryers. Currently, access to modern equipment in the country is not straightforward. The mills could benefit from better access to milling technology, including advisory services with respect to machinery purchases, and by ensuring the availability of spare parts and maintenance services for imported machinery, and by raising awareness of the latest available technology.

The millers have tried to become more environmentally sustainable by finding purposes for by-products or waste but constraints in the enabling environment have made it more difficult for them to do so. Specifically, high costs of electricity and of researching the market for equipment have discouraged the millers from using their husk for making briquettes. However, other efforts have paid off, such as producing fertilizer and powering the milling process with husk.

Electricity is one of the higher operational costs that impede local rice from successfully competing with cheaper imports. Also, the rural areas where many agrifood companies are located, suffer from poor access to electricity. This is concerning given that disruptions can affect processing with negative consequences for food safety and quality, and can lead to more food waste. More attention can be given to identifying feasible strategies for decreasing costs and increasing access to electricity particularly for small and medium manufacturers in rural areas.

Focusing on supply-level investments to increase production and satisfy price-sensitive consumers without attention to value-adding activities can lead authorities to overlooking quality and safety aspects at the processing-level. This is discussed further in Section 6, which looks at how the practice of blending impedes the country from developing a national brand for local rice.

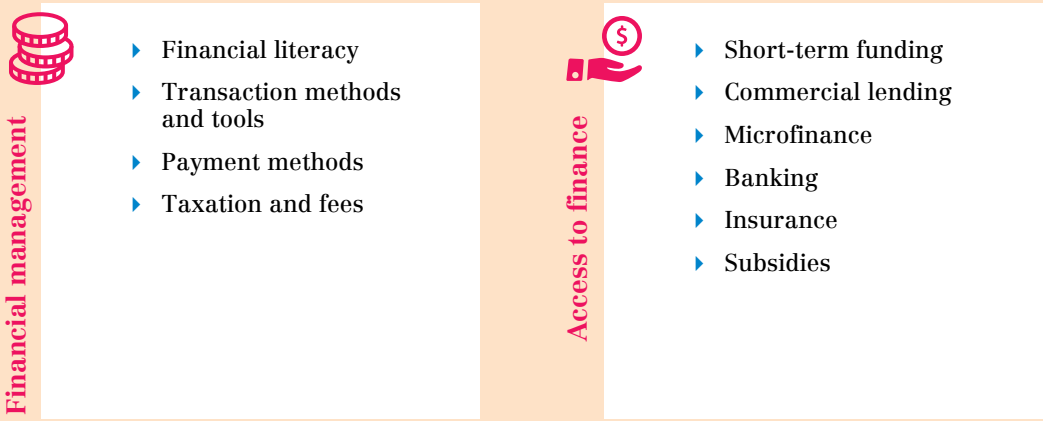
5 Finance

KEY MESSAGES

- Late payment from buyers, particularly supermarkets, along with limited capacity use and farmers' need for immediate payments, makes cash flow a critical constraint for the operations of the rice millers in the study.
- There is a gap in the market of financial products for agrifood SMEs that have to rely on government schemes or donor support to make capital investments and catalyse their growth.
- The produce cess charged on agricultural commodities by Kenyan counties adds to the high operational costs incurred by rice millers, preventing them from competing with cheaper imports.
- Incentives should be provided to the financial sector to introduce financial products that are more suitable to the needs of agrifood SMEs and address their needs, including the cash flow constraints (see also Section 2).

The way a firm uses its funds is essential to accomplishing its financial goals and business objectives. However, good financial management depends on the financial literacy available to the company, use of financial tools or legislation such as on corporate taxation or insurance contributions. Nonetheless, a firm's financial component is also shaped by their access to finance in the country, which depends on the availability of commercial lending, short-term financing or subsidies (see Figure 14).

FIGURE 14 External factors affecting the finance of agrifood manufacturers



Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

5.1 Background

According to the 2019 World Bank Doing Business report (World Bank, 2019), Kenya is a top reformer in providing access to credit. The improvement was largely due to the creation of a unified secured transactions legal framework and a new unified and notice-based collateral registry. Generally, Kenya is seen as a forerunner in financing for SMEs and has one of the most advanced financial sectors in sub-Saharan Africa. Data reveals, for instance, that most SMEs that have applied for a loan obtained it. Commercial banks already largely cater to the needs of SMEs, deriving a large portion of their revenue from these enterprises (ITC, 2019). Additionally, most banks are active in the agricultural sector and offer asset-based credit (Financial Sector Deepening Africa, 2017).

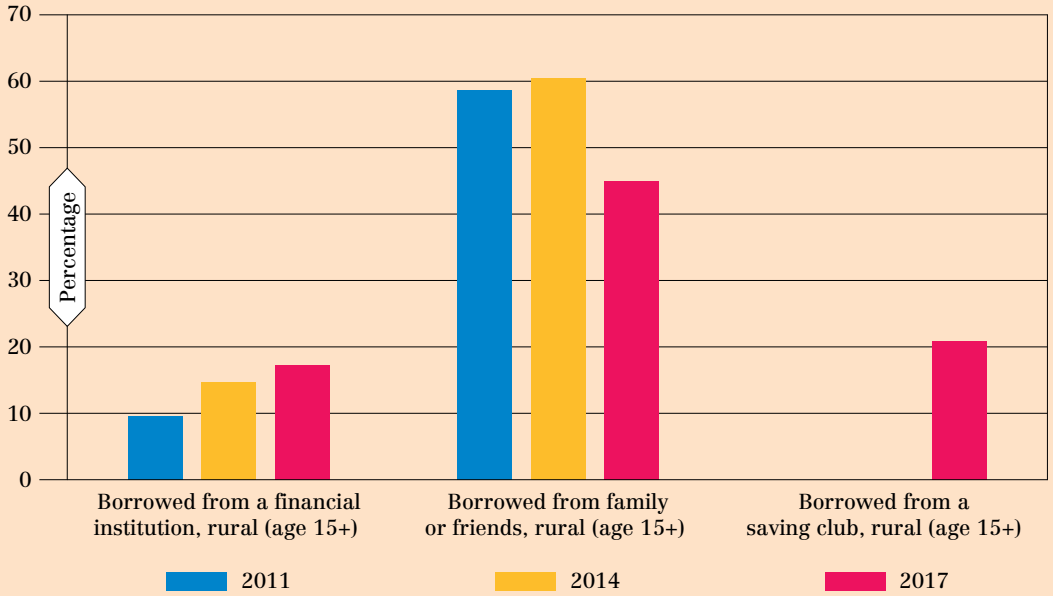
These facts, however, do not present the whole picture. While the loan rate approval for SMEs is high, it is rather the high-growth enterprises that have applied for loans and have been successful. High interest rates prevail and are identified by SMEs as the main obstacle in applying for loans (ITC, 2019). World Bank Enterprise Surveys 2013 reveal that about 68 percent of Kenyan firms perceive access to finance as a challenge. In this context, half the SMEs have never interacted with a bank and only 36 percent have accessed loans (Dutch Good Growth Fund, 2015). In line with findings across sub-Saharan Africa, Kenya is characterized by a "missing middle" of financial products, which is holding back the growth of SMEs. More specifically, the financial sector does not meet the needs of a specific segment of SMEs who are too big for microfinance and too small or risky for commercial investors (Dutch Good Growth Fund, 2015). Kenya's 2016 MSMEs survey reveals that most of the sources of financing for these companies are personal savings, loans from friends and family, and other informal sources (Kenya National Bureau of Statistics, 2016).

This holds true for the agricultural sector where the financial sector does not cater to the needs of most commercial millers (Farm Africa, 2014). According to World Bank surveys, Kenyan agrifood SMEs are less likely to have a line of credit when compared to their non-agrifood counterparts. Out of the total lines of credit reported in the surveys by respondents, only 34 percent belong to agri-SMEs, while the rest were provided to the non-agrifood sector. While banks are active in the agricultural sector, most only have an asset financing product offered at prevailing interest rates (between 18 and 25 percent), and at least two financial actors that have tried to offer subsidized interest rates are reported to have financial difficulties (Financial Sector Deepening Africa, 2017).

While fierce competition drives Kenyan banks to innovate to the benefit of SMEs, tax and regulatory issues seem to impede alternative financial services from taking off. Leasing, for instance, has more tax disadvantages than traditional loans (Hansen *et al.*, 2012). Nonetheless, the agricultural leasing sector, which has shown great potential for economic development in other African countries, is growing and would significantly benefit from targeted awareness-raising along with capacity-building initiatives (Financial Sector Deepening Africa, 2017).

With respect to rural areas specifically, there is generally poor interaction with financial institutions, with most borrowing coming from family or friends, as the Global Findex Database reveals. However, this rate has dropped from 60 percent in 2014 to about 45 percent in 2017, while the percentage of people borrowing from financial institutions has increased only slightly from 15 percent in 2014 to 17 percent in 2017 (see Figure 15).

FIGURE 15 Borrowing sources in rural areas in Kenya



Source: World Bank. 2021. Global Findex. In: *World Bank*. Washington, DC. Cited 4 December 2021. https://globalfindex.worldbank.org

5.2 Start-up financing

Family and personal savings are the main sources of start-up capital in Kenya (Kenya National Bureau of Statistics, 2016). The foundation stories of these three enterprises typify the narratives encountered in SMEs throughout Africa. Shine Rice represents the legacy business: the entrepreneur at the helm was able to leverage the social capital inherited from a family of entrepreneurs, along with assets accumulated through a career as an engineer working abroad, to overcome the usual collateral barriers to accessing commercial financing.

Shine was also able to take advantage of subsidized financial products available for rural development, including a grant from the irrigation scheme. To pull together the initial investment of KES 1.2 million (USD 10 600) to build and outfit the plant, the owner also took a loan from the Industrial and Commercial Development Corporation, which asked for an in-depth business plan. The owner expects the factory will need to be upgraded in about 10 years.

Terra Mill, while now being run autonomously, is the product of government involvement in the development of the rice sector in Kenya dating back to the 1960s. The cooperative's activities at large (1967) were financed through a 60 percent equity share by the National Irrigation Board and a 40 percent share by the rice farmers. Given a period of focus on cooperatives followed by privatization and market-oriented agricultural development policies in Kenya and throughout the developing world, many SMEs in the region can trace their origins back to public initiatives that provided a useful leg up in finding the capital to initiate their private operations.

Terra Mill's first mill was put in place in 2005 with the help of a loan with an interest rate of 21.5 percent, which was paid off with rice profits in five years. A second line costing KES 16 million (USD 145 335) was installed in 2012, at which point they retired the first (but have retained all the equipment).

ET Rice's story is also typical. A self-made entrepreneur, its owner managed to attain his current scale of operations through a multitude of previous, micro- and small-scale businesses, each generating investment funds and credit history for the next. In order to amass the capital required to launch the current suite of businesses, the owner worked first as a tailor, eventually moving into an import/export enterprise, and then ran a local transport operation in Nairobi. Despite now running several different businesses, he reports that his personal philosophy is never to pull money from one to help finance another, they must all be consistently self-sustaining. Eventually, he was able to acquire the collateral – with help from a family friend – to access commercial financing from Barclay's to start the mill.

In 2010, when he first started making investment plans for the mill, interest rates were around 21 to 23 percent. The owner reports that unless one had between KES 10 000 (USD 90) or KES 20 000 (USD 180) saved, banks would make it difficult to open an account. A friend offered to put up his land as collateral so that he could access a KES 100 million (USD 908 350) loan. This helped to buy the property where the mill now sits. He later received assistance from the Bank of Africa, which provided financing for the equipment (an equipment collateral loan).

5.3 Working capital

Kenya's Association of Manufacturers reports that the country's culture of late payments – from private and public actors alike – is adding excessive strain to their business (Kenya Association of Manufacturers, 2019). Late payments from retailers are cited by associations of suppliers as a key factor leading to the closure of business. A 2017 study finds that 37 manufacturers whose books were examined were owed KES 1.6 billion (USD 14 533 563) by retailers, a debt which was over 60 days due (Kenya Ministry of Industry, 2017). Recently, a Code of Good Practice was signed jointly by Kenyan manufacturers and retailers in order to encourage self-regulation on payments that the government has proposed anchoring in the Kenyan law (Muhatia, 2019). It is not yet known, however, whether the code of practice has brought any changes to the faulty payment system, which is also a result of the retailers' own operational challenges such as poor sales or high overhead costs (Kenya Ministry of Industry, 2017).

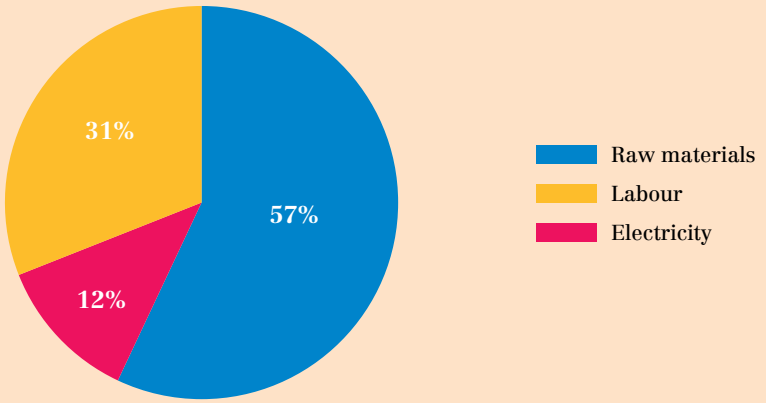
The above-mentioned constraints are in line with reports from the three millers which all state that delayed payment from buyers, especially from supermarkets which can take up to three months to settle their accounts, hinders cash flow and consequently affects other business.

Between collecting the debts from the member farmers and also from customers, Terra Mill states that financial planning becomes nearly impossible for their team. They had to delay paying salaries to their employees when having severe cash flow issues. Both Shine and ET report that problems are created payment delays, which are typical for the large-scale clientele with which they deal. Shine identifies working capital as its major need and does not know how they will face this challenge. The company had to let go of some buyers because of payment delays. ET Rice envisions a system where they could invoice the supermarkets through the bank, and have a standing line of credit to assist with cash flow. The miller also states that this would allow them to provide better support to their suppliers.

The late payment from buyers adds to the high operational costs, shortage of supply limiting capacity use and farmers' demand of immediate payments (see Section 2), making cash flow an exorbitant challenge for the millers. Indeed, working capital is identified as one of the greatest demands that are unmet by the financing sector (Dutch Good Growth Fund, 2015; Farm Africa, 2014), forcing enterprises to rely on traditional loans that involve complex and lengthy procedures. Banks acknowledge this financing gap but report weak legal frameworks or inefficient judicial systems as preventing them from offering working capital loans (Hansen *et al.*, 2012).

The average distribution of costs for a Kenyan agribusiness manufacturer is given by the World Bank surveys as depicted in Figure 16.

FIGURE 16 Distribution of main costs for an agrifood small and medium enterprise in Kenya



Source: Authors' elaboration based on World Bank Enterprise Surveys data.

Naturally, paddy is the main cost incurred by the three millers. In terms of operational costs, electricity is the highest for Shine and ET, followed by labour. Terra Mill incurs a much higher cost of labour per unit than electricity, but it is also the largest company in terms of both permanent and casual employees. Section 5.3 discusses the costs and access to electricity in the country in more depth.

5.4 Growth

The three millers in this study all obtained loans and report that now financing for upgrades can be accessed at the considerably lower rates of 13 to 14 percent. The SACCO is one of the financial institutions offering this option. Indeed, limited options of formal long-term capital forces companies to rely on other key actors including SACCO, which offers short-term finance at lower interest rates to their members in comparison to banks (Dutch Good Growth Fund, 2015).

ET Rice accessed start-up capital in 2010 during a time when rates were between 21 and 23 percent, and his total investment in the mill is reported at KES 100 million (USD 908 350). The owner was able to access commercial financing based on the creditworthiness established in his previous enterprises.

As discussed earlier, Terra Mill also received bank loans to make capital upgrades to their operations. The first of which, taken in 2005 at an interest rate of 21.5 percent, created the first milling line, and was paid off with their milling profits in five years. The second line, which is now in operation cost KES 16 million (USD 141 700) in 2012.

Shine Rice received support from the irrigation scheme and from the United States Agency for International Development (USAID), but also largely relied on the owner's savings from previous salaried employment and loans from family as banks were reluctant to consider start-ups. The enterprise states that collateral requirements are exceptionally high and currently they cannot access loans for the packaging machine they need because their collateral is tied up in another loan.

5.5 Bookkeeping

In line with the wider literature, a Kenyan study shows that bookkeeping skills of SMEs and their debt management literacy are significant determinants of growth (Mwaniki and Omagwa, 2018). Generally, firms in Kenya manage their finances well. A survey administered to 893 businesses across Kenya revealed that 81 percent of firms believe they have detailed knowledge of the loan process, 82 percent state that they have a good ability to manage their cash flow and 89 percent have a bank account (ITC, 2019).

The three millers have their own business bank account. At ET Rice, the administrator responsible for day-to-day record keeping had previous accounting experience. Shine outsources its accounting but the owner and the production manager do the day-to-day record keeping. They monitor profit and loss statements, which are calculated monthly, as their chief performance metric. Terra Mill, with their various operational branches and comprehensive service offerings, keeps a dedicated accountant on staff who is also a college graduate. As of June 2018, the company has put in a new inventory system to keep track of their revenue, which they refer to as "bags in vs bags out". As the accountant is responsible for all the revenue generating activities of the cooperative (not just the mill), they do not keep disaggregated figures on hand to measure the profitability of each venture.

5.6 Taxes and fees

According to the 2013 World Bank surveys, only 18 percent of SMEs (formal and with more than 5 employees) identified tax rates as a major challenge, a figure which contrasts with 56 percent of micro or informal firms that felt that taxes were too high, as revealed by another survey (Suri, 2019). Kenyan companies are subject to 30 percent corporate income tax but several special rates apply to certain categories of firms. For instance, enterprises located in export processing zones are exempt from paying the tax for the first ten years of operations. Similarly, special economic zone companies only pay 10 percent corporate income tax during their first ten years of operations (Kenya Revenue Authority, 2020).

For those companies with a yearly turnover greater than KES 1 million (USD 9 083), but not exceeding KES 50 million (USD 454 173), a 3 percent turnover tax (ToT) applies. In this case, taxpayers are only required to keep a daily gross sales record so there is no need to hire accountants. More recently, the government also introduced the Presumptive Tax of 15 percent of the single business permit or trading licence fee.[9] Its purpose is to simplify the taxation regime for small and micro enterprises with annual turnover not exceeding KES 5 million (USD 45 417). While the ToT is charged monthly, the Presumptive Tax is paid once a year at the point of acquiring or renewing the business permit. Filing tax returns for Presumptive Tax is not needed but records must be maintained for the determination of the turnover. Taxes can be paid online through the iTax platform (Kenya Revenue Authority, 2020).

Kenya is considered a recent top reformer in paying taxes, having merged all permits into a single unified business licence and having enhanced its iTax system to simplify the process of providing value added tax information (World Bank, 2019). However, it is not yet clear how these procedures or the introduction of the Presumptive Tax have benefitted SMEs, especially the micro or informal ones.

[9] Enterprises in Kenya must obtain a county licence (also known as the Single Business Permit) and the charges for it depend on the respective county finance acts.

In addition to these taxes, produce cess and market levies are also imposed by devolved government authorities. The cess collected for rice is aimed at investing it into the infrastructure of rice-growing areas (Republic of Kenya Ministry of Agriculture, 2008). The cess is levied according to the weight of the product or the carrying capacity of the vehicle that transports the goods through the county. Some counties do not impose transportation cess but rather for producing or extracting the goods within the county – however, the transporter or trader also have to pay market fees to sell the goods in the destination. Additionally, counties also impose licences related to the distribution of goods that manufacturers or traders have to pay according to where they distribute, offload or supply goods to market (The Center for International Private Enterprise, 2019). There is little empirical research on the impact that these taxes have on the agricultural sector in general, and rice industry in particular, but one study finds that "cess significantly contributes to increasing the overall cost of doing business and may restrict trade in agricultural products" with 1 percent increase in cess leading to a 0.8 percent increase in the costs of distribution. Nonetheless, the cess burden varies by county and commodity; at times, double taxation also occurs when cess is charged at multiple levels (i.e. counties or cess points) (Bayesian Consulting Group, 2016, p. 33).

While the three millers report different tax structures on income/turnover, they all pay regional cess, which vary according to the amount of produce transported and the destination. Shine, which delivers its rice to the packhouses located only 50 km away (see Section 3.2) pays about KES 16 000 (USD 145) regional fees in a year. Terra Mill, however, pays an annual KES 26 000 (USD 237) to deliver and market its rice in Nairobi. ET Rice refused to disclose the total cess paid but believes that taxes are exorbitant.

Value-added tax (VAT) is 16 percent and only ET Rice and Terra Mill pay it for their branded products. Only companies with a turnover of taxable supplies of KES 5 million (USD 45 537) per year and above are required by law to register for VAT. There are some VAT exemptions such as some supplies of main agriculture and food items. Shine, as a wholesaler, is exempt from paying VAT.

5.7 Conclusions

Kenya is a top reformer in providing credit but several issues remain. For instance, it is the high-growth segment of enterprises that are successful in their applications for loans rather than the moderate or slow-growing ones. High interest rates prevail and so, most SMEs, particularly in the agrifood sector, have low interaction with the financial sector and cannot make use of loans that would catalyse their growth. The government could dedicate attention to the missing financial products that these enterprises need, putting in place the proper tax and regulatory framework required by financial institutions to introduce alternative offers. Leasing schemes to stimulate mechanization, for instance, have been successfully employed in other countries across sub-Saharan Africa when backed by governments or donors (see Ilie and Kelly, 2021).

The millers in this study encounter various financial challenges that vary according to the specific stage they are at in their lifecycle. Shine, the most recently initiated business, has managed to find start-up financing but is now facing the difficulty of finding credit for expanding its operations, a challenge which is known in today's literature as the "missing middle". ET Rice and Terra Mill have managed to bypass this issue due to the creditworthiness established by previous activities or businesses in the region. Nonetheless, all three millers struggle with working capital, which is a feature that also dictates HR and procurement practices; in this context, employees or farmers cannot be paid timely when cash flow problems arise. This issue is worsened by supermarkets that also encounter their own working capital constraints due to their high operational costs. Overall, the late payment

from buyers, the shortage of supply limiting capacity use and farmers' demand of immediate payments (see Section 2), makes cash flow an enormous challenge for the millers. Securing reliable payment arrangements with buyers is an area that deserves further attention, especially since it can have positive spill overs with respect to cash flow further upstream.

A particular challenge for agrifood manufacturers specific to Kenya results from the produce cess levied on agricultural commodities. This charge adds to the already high operational costs, especially electricity, further impeding the sector from successfully competing with more affordable imports. Reforms are required in this area, taking into consideration assessments on market levies and their impact on counties' revenue streams (such as Bayesian Consulting Group, 2016). Such studies with respect to the rice sector would be desirable before undertaking any measures.

Lastly, financial bookkeeping and accountancy skills, either internally managed or outsourced, are essential to business survival and growth. The way a company manages its finances is central to cash flow and ultimately, its long-term survival. Further, this can also enable firms to attract investors and stimulate their growth particularly in a context characterized by a lack of financial products for SMEs. Mainstreaming financial skills across SMEs is essential if any financial schemes involving banks, investors or other financial actors are to take off.

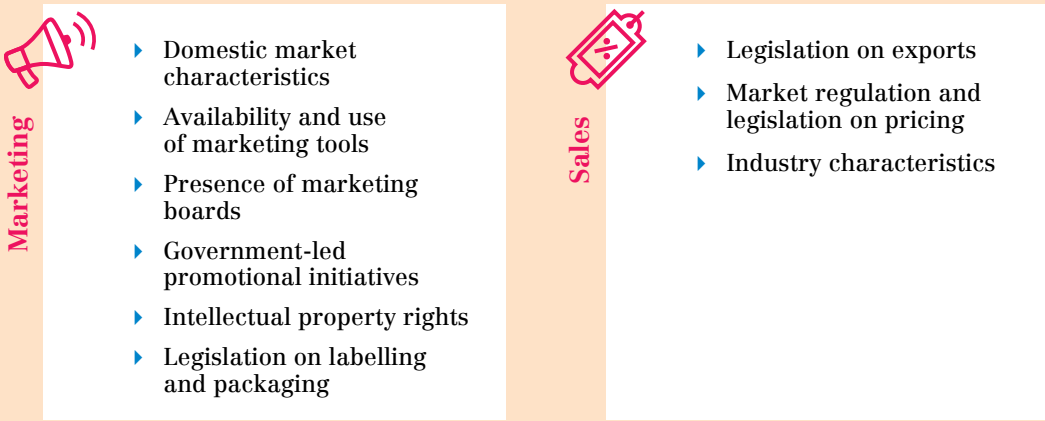
6 Marketing and sales

KEY MESSAGES

- Rice millers in Kenya face intense competition from cheaper imports and village mills offering low-quality rice. The high operational costs and gaps in the business enabling environment, makes it difficult for them to compete on price.
- As such, to satisfy a wider range of consumers, the millers and traders alike are engaging in practices aimed at making the rice more affordable such as blending varieties or grades. These practices, however, also have the potential to distort the quality offered, which in turn poses the risk that consumers will develop a negative bias towards local rice.
- Research can be conducted to identify consumer segments in Kenya's market for rice and the premium they are willing to pay for certain quality characteristics. This would allow millers to develop products that respond to local preferences and formulate their pricing and marketing strategy accordingly.
- Poor collaboration in the rice industry means that the sector has not been able to gather efforts to develop a common Mwea brand for rice and compete with imports.

Businesses ultimately link their products to the market by employing various sales strategies or methods. In this context, sales can be affected by factors such as intellectual property rights, intensity of competition in the sector, exporting legislation or the presence of distributors. Marketing activities can also enable sales, but these are affected by various exogenous influences including the availability of marketing tools such as television or magazines, the presence of marketing boards or market characteristics such as consumer preferences (see Figure 17).

FIGURE 17 External factors impacting on the marketing and sales strategy of agrifood manufacturers



Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

6.1 The domestic market

The main quality characteristic that Kenyans value is aroma, and it is for this reason that Basmati rice fetches a higher retail price (Gitonga, 2019). This preference might have been historically influenced by Kenyans of South Asian origin, who form a significant minority in urban areas. Basmati rice is relatively high value rice, which is reflected in the fact that the crop has historically been perceived as a cash crop: "Mwea rice farmers in the 1980s sold most of the rice and relied on maize and beans they cultivated off the scheme for their own consumption. They considered rice as a cash crop consumed by people in urban areas" (Short, Mulinge and Witwer, 2012, p. 10). These perceptions have been changing lately, however, and rice has started to become a staple food for Kenyans (Atera, Onyancha and Majiwa, 2018). Generally, consumers in Kenya are becoming more sophisticated with increases in income and their standards with respect to quality – aroma and type of grains – as well as packaging and branding are becoming more stringent (Kilimo Trust, 2014).

The primary challenge to marketing Kenyan rice in general is competition from cheaper imported varieties, particularly from Asia, which continues to supply the market due to a bilateral trade agreement that Kenya is honouring despite East African Community (EAC) rules that would have imposed a 75 percent tariff on such imports. Based on the justification of limited rice production, Kenya is being granted a waiver and charges a tariff of only 35 percent on imported rice (Gitonga, 2020).

Incidences of imported cheap and poor quality rice are mentioned in Kenya's rice development strategy paper, "… which is fraudulently repackaged presenting unfair competition to locally produced rice" (Republic of Kenya Ministry of Agriculture, 2008, p. 6). As the government considers that Kenyan rice has a higher quality than imports, the country's policy has been biased towards supply-shift investments[10] that generally benefit poor consumers as they can make local rice cheaper (Demont, 2013).

[10] These include "direct and indirect support for rural infrastructure, human capital development, research and development (R&D), extension, intensification and access to land, seed, credit, inputs and mechanization" (Demont, 2013, p. 174).

This view is challenged by the European Cooperative for Rural Development (EUCORD), which states that Asian imports are already preferred by Kenyan consumers to the detriment of locally produced rice (EUCORD in Demont, 2013). Demont posits that "since the growth rates of rice consumption are so high in Mozambique and Kenya, the challenge in these countries will consist in gaining market share with local production before consumers have the time to develop preferences for imported rice" (Demont, 2013, p. 179).

6.2 The role of the millers in offering a good quality and affordable product

Our research points to the existence of several rice consumer segments in Kenya, which are reflected in the product portfolio of the millers who offer rice of varying grades and different price points. ET Rice offers two grades of branded rice: Grade 1 priced at KES 160 per kg (USD 1.46) and Grade 2 priced at KES 150 per kg (USD 1.37). Terra Mill, on the other hand, offers four products; its Grade 1 rice ("SPR classic") is priced at KES 160 per kg and Grade 2 rice ("Classic") at KES 140 per kg (USD 1.27). The miller also offers a premium grade ("Kenya Select") for KES 180 (USD 1.64), and brown rice for KES 175 per kg (USD 1.59). While Terra Mill states that the product most demanded by consumers is its Grade 1 rice, ET Rice, which caters mainly to rural areas asserts that their most popular product is Grade 2 rice. Shine, however, as a wholesaler catering to similar customers (Kenyan industrial brands), only offers generic rice priced at KES 135 to 140 per kg.

As such, those price sensitive consumers who are mostly located in rural areas, do prefer imports because they are more affordable. This is reflected in the millers' complaints that imports divert consumers away. It is for this reason that millers and traders alike are engaging in practices aimed at making paddy or rice more affordable, but which also have the potential to distort the quality offered; this in turn poses the risk that consumers will develop a negative bias towards local rice.

Blending, for instance, occurs at more points along the supply chain. As discussed in Section 2, millers often receive mixed varieties of paddy but blending can also happen at the processing level. Companies often accuse their competition of cutting Mwea rice with such imports, diluting its quality. One company, which has an entire retail side of operations focused on the rural, lower income community, admits to doing this to cut costs; the miller blends 2 percent non-aromatic imported varieties with 98 percent pure Pishori rice. Indeed, previous literature confirms that "to satisfy a wider range of consumers, blending of aromatic and nonaromatic, and repackaging are common" (Gitonga, 2019). It was revealed during the interviews that most millers in the region allow for 14 percent of broken grains in the bag of rice, which can even go up to 30 percent.

Nonetheless, another consumer segment is represented by less price-sensitive Kenyans, mostly from urban areas, who associate quality with pure (unblended in terms of variety and degree of brokenness), aromatic Pishori (also known as Basmati). The millers also compete on these characteristics and state that these consumers value and pay a premium for quality.

While maintaining strict controls on quality comes with a high price to milling enterprises, it also brings benefits in terms of high-volume clientele. According to Shine Rice's management, of all the Mwea mills, only they and Terra Mill have the capacity to grade well, which is the primary criteria for the large agrifood companies that source from them for sale in urban supermarkets and other high value outlets. These brands likely know of the pitfalls that can come with working with less professionalized mills – where off-colour grains that should be discarded are often put back through the milling process and sold to consumers, and the high quality Pishori is often blended with low quality imported rice

or, during the low season, less desirable varieties are brought in from other regions by disreputable traders and passed off as Pishori.

6.3 Marketing strategies

The 2016 MSME survey revealed that the majority of MSMEs did not market or advertise their goods or services at all, with business owners expressing their wish for the government to assist in market promotion and to provide an enabling environment for fair competition (Kenya National Bureau of Statistics, 2016).

The absence of government support in developing consumer demand for local rice is reflected in the marketing component of the rice businesses. The millers dedicate important efforts to capturing customers even when the budget does not allow investments in this area. To outrun competition, especially from Asian imports, processors make use of billboards, flyers and sampling (Terra Mill), newspaper, TV and radio (ET Rice) and word of mouth or networking (Shine).

ET Rice has amplified their first mover advantage through aggressive, low-cost marketing strategies that seek to, and often succeed in, making their enterprise synonymous with Mwea Rice. ET Rice elevates Mwea rice in their promotion – to help increase the profile of the farmers who use their milling services – which the owner depicts as a win-win proposition for the farmers and the company. Despite that, competition from other milling enterprises continually threatens the company. In particular, Terra Mill and other local millershave successfully diverted some of their clientele. While ET Rice had the initial advantage, many mills have innovated their milling and particularly grading capabilities, and are now overtaking the company in their performance.

Company leadership has cultivated personal relationships with media outlets in order to lower the cost of doing this. The owner is frequently featured in local newspapers, radio, and TV shows discussing his contributions to development in the village. Their retail is focused on local outlets and with their high visibility in the region, a more formal approach is not warranted according to company leadership.

With their role as a wholesaler selling to well-established brands, Shine Millers does not have to invest funds in any marketing activities but rather networks within the sector to secure their clients. According to Shine, their mill is one of the very few capable of consistently delivering the graded quality required by these brands, so they feel secure in their market position. Terra Mill, with its three separate brands, contributes most of its operational budget to marketing, an estimated 20 percent of their total annual expense budget, using a sales team that works on commission through setting monthly sales targets. Despite these efforts, company leadership states that they are still not well known and should invest more.

Additionally, the fact that there is no collaborative culture in the rice industry means that the sector has not been able to gather efforts to develop a common Mwea brand and compete with imports. While some of the large brands are part of the East African Cereals Association, attempts to start a rice millers association has failed in Mwea, as millers are reluctant to share sensitive information with competitors. Nonetheless, companies state that they have filled shortfalls by purchasing from other mills on occasion. Shine has received orders that are too large to fill.

6.4 Conclusions

The millers currently aim to satisfy a wide range of consumers without a clear, focused strategy. The current practices that farmers, traders and millers engage in (blending varieties, mixing different grades of rice) have been overlooked by the government, which has focused its attention on farm-level production. This requires an urgent strategy revamp in order to prevent consumers from developing a preference for imports before it become too difficult to reverse such a trend.

Increases in income are slowly translating into more sophisticated demand with respect to food. In the rice sector, this means more stringent requirements with respect to aroma, type of grains, and also packaging or branding. Since the millers' operational costs are high (see Section 4), businesses engage in practices aimed at making the product more affordable so it can compete with cheaper imports that are preferred by price-sensitive consumers, especially in rural areas. However, these practices distort the quality offered, posing the risk that consumers – urban and rural alike – will develop a negative bias towards local rice.

The industry could benefit from more research dedicated to identifying consumer segments in Kenya's market for rice and the premium they are willing to pay for certain quality characteristics. This would help millers to develop products that respond to customer preferences and to develop their pricing and marketing strategy accordingly.

Millers are also forced to compete with imports individually as the competitive spirit in the industry has not allowed them to work together and build a collective Mwea brand. Government or development actors could intervene as moderators to bring the sector together and identify possible areas of collaboration. Ultimately, marketing boards can be created to advance the interests of the sector and promote the industry both domestically and abroad.

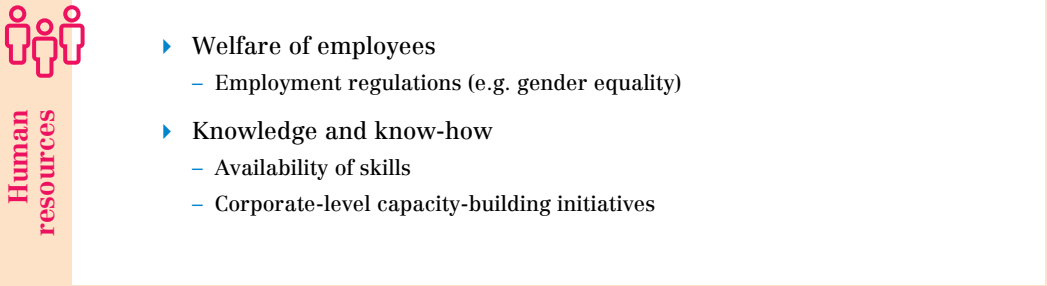
7 Human resources

KEY MESSAGES

- Rice millers have the potential to create lucrative employment opportunities in the rural areas of Kenya. The industry, however, relies on temporary labour whose working conditions are far from what is considered decent employment, particularly for women.
- Finding the hard skills necessary for the operations of a rice miller is not difficult but it is hard to cultivate professionalism and a work ethic among employees. Integrating soft skills associated with job integrity in the school curriculum or business training is essential as this is currently perceived as the most challenging HR-related issue.
- The occupational safety concerns identified are: the overloaded weight of paddy bags that casual workers are responsible for carrying; abundant bran dust posing concerns for the respiratory system; and the inconsistent use of proper footwear in the mills.
- Oversight and greater involvement of the government is needed with respect to decent employment.

The knowledge and skills of employees are important growth enabling factors for any business. The way a company manages its human resources is critical to its success, helping to bridge employee performance and organizational strategic objectives. By ensuring employee satisfaction, human resources management can contribute to business productivity. National factors such as policies related to the welfare of employees or the quality of the educational sector will affect the HR strategy of the company (see Figure 18).

FIGURE 18 External factors affecting the human resources strategy of agrifood manufacturers

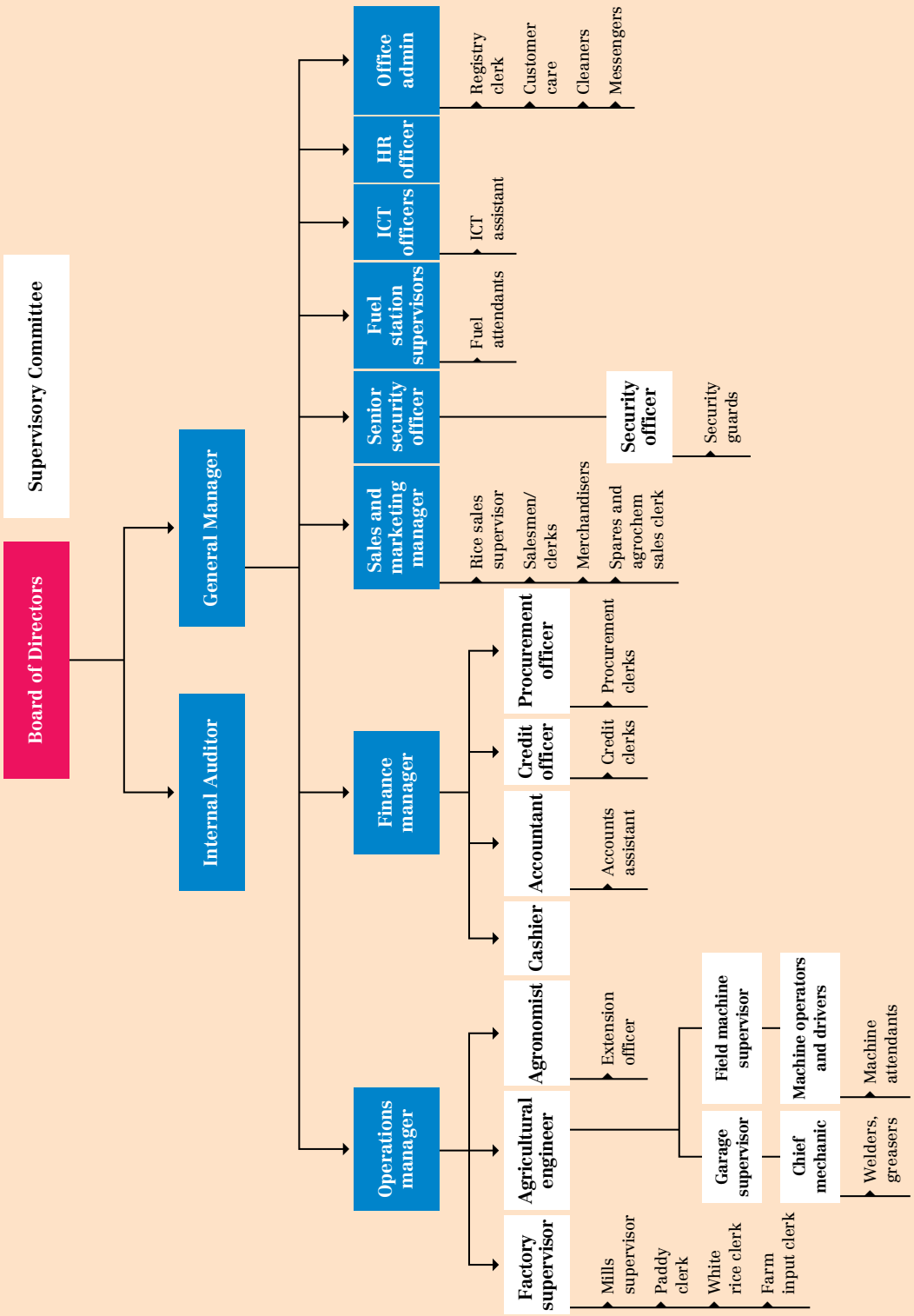


Source: Ilie, E.T. & Kelly, S. 2021. *The role of small and medium agrifood enterprises in rural transformation: the case of rice processors in Senegal.* FAO Agricultural Development Economics Technical Study No. 10. Rome, FAO. https://doi.org/10.4060/cb3873en

7.1 Human resources structure and practices

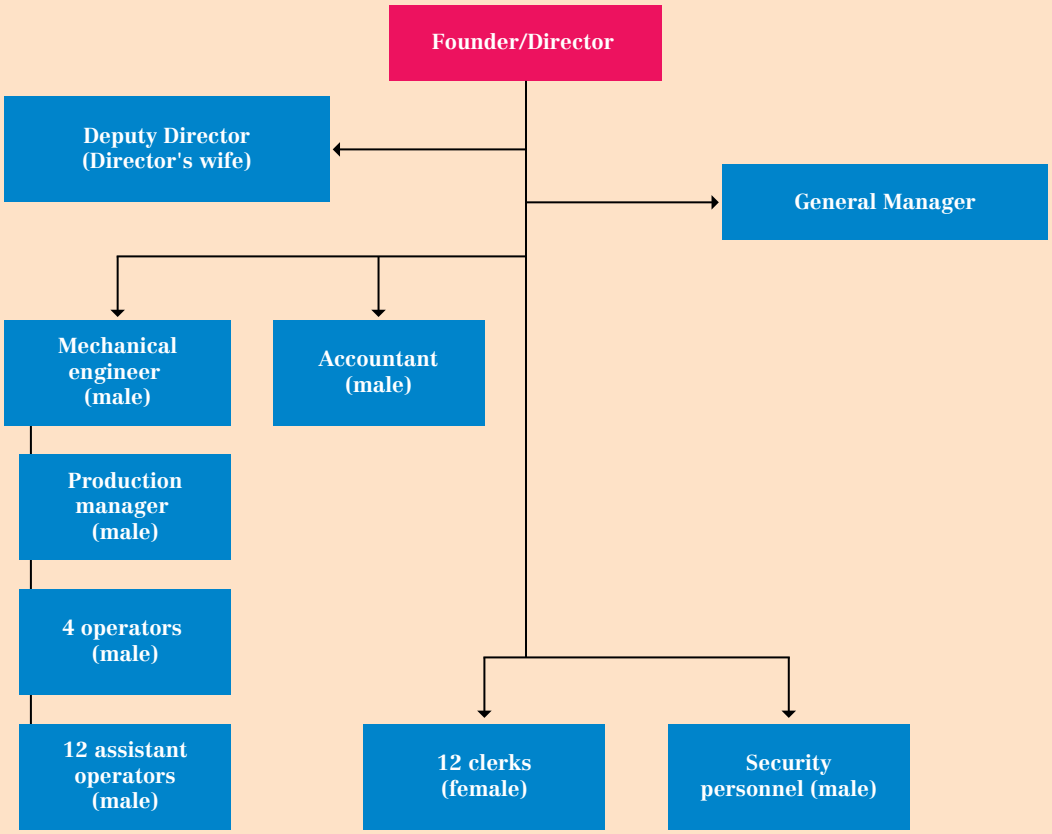
The organizational structures of the three enterprises are shown below.

FIGURE 19 Organigramme of Terra Mill



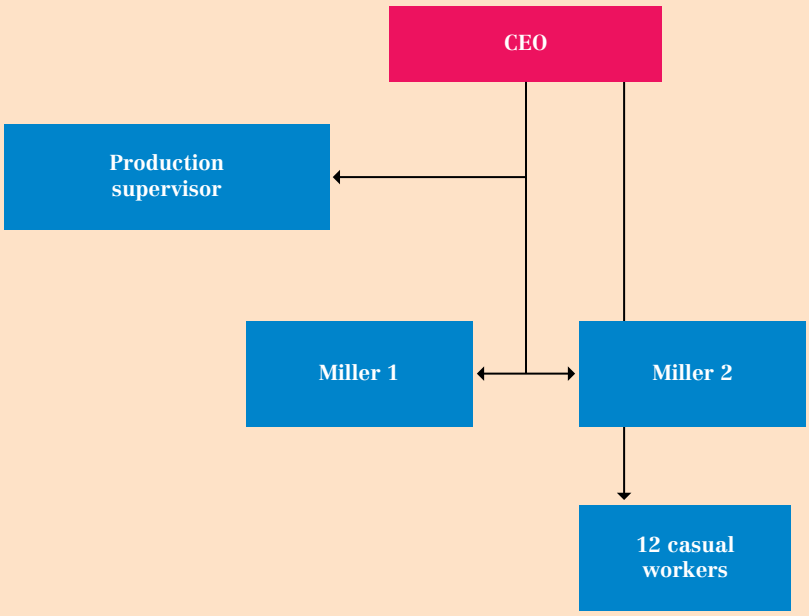
Source: Authors' own elaboration based on interviews with the millers.

FIGURE 20 Organigramme of ET Rice



Source: Authors' own elaboration based on interviews with the millers.

FIGURE 21 Organigramme of Shine



Source: Authors' own elaboration based on interviews with the millers.

The three millers have a clear, hierarchical structure, varying in complexity according to the size of the business and its diversification of revenue-generating activities. As such, Terra Mill offers the most varied types of jobs – with staff involved in activities ranging from processing or accounting to customer care or ICT. A mill supervisor oversees a paddy clerk, a white rice clerk and a farm input clerk. The current supervisor was trained as an electrician and is confident making repairs on the equipment when needed.

ShineShine's lean operation relies heavily on the Production Supervisor, who holds a degree from Kenyatta University and was recruited from the local community. The other millers came to Shine from ET Rice and other mills. One of them is highly skilled and is able to weld and perform repairs on the facility. All workers are male and most of them live onsite. Besides one miller who had to be let go, the rest of the work crew has been with Shine since the beginning. The Chinese manufacturer of the equipment provided training for the workers on how to operate it. For other tasks, the owner of the mill trains his workers himself.

At ET Rice, four operators and twelve assistant operators work on the mill floor under the Production Manager. The owner prefers to promote within the company – generally, assistant operators seek to become operators. However, the mill has also had employees transferred to other businesses under the same leadership, as needed. Many employees have been working under the same leadership from the beginning.

7.2 Recruitment

According to the World Bank Enterprise Survey of 2013 data, 35 percent of Kenyan firms identify an inadequately skilled workforce as a constraint. In particular, there is a significant gap in skills at the middle-level management, making such labour expensive to hire (Dutch Good Growth Fund, 2015). The Government of Kenya recognizes the need to enhance human resource skills, including technical, entrepreneurial, production and managerial competences, for industrial and SME development (Government of Kenya, 2012).

Surprisingly, none of the three enterprises complained about access to skilled personnel considering the weak human resources prevalent in the country. The most frequent problem related to human resources is not that of finding skilled workers but rather the lack of a work ethic among employees who, for instance, allow inferior product to be shipped out, drink on the job or leave the company without prior notice.

Two of the millers in this study reported no difficulty in recruiting skilled staff – millers at Terra Mill were qualified as electrical technicians, and at ET Rice managers all had valuable work experience and training in their respective fields. As a newer enterprise, Shine Rice very actively recruited a college educated production manager, but has struggled to find dependable employees for lesser-skilled positions – even having to lure workers away from other mills at times. Indeed, poaching staff is a common recruitment approach for technical positions (such as machine engineers) for which some training needs to be provided.

ET Rice reports that turnover had been low until this year as they benefit from having the reputation of paying salaries and wages on time. More recently, however, the increased competition has been felt acutely in this aspect of their business as well, with two employees recently being poached by another mill. ET Rice prefers to promote from within, with the notable exception of the General Manager, who was recruited by word of mouth and had previous experience working as a clerk in a cut flower company, and the Production Manager, who had experience working in smaller mills. In making hiring decisions, prior experience is preferred over educational qualifications. The company states that clerks tend to come in with a good educational background, and can grasp the recordkeeping within a week.

Technical training for employees is one facet of conducting business in Mwea in which entrepreneurs are able to access outside support from the public sector or consultants provided by the equipment manufacturers. The Ministry of Agriculture provides food safety trainings which workers at ET Rice reported attending. Shine, however, reports no need for external training as learning takes place on the job.

7.3 Decent employment

In 2011 there were 30.5 percent of casual workers in wage employment. Employers in Kenya generally rely on such workers to reduce operational costs, achieve more flexibility and exert greater control over labour (ILO, 2012). This holds true in the case of the millers; only four of Shine's employees are considered permanent, and 40 of Terra Mill's 200 workers are permanent. ET Rice, however, claims that all its employees are given full employment contracts after a six-month probational period, but this could not be verified.

Salaries for the permanent employees at the managerial level are comparable among the three mills, ranging from KES 25 000 to 45 000 (USD 221–400), while workers on the mill floor receive a salary ranging from KES 10 000 to 20 000 (USD 89–177). In comparison, the average salary paid by a Kenyan agribusiness SME, according to 2018 World Bank surveys, is about KES 29 700 (USD 263) per month, and the average non-agribusiness SME pays a much higher monthly salary of KES 49 300 (USD 437) per month to a permanent employee.

Terra Mill benefits from the most formalized relationships with its employees among the three millers – leave policies are streamlined, accessed through written requests to the mill management, as is overtime compensation. All employees of Terra Mill are paid through direct deposit. The workers are allowed to draw advances against their salaries if needed. Terra Mill offers contracts to all its permanent employees but only to 20 of its 160 casual workers. Terra Mill also offers the most benefits to employees of the three companies. These include one-month paid annual leave, sick or personal leave, overtime pay, social security and salary advancements, which are provided to all its contracted employees. Casual workers are also compensated for overtime by the hour and are paid weekly. The number of hours worked is entirely at the employee's discretion according to the mill supervisor. Shifts at Terra Mill are a standard eight hours (with two shifts a day during the high season), a convention not observed in other mills in the region particularly during harvest.

At ET Rice the shift starts at 07:00, and it was reported that employees have to stay on the premises until 18:00. Clerks in particular are dissatisfied with the long working hours. The mill's management staff report that to be employed, the applicant must produce a national identity document (ID), bank account information, and obtain a health certificate to work in processing (per Kenyan law). The person must have a National Hospital Insurance Fund (NHIF) card,[11] so the company can pay into the health scheme on their behalf. Additionally, ET Rice deducts the National Social Security Fund from the pay checks of their permanent employees. In terms of benefits, the employees get one month paid annual leave and in order to take sick or personal leave, they simply submit a request to the manager. Staff is registered with NHIF, and social security contributions are also made for employees. Lunch and tea is provided for free each day for processing staff. ET Rice also offers unpaid maternity leave.

Shine Millersis the least formalized company among the three in terms of HR policies and does not provide contracts to any of its employees. As it is located in a remote area of the scheme not easily accessed from the tar road, it does provide housing for their workers at no

[11] The NHIF is a state owned enterprise established in 1966 as a department under the Ministry of Health. Currently the NHIF Act No 9 of 1998 governs the fund. NHIF membership is open to all Kenyans over the age of 18 who have a monthly income of more than KES 1 000 (USD 10).

cost. Often, company managers are called on to provide advances or grants for medical or funeral expenses, for which they expressed a willingness to do so for longer-term employees that they wish to retain. Workers must provide ID and be over 18 years old, so they may be enrolled in the national health scheme and social security. As a benefit, the workers also receive year-end bonuses.

7.4 Gender aspects

Milling remains a male dominated industry in Mwea. This is due in part to the large bag sizes used to pack paddy. Women were found in upper management positions at ET Rice and, though the company did not express any specific policy in this regard, it does pride itself on providing opportunities to vulnerable single women as traders working from the company premises. Young men, some recent college graduates, hold managerial positions at Terra Mill, as do some (though fewer) women, though not within the milling side of the operation. While some traditionally marginalized groups are finding opportunities within milling enterprises, affirmative action policies are not formalized and have not been expressed as a part of the owners' personal philosophy towards their businesses.

In Kenya, female employees are not generally found on the mill floor, but they do work as baggers, clerks and they check people in at the gate. Despite their jobs being comparable to the mill technicians in terms of skills required, they are paid less than the rates offered to the technicians. At ET Rice, 80 percent of the traders are women – many are divorced, single mothers, or otherwise vulnerable. The owner states that this type of flexible employment is one of the few things women in that position can do locally to make money. In order to work in the mills one must be able to move sacks of rice weighing as much as 100 kg, which reinforces the male nature of the work.

7.5 Health and safety

From an occupational safety perspective, the primary hazard encountered in the mills is the abundant bran dust, which poses a threat to the respiratory systems of long-term workers. All the mills provide nose masks and dust coats, and all of them reported problems incentivizing the workers to wear them because they are uncomfortable during the hotter months. Across the mills in the Mwea area inconsistent use of proper footwear was observed, particularly for casual labourers.

Another health and safety issue specifically effecting casual labour is the packed weight of the paddy bags that they are responsible for manually unloading and packing into the storage facility. It was revealed that some of the larger scale mills in the western part of the country have mandated the use of smaller paddy bags out of consideration for the physical exertion (and potential for injury) of using 60 kg bags.

7.6 Conclusions

The millers provide a wide range of jobs that vary according to their size and diversification of revenue-generating activities. The employment provided is stable – with low turnover due to the millers' preference for promoting internally. Mechanical engineers are considered the most important employees for the millers' operations, due to the need to keep the machines working at full capacity, particularly during harvest season. The millers reported that good mechanics can learn quickly on the job and that training is also provided by the sellers of the equipment and through government extensionists. The millers also referred to increasing

rivalry among the mills to attract mechanics who are frequently poached by other millers. Formal qualifications are not taken into consideration during recruitment if they are not needed. Shop floor workers or machine operators will require primary and some level of post-primary education due to literacy and numeracy needs. A work ethic, reliability and trustworthiness were highlighted by all millers as important.

During the high season the millers depend on a large number of casual workers, particular for unskilled roles such as bagging and loading. Apart from a daily wage and experience acquired, these roles do not come with contractual benefits, creating a vulnerability gap in the mills. These workers are also the most susceptible to occupational safety concerns such as carrying overly heavy loads, respiratory problems from exposure to bran dust, and a lack of workplace protective clothing. Policy reforms that allow casual employees to pay into, and benefit from, social security while also retaining flexibility for the employee and employer will contribute to fostering decent employment within the sector in addition to reducing vulnerability in the rural areas where the mills operate. Gender pay parity also remains a concern, with the findings showing that women are currently paid less than men for jobs requiring similar qualifications and skill levels.

8 Partnerships

KEY MESSAGES

- Opportunities created by development actors and other partners could help address weaknesses in the enabling business environment, such as the lack of finance or weak value chain coordination.
- There is significant scope for improving collaboration among millers to advance the interests of the sector; to bring actors together, networking events could be organized by moderators such as governmental agencies or donors.

Partnerships in the rice sector in the Mwea constituency are characterized by general distrust and an unwillingness to share information or collaborate to achieve mutually beneficial goals. Despite the large numbers of millers in the Mwea area, attempts to formalize a rice millers association were unsuccessful. The companies reported that some have tried to initiate associations, to help lobby and advocate for the interests of millers. However, companies operate with secrecy due to the intense competition.

There are three industry advocacy associations active in Kenya that milling enterprises would qualify for as members:

1. The Kenya Association of Manufacturers (KAM): Established in 1959, it is the representative organization for manufacturing value-adding industries in Kenya. KAM carries on a constant dialogue with the government representing the views and concerns of its members with the scope to promote trade and investment and encourage the formulation of sound policies that facilitate a competitive business environment and reduce the cost of doing business. Out of 853 members, only 187 belong to the food and beverage industry and 11 of them market fresh produce.
2. The Kenya Private Sector Alliance (KEPSA): Founded in 2003, KEPSA aspires to influence public policy for an enabling business environment. It has more than 100 000 direct and indirect members through business membership organizations and corporate members.
3. The Kenya Agribusiness and Agroindustry Alliance (KAAA): KAAA provides services such as linking agribusinesses to both SMEs and smallholder farmers, increased visibility through brand recognition on various KAAA platforms, representation in lobbying and advocacy initiatives such as agricultural roundtable meetings, programmes geared towards developing and commercializing agriculture and agribusiness, and trade and investment facilitation. KAAA recognizes as priority value chains dairy, livestock, horticulture, cotton, and grain and cereal. KAAA works with players in these value chains through capacity-building, resource mobilization and market linkages.

Partnerships with public entities, particularly the NIB, have proven beneficial to mills operating in the area, and have been crucial to the two aforementioned mills' access to seed funding. Terra Mill also works closely with the SACCO. Shine is now faced with the decision

of whether and how to structure a collaboration with the biotech firm that has approached them about a new variety of rice they have developed. The tentative idea would be to have 500 out growers produce the superior variety for Shine Rice on an area of 2 000 acres.

8.1 Conclusions

To conclude, the three millers interviewed for this study have benefitted from partnerships to some extent but there is significant scope for improving collaboration in the sector. First, roundtable discussions or networking events could be convened by moderators such as governmental agencies or donors who are widely trusted and respected. Strengthening the presence of existing associations such as KAM, KEPSA or KAAA is also a strategy to be considered, as is making them more inclusive to SMEs and agribusiness. The NIB, in its close position to farmers and millers, can play a more decisive role in bringing together various actors for advancing the common interests of the rice sector.

9 Conclusions

Examining the business models of agrifood processors has provided a detailed perspective of the agrifood system in which they operate. By looking at their procurement procedures, we grasped the challenges with respect to the production of paddy in the region and understood the organization of the supply chain in Mwea. Examining their finances revealed strengths and weaknesses with respect to firm finances, taxation challenges, and the availability of credit in the country. Analysing human resources practices provided insights into decent employment issues in Mwea including issues of gender equality and the availability of the right skills for the operations of rice millers. Assessing the logistics and operations offered an overview of the infrastructure in the country such as roads and electricity, and also of the availability of inputs and services markets for the agrifood sector. Marketing and sales analyses uncovered issues with respect to consumer demand for rice, and competition in the rice sector. Cross-cutting issues such as food safety and quality have emerged across several sections including logistics, operations and procurement.

Creating the proper environment for the growth of food SMEs is important not only for creating commercial value but also to enable these companies to contribute to rural development goals. The rice millers examined in this study are already contributing to filling in the gap in the market for rural services such as by providing affordable storage or transportation. They are generating advantageous employment opportunities and offering a nutritious product on the local market.

However, there is significant scope for improving their business enabling environment, which would eventually allow them to enhance their contribution to rural transformation. Currently, the high operational costs, particularly electricity charges, impede the millers from successfully competing with cheaper imported rice. The cess levied by counties on agricultural commodities adds to these expenses. Further, a culture of late payments – particularly from retailers – along with low-capacity utilization and the needs of the farmers for prompt payments translates into important cash flow constraints for the millers.

The high costs incurred by millers, the blending practices that some engage in to decrease the costs of production, the improper post-harvest practices (i.e. drying, storage) as well as weak coordination along the value chain posing safety and quality concerns, low technology adoption are all issues that could encourage Kenyan consumers to develop a preference for imported rice to the detriment of local rice. While the rice millers provide employment opportunities, more efforts are needed to incentivize them to engage in decent work standards, particularly for women and casual labourers who do not benefit from the same working conditions as permanent employees.

Policy options to address the issues identified include: reforming the cess charged on agricultural commodities by counties; setting up the right regulatory environment for the financial sector to introduce alternative financial products to agri-SMEs such as leasing; providing advisory services for purchasing equipment; strengthening value chain coordination such as by introducing contract farming schemes; exploring tools for smoothing cash flow along the value chain such as WRS; providing oversight and incentives to the millers for adhering to safety and quality practices and decent employment standards; and encouraging actors in the rice sector to establish collaboration and advance the common interests of the rice sector.

The analysis also revealed several areas that deserve further research. First, Kenya's rice sector would benefit from studies on the advantages that might be conferred by working directly with a milling enterprise as a contract grower, as opposed to the arrangements currently in place in which farmers sell occasionally to the millers directly but in greater part to brokers and traders. Second, more research can be dedicated to identifying rice consumer segments in Kenya and the premium they are willing to pay for specific quality characteristics; this is to enable millers to develop a more focused marketing and sales strategy. And lastly, studies could be conducted to understand the impact that the county cess has on the growth of the rice sector and the effects of its elimination on county revenue.

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This publication has several interrelated objectives. First, it aims to learn from small and medium sized rice processors about the role they play in agrifood systems transformation in Kenya. In particular, the study extracts lessons from semi-structured interviews with Kenyan rice millers which delve into their day-to-day business, challenges encountered, and any solutions used to address constraints.
Second, the study employs different disciplinary perspectives to gather evidence for the public sector on integrating policies in a way that is more conducive to doing business in the country. Third, the paper showcases the links between various business elements (procurement, operations, logistics, finance, marketing and sales, human resources and strategic partnerships) and sustainable development objectives such as enhancing farmer-market linkages, promoting gender equality, creating employment opportunities, or ensuring food safety and quality, and better nutrition.

The study provides various examples of how small and medium agrifood enterprises may respond to external environment cues and influence the local community when doing business. Overall, the paper represents a unique base of evidence on policy options that can foster the potential that small and medium agrifood firms have in agrifood systems transformation.

The FAO Agricultural Development Economics Technical Study series collects technical papers addressing policy-oriented assessments of economic and social aspects of food security and nutrition, sustainable agriculture and rural development.

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