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Can the agroprocessing sector create jobs in Africa? Evidence from Ethiopia, Ghana and Tunisia

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Working Paper 215

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Can the agroprocessing sector create jobs in Africa?

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Zaneta Kubik, Tigabu Getahun, Rose Omari, Meriem Oueslati Zlaoui

Abstract

This paper analyzes the potential of the agroprocessing sector to create jobs in Africa, based on the evidence from Ethiopia, Ghana and Tunisia. The analysis uses both primary qualitative data and secondary quantitative data on formal firms and workers in the agroprocessing sector and shows how responsive the sector is to the growing consumer demand and how it translates into employment generation. Agroprocessing sectors in Ethiopia, Ghana and Tunisia differ greatly in terms of the size and structure, and, accordingly, the stages of industry lifecycle, from nascent industry in Ethiopia to a relatively mature sector in Tunisia. Also, the type of jobs and their quality differ between the three countries even though they are generally considered to be good jobs compared to other jobs available to the same workers. So far, the potential of the agroprocessing sector remains largely untapped. Formal sector employs between 60 and 80 thousand people in each of the study countries, and the figure is around five times higher if employment in the informal sector is included. As of now, employment in agroprocessing activities accounts for only around 5% of total employment in the food economy. However, over the last two decades, it has grown rapidly. In Ethiopia, Ghana and Tunisia, the agroprocessing sector exhibits high employment elasticities of output, from 0.55 in Ghana and 0.66 in Tunisia to 0.85 in Ethiopia. This suggests that the agroprocessing sector is labor-intensive and presents high employment generation potential, both in absolute terms and compared to other sectors of manufacturing. On the other hand, if agroprocessing firms shift toward more capital-intensive production structures and use more mechanization and automation, the expected employment effects remain ambiguous.

Keywords: agroprocessing, food, beverages, manufacturing, employment, labor demand, inclusiveness

JEL codes: J23, J43, J80, L66

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1 Introduction

Labor is the critical asset of the poor. Creating opportunities to leverage this asset and generate a steady income stream is the most sustainable pathway out of poverty, in line with the Sustainable Development Goal 8 which aims to “promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all”. While the labor force participation rate in Africa, at 63.1% in 2019 (ILO, 2020), is higher than the global average, pointing to a large labor supply in the continent, poverty levels remain unacceptably high, especially in Sub-Saharan Africa, at more than 40% in 2018 (WB, 2020). In 2018, 33% of workers in Africa lived in extreme poverty, and 22% in moderate poverty, despite having a job (ILO, 2019a). These figures clearly indicate that in Africa, lack of adequate employment opportunities – which involve productive work and offer decent earnings, job security and social protection, among others – continues to be one of the principal challenges hindering poverty reduction efforts.

Population growth puts additional pressure on labor markets and the insufficient number of jobs. With a projected increase of more than one billion people by 2050, Sub-Saharan Africa is expected to become the most populous region of the world (UNDESA, 2019a). The growing size of the working age population translates into the size of the labor force – the latter has markedly grown over the last two decades, from 302.1 million in 2000 to 489.7 million in 2019 (ILO, 2020). So far, despite sustained economic growth – at least until the Covid-19 pandemic – the African economy has not been able to absorb labor. Estimates point to low employment elasticity of growth in Africa, with a 1% increase in GDP being associated with only 0.41% increase in employment over the period 2000-2014 (AfDB, 2019). This low contribution of economic growth to job creation has mainly been explained by the limited role that the manufacturing sector – which usually exhibits higher employment elasticities (ILO, 2019b) – plays in the African economy.

In this context, food systems have been identified to have a high potential to accelerate Africa's economic transformation and development, and the much-needed job creation (WB, 2013; Tschirley et al., 2015; Allen et al., 2016; Townsend et al., 2017; Allen, Heinrigs & Heo, 2018). Over the past years, food systems in Africa have been undergoing a far-reaching transformation, moving away from predominantly subsistence-oriented activities to higher levels of commercialization and vertical coordination of the food value chains (Reardon et al., 2009). One important aspect of this transformation is the growing role of the food midstream activities, such as processing, marketing and retail, even though with significant variation between countries, depending much on their endowments (Laborde et al., 2019). These changes have been facilitated by the processes of liberalization and privatization which have shaped the agroindustry (von Braun & Díaz-Bonilla, 2008) and spurred foreign direct investment (FDI) and imports and exports (Awokuse & Reardon, 2018).

Food system transformation in Africa has been shaped by the changing patterns of food demand, moving away from staple and unprocessed foods to high-value fresh, processed, and convenience foods – mainly as a consequence of rising per capita incomes and urbanization. The World Bank (WB) predicts that the most dynamic sectors are likely to be rice, feed grains, poultry, dairy, vegetable oils, horticulture and processed foods to supply domestic markets (WB, 2013). In addition, food-away-from-home is the category exhibiting the highest growth potential (Allen et al., 2016). These changes in demand entail changes in production, in particular higher level of food transformation beyond the farm which, in turn, creates opportunities for local food producers, especially that an estimated 96% of marketed output in Africa is supplied through domestic markets (Awokuse et al., 2019). By 2030, the African food market is expected to reach US\$ 1 trillion by 2030 (WB, 2013), potentially making agriculture and agribusiness catalysts for job creation, development and poverty reduction.

In line with these trends, and in particular considering the growing role of food transformation and processing domestically, this paper aims at assessing the potential of agroprocessing sector to create decent and inclusive jobs in Africa, based on evidence from three countries: Ethiopia, Ghana and Tunisia. The focus on agroprocessing is motivated by the fact that even though currently, employment

in agroprocessing is still very low across Africa, it is projected to grow fast in the future (Allen et al., 2016; Townsend et al., 2017). Besides looking at how many jobs agroprocessing can create, this paper also looks at the quality and inclusiveness of these jobs. This is in line with the decent work agenda of International Labor Organization (ILO), and particularly important in the context where informality predominates labor markets and where population growth continues fueling labor supply. The paper has several limitations. First, the analysis is limited to the formal agroprocessing firms. Hence, it excludes an important share of the processing activities and related employment in the informal sector, in particular self-employment. Second, the paper only looks at jobs created within the agroprocessing sector, but does not consider indirect and induced effects. These economy-wide effects of growth in agroprocessing are expected to be large given the extent of linkages with upward and downward segments of the food value chains.

The paper proceeds as follows. Section 2 describes data and methodology, section 3 presents the conceptual framework which focuses on the drivers of employment creation in the agroprocessing sector and guides the analysis in this paper. The remaining analytical sections present the main findings: section 5 provides an overview of the agroprocessing sector in Ethiopia, Ghana and Tunisia and discusses how local firms have responded to the growing consumer demand, while section 6 focuses on issues related to various aspects of employment, including employment intensity of output and the number of jobs created, as well as the quality and inclusiveness and the workers' perceptions about the jobs in agroprocessing. Finally, section 7 concludes.

2 Data and methodology

The analysis in this paper is based on both primary and secondary data, and combines qualitative and quantitative methods. The primary data was collected by the authors in the three study countries: Ethiopia, Ghana, and Tunisia. The data collection process took place in the second half of 2019 and was implemented by the Policy Studies Institute (PSI) in Ethiopia; the CSIR-Science and Technology Policy Research Institute (STEPRI) in Ghana, and the National Institute of Agronomic Research of Tunisia (INRAT). The qualitative survey comprised semi-structured interviews in selected agroprocessing firms. The list of registered firms operating in the agroprocessing sector was established based on available secondary data or elicited from the relevant institutional bodies; i.e. Central Statistical Agency's Large and Medium Manufacturing (LMM) and Small-Scale Manufacturing (SSM) surveys in Ethiopia, Association of Ghana Industries in Ghana, and Industry and Innovation Promotion Agency in Tunisia.

The study focuses on registered firms operating in the food and beverages manufacturing sector. Two caveats that relate to this choice need to be signaled. First, the term *agroprocessing* is used interchangeably throughout the paper, in reference with the literature which typically places agroprocessing activities within the context of food system and food production. Alternatively, the literature has also employed terms such as *agro-industry* or *agribusiness*. Hence, by focusing on food and beverages manufacturing only, this paper excludes other subsectors of agroprocessing like leather, textiles, animal feed or forestry products – which in some countries may play an important role, as, for instance, leather in Ethiopia and textile in Tunisia. Second, with respect to food and beverages processing, only registered firms are included in the sampling frame. Considering that in Africa, most of employment is in the informal sector (IMF, 2017), looking at formal firms only is an important limitation, especially in what concerns the quantitative assessment of the number of jobs created in the sector. On the other hand, since the interest of this paper lies not only in the quantity, but also quality and inclusiveness of jobs, narrowing the analysis to formal sector might provide a good indication of the potential of agroprocessing sector to create good jobs. This would, clearly, rely on the assumption, often made in the literature, that formal sector jobs are better than jobs in the informal sector (Ohnsorge & Yu, 2021); however, this assumption has been questioned by some authors as not reflecting the complexity and diversity of the informal sector (Fields, 1990).

Due to its small size, the sample is not representative for the agroprocessing firms in the three countries, nevertheless, to ensure reliability of the data, listed firms were stratified based on the following criteria:

- i. Ownership (foreign-owned; domestic private; state-owned; joint venture)
- ii. Size (micro; small and medium; large)
- iii. Capital intensity of production (capital-intensive; labor-intensive¹)
- iv. Export status (exporting firms).

From each stratum, one firm was selected using probability without replacement method. In case of Ethiopia and Ghana, the sampling frame was narrowed down to firms located in and around the capital cities since they constitute a large majority of agroprocessing firms operating in those countries. For instance, in Ghana, more than 90% of agroprocessing firms are located in the Greater Accra region, especially in Accra and Tema. In Ghana and Tunisia, the pre-established information on capital intensity of the listed agroprocessing firms was not available, hence the sampling strategy could not account for that criterium. Finally, as is typical in the case of firm-level surveys, the non-response rate was non-negligible, especially in Ghana and Tunisia, which affected the composition of the samples in the two

¹ Capital-intensive firms were defined as those exhibiting the capital-labor ratio above the sectoral average, and labor-intensive as those exhibiting the capital-labor ratio below the sectoral average.

countries. In total, data was collected from ten firms in Ethiopia, six firms in Ghana, and nine firms in Tunisia (Table A1 in the Appendix).

Two qualitative methods were employed: key informant interviews (KIIs) and focus group discussions (FGDs). KIIs were conducted with the firm's owner, manager, or the most knowledgeable person in the organization. FGDs were conducted with the firm's workers; mostly, but not only, the blue-collar production workers. In Ethiopia, FGDs with workers were not feasible due to the deteriorating socio-political situation over the survey period; and in Ghana and Tunisia, some of the firms refused that their workers be interviewed. Both KIIs and FGDs were centered around the questions relative to employment. More specifically, KIIs addressed a relatively broad set of topics, including the quantitative and qualitative aspects of employment. In line with the conceptual framework presented below, issues relative to consumer demand, competitive structure of the industry, future prospects of growth and challenges faced by agroprocessing firms were also discussed. FGDs, on the other hand, focused on the quality and inclusiveness of employment and were used to triangulate information obtained from KIIs and elicit information on workers' perceptions on jobs in agroprocessing.

The qualitative analysis of the primary data is complemented with quantitative analysis of the secondary data. The main source of the secondary data is the UNIDO Industrial Statistics Database (INDSTAT 2 2022, ISIC Revision 3). This database provides cross-country timeseries on the manufacturing sector disaggregated at the 2-digit level of ISIC² and includes indicators such as the number of establishments, number of employees, number of female employees, output, value added, gross fixed capital formation and wages. The data is reported by national statistical authorities and compiled by UNIDO. Coverage in terms of years, as well as data items, varies from country to country; in particular, data for some African countries is patchy if not entirely missing. In case of the three study countries, the data on the number of establishments, number of employees, output, and value added in the food and beverages manufacturing is fairly complete for Tunisia until 2020, and Ethiopia until 2015; while only several datapoints are available for Ghana over the last two decades. Complementary data from the WB's World Development Indicators (WDI) is also used.

The analysis in this paper is descriptive and centered around three aspects: employment quantity, quality and inclusiveness. Employment quantity corresponds to the number of jobs created in the agroprocessing sector and is estimated based on the secondary data. Apart from descriptive statistics on employment and wages, employment elasticities of output are calculated to assess how employment-intensive growth in the agroprocessing sector has been in the three countries. Employment elasticity is the percentage change in the number of employed persons in an economy or sector associated with a percentage change in economic or sectoral output (Kapsos, 2005). Two methodologies are frequently used; one gives the arc elasticity of employment, and the other the point elasticity of employment. In this paper, the latter is used as it is considered to provide more consistent results. In line with Kapsos (2005), a log-linear regression model with country dummy variables interacted with logarithm of the sectoral value added, as in equation (1), is employed:

$$\ln E_i = \beta_0 + \beta_1 \ln Y_i + \beta_2 (\ln Y_i \times D_i) + \beta_3 D_i + u_i \quad (1)$$

Here, the elasticity ε_i of employment in sector i , E_i , with respect to the sectoral value added, Y_i , is given by differentiating both sides of equation (1) and solving for $\partial E / \partial Y$:

$$\left(\frac{\partial E}{E}\right) = (\beta_1 + \beta_2) \left(\frac{\partial Y}{Y}\right) \rightarrow \frac{\partial E}{\partial Y} \left(\frac{Y}{E}\right) = \beta_1 + \beta_2$$

where $\beta_1 + \beta_2$ represents change in employment associated with a differential change in value added.

² International Standard Industrial Classification of All Economic Activities

While employment elasticity of output is a useful indicator of the labor markets, it has many shortcomings. Most importantly, it is limited to represent the change in *quantity* – but not *quality* – of jobs associated with a change in the output. Kapsos (2005) emphasizes the fundamental arithmetic identity linking employment elasticity and labor productivity whereby for a given amount of output growth, ΔY , any increase in the rate of employment growth must be met by an equal and opposite decrease in labor productivity growth.³ Hence, while interpreting the employment elasticity of output, it is necessary to also consider concurrent changes in labor productivity. Besides looking at the quantity of jobs in the agroprocessing sector, this paper also discusses the quality and inclusiveness of employment in the sector.

Because it is multidimensional, defining and measuring job quality is challenging, and the process has not so far been harmonized despite much policy interest. Moreover, such attempts are further complicated by the highly subjective and contextual character of perceptions about what good jobs are (Findlay, Kalleberg & Warhurst, 2013). Nevertheless, the literature has come up with a set of commonly used indicators that the analysis in this paper refers to, including various aspects of wage and remuneration, contractual arrangements, working time, tenure and promotion, social protection, occupational safety and health, and industrial relations (Findlay, Kalleberg & Warhurst, 2013; Arranz, Garcia-Serrano & Hernanz, 2019). Inclusiveness of employment with respect to specific groups of individuals, for instance women, youth, disabled or ethnic minorities, defines an employment environment where every person has the right to equal treatment and opportunities at work, regardless of any attributes other than ability to do the job (ILO, 2022). In this paper, the focus is specifically on women and youth; however, broader issues of discrimination at work are also elaborated. Quality and inclusiveness of jobs in agroprocessing sector are assessed based on the qualitative data, using both objective measures as well as subjective perceptions of interviewed workers.

³ This is because $Y = E \times P$ where P is output per worker; this implies that for small changes in output, $\Delta Y = \Delta E + \Delta P$. Dividing by ΔY : $\varepsilon = \frac{\Delta E}{\Delta Y} = 1 - \frac{\Delta P}{\Delta Y}$.

3 Conceptual framework

3.1 Agroprocessing sector and its role in the food economy

Food economy plays a central role in livelihoods and economic development in Africa. So far, policy and research alike focused primarily on agriculture, leaving other segments of the food value chain out. However, it has been recently recognized that a comprehensive value chain approach is more relevant, as it allows to account for important linkages between all steps of food production, from farm to final consumer (Hollinger & Staatz, 2015). In particular, the food midstream (processing, logistics, and wholesale), or the ‘hidden middle’, for long absent from the debate, has been an important part of the food economy transition in low- and middle-income countries (Reardon, 2015; Reardon, Liverpool-Tasie & Minten, 2021), with the potential to contribute to healthy, inclusive and sustainable food systems (IFAD, 2021). The performance of agribusiness is expected to affect essential dimensions of Africa’s development: economic growth, poverty reduction and their spatial patterns within and across countries; also, because of the strong linkages with agriculture – a mainstay of rural livelihoods – the structure of agribusiness may influence equity outcomes (Haggblade, 2011).

Agroprocessing is a critical part of the food midstream; and almost all agricultural products, with the exception of fresh fruit and vegetables, undergo some form of processing before the final consumption. Agroprocessing is the transformation of agricultural raw products through mechanical (e.g. de-hulling, shelling and milling), biological (e.g. fermentation) and chemical (e.g. pasteurization) alterations, or combinations thereof (Hollinger & Staatz, 2015). The extent of these processes varies widely, from grinding grain for flour to the industrial production of convenience foods (van Boekel et al., 2010). “[Agroprocessing] converts agricultural raw material or commodities into agrifood products for human and animal consumption or for further industrial use. [...] It changes the quality, safety and health attributes of agricultural commodities in terms of shelf-life, color, texture, nutrient content or volume.” (Hollinger & Staatz, 2015). Food processing can have implications for nutrition, for instance if it leads to more diversified diets (Ferguson et al., 1993); or if nutritional quality of foods is improved through fortification (Venkatesh Mannar & Hurrell, 2018). On the other hand, overconsumption of ultra-processed foods (UPF) poses serious threats to health and nutrition, and is one of the drivers of the double burden of malnutrition in Sub-Saharan Africa (Reardon et al., 2021; IFAD, 2021).

The agroprocessing sector plays an important role in the food economy, as it (i) reduces post-harvest losses; (ii) extends the shelf-life of food, making it easier to reach urban areas where a big share of consumers is concentrated, this is particularly essential in cases of perishable nutrient-dense products; (iii) reduces the seasonality of access to various foods, offering more diversified diets over longer periods of time; (iv) improves the quality and safety of foods, especially if accompanied by investments in dry storage and cold-chain facilities (FAO & UNIDO, 2010; IFAD, 2021; Liverpool-Tasie et al., 2021). To the extent that consumers are willing to pay a premium exceeding the cost of processing, agroprocessing is a significant step in value addition to agricultural products (Hollinger & Staatz, 2015). For instance, evidence from Bangladesh shows that sorting, cleaning, grading, cooling and packing accounts for almost half of the FOB price of the French beans intended for exports (WB, 2007). In addition, because of its forward and backward linkages, investment and growth in the agroprocessing sector has the potential to create extensive multiplier effects, in particular by generating demand for agricultural products and associated inputs and services, creating on- and off-farm employment, enhancing incomes and public sector revenues. Ultimately, all these aspects contribute to poverty reduction, improved food and nutrition security, and economic development (FAO & UNIDO, 2010; WB, 2007).

3.2 Drivers of employment creation in the agroprocessing sector

The future prospects of the food economy are expected to translate into important potential for employment creation. While food economy has traditionally occupied an important place in

livelihoods, employment and income generation in Africa, a change in the structure of employment patterns within the food economy, in particular toward a growing role of the off-farm segments, is anticipated in view of rapid demographic and socio-economic changes that Africa is undergoing and which have implications for demand and supply of the agrifood products (Hollinger & Staatz, 2015). Population growth, urbanization and rising incomes are considered to be the main drivers of the food demand and supply in Africa. According to recent projections, the population may increase by 1.05 billion people between 2019 and 2050 in Sub-Saharan Africa, accounting for most of the growth of the world's population (UNDESA, 2019a). Because of declining fertility rate, the working age population is growing faster than any other age category, creating an opportunity for demographic dividend, accelerated economic growth and rising incomes. The extreme poverty rate fell from 56% in 1990 to 40% in 2018, even though the Covid-19 pandemic has later reversed this trend and the number of the poor is now rising (WB, 2020). The continent is also rapidly urbanizing, and it is expected that by 2050, 59% of the population will reside in urban areas, compared to 43% in 2018 (UNDESA, 2019b).

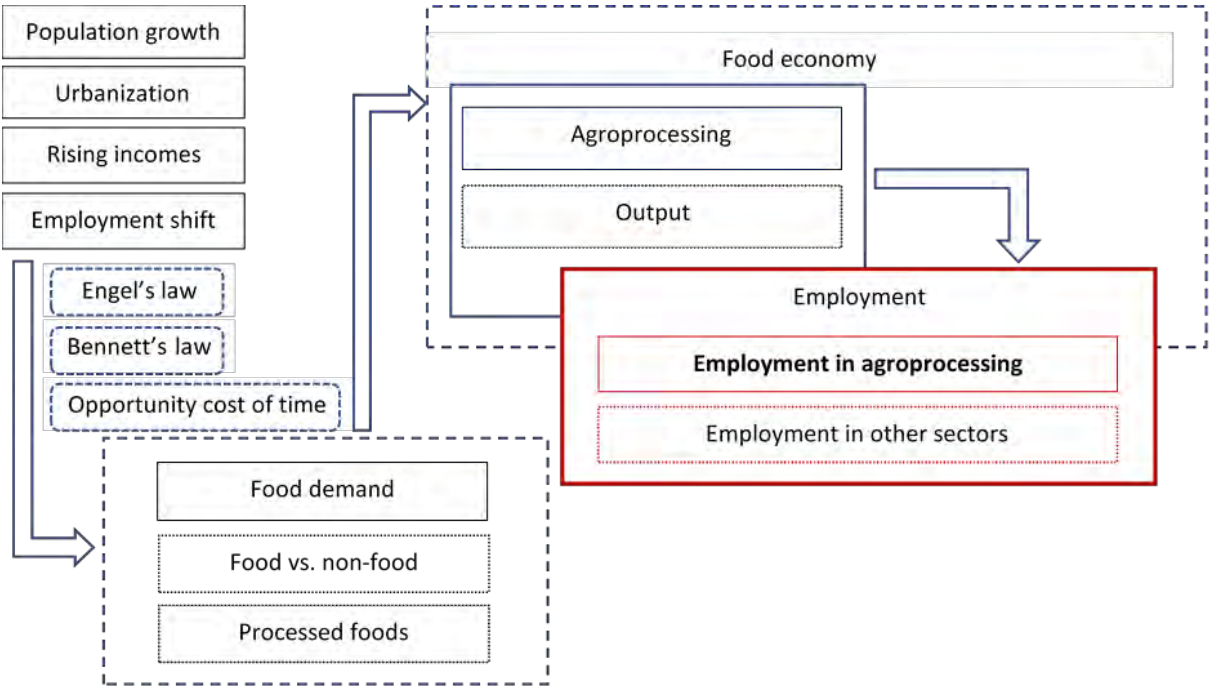
Together with strong economic growth over the past two decades – at least until the Covid-19 pandemic, these trends have been expected to fuel an emerging middle class, estimated at around a third of Africa's population, or nearly 350 million people as of 2010 (AfDB, 2011). These figures have later been called into question, especially that the majority of the estimated 350 million people falls into the floating class category, meaning that they barely exceed the poverty threshold and hence their purchasing power is limited (Melber, 2022; van Blerk, 2018); nevertheless, the implications of growing incomes for food demand and food market expansion in Africa are substantial (Allen et al., 2016). Importantly, while exports offer important opportunities in specific food value chains, the broad employment patterns in the food economy in Africa are primarily driven by local food demand (Allen et al., 2016). The relationship between consumers' income and food demand is well known and described by Engel's law and Bennett's law. The former shows that as income rises, the share of food in total expenditures falls compared to the share of non-food goods; even if it rises in absolute terms. The implication for the poor countries in particular is that the demand for food may rise nearly as quickly as for non-food products in the early phase of growth; even though it is later outpaced by the non-food demand. The latter, on the other hand, explains how the demand for different types of food changes with rising incomes; more specifically, consumers spend a growing share of their food budget on perishable foods such as fresh produce, dairy and meat, while the share of staple cereals and root crops declines (Allen et al., 2016).

Both the Engel's law and the Bennett's law are expected to have important implications for employment. First, in line with the Engel's law and the growing demand for non-food goods, employment should move off the farm into rural non-farm employment (RNFE) – this trend has already been widely documented in Africa (Christiaensen & Maertens, 2022). Second, in line with the Bennett's law, and of principal interest for this paper, within the food economy, employment should progressively move off the farm into the food midstream (Allen et al., 2016) – this is because of the growing demand for perishable and processed foods. These foods require much more value addition which, in turn, requires labor inputs. Hence, the expected changes in the structure of food demand are likely to drive employment generation, directly in the food midstream, and, indirectly, in agriculture and other sectors of the economy (Figure 1).

Several arguments suggest that the patterns described in Figure 1 are likely to unfold in Africa. The share of food expenditures in total market expenditures varies widely across countries but is generally high, between around 30% in Mozambique and up to 60% in rural Nigeria. The figures depend largely on the respective shares of consumption of food from own production compared to food purchased on the market. Nevertheless, reliance on the market is very high overall, between 43% of total food consumption in Mozambique and 83% in Nigeria; even for rural households which purchase more than 50% of their food consumption on the market (Allen et al., 2016). These figures may further increase with the dietary transition that is taking place across Africa, in particular the rise in consumption of processed and ultra-processed foods (Reardon et al., 2021). Changes in food consumption patterns are well documented in Africa (Reardon et al., 2015; Tschirley et al., 2015; Hollinger & Staatz, 2015; Allen

et al., 2016) and globally (Gehlhar & Regmi, 2005). Already as of 2005, global sales of processed foods accounted for around three quarters of total annual food sales (Gehlhar & Regmi, 2005). In Africa, these figures vary widely and range from 27% of purchased food in Mozambique to 58% in Nigeria, excluding the “food away from home” (FAFH) category (Allen et al., 2016). When FAFH is included, Nigeria, for instance, reaches the global average, i.e. around 75% of total purchased food. In addition, the growth rate of per capita sales of the ultra-processed foods in Africa is among the highest in the world (IFAD, 2021), and particularly so for the FAFH, even though disparities exist between countries (Allen et al., 2016).

Figure 1: (Domestic) drivers of employment creation in the agroprocessing sector



Source: Authors’ own elaboration

Although – in line with the Engel’s law – income elasticity of demand for food is nearly always less than one, Allen et al. (2016) show that it can exceed one in case of specific product groups, especially in low-income countries. For instance, foods such as wheat and rice, oilseeds, fruit, dairy, eggs and meat exhibit demand elasticities above one. More importantly, processed items within these food categories often have elasticities larger than 1.5 – which clearly points to the increasingly dynamic food market and the great potential that the agroprocessing sector may have in the future. Concurrently, the demand for food is not only growing but is also becoming more diverse, a phenomenon propelled by socio-economic stratification, urbanization, and globalization. Even though price remains a key determinant of demand, other food product attributes such as nutritional and health characteristics, presentation and packaging, shelf-life, and ease of preparation are shaping consumer preferences and purchasing decisions (Hollinger & Staats, 2015). In case of processed foods more specifically, the demand is driven by convenience that they offer – which in turn is related to the employment shift observed in African countries, with an increasing number of women working outside the home, and more generally, increasing number of people working in non-farm jobs. Hence, the opportunity cost of time has become a critical factor shaping food demand, especially in urban areas (Reardon et al., 2021). Indeed, consumption of processed foods tends to be much higher in urban areas than in rural areas; for instance, in Tanzania, per capita daily energy intake from processed foods, including FAFH, is 800 kcal on average in urban areas and 300 kcal in rural areas (Cockx et al., 2019); even though

income elasticities of demand for some food products may actually be higher in rural areas (Hollinger & Staats, 2015).

While it is clear that the growing demand for processed foods creates opportunities for the agroprocessing sector, an important question is to which extent this demand will be captured by the local agroprocessing firms as compared to imports. The fact that Africa is a net food importer, despite its vast agricultural potential, is of concern to many (Rakatoarisoa, lafrate & Paschali, 2011). Its food imports total up to about US\$ 60 billion per year (ZEF & AKADMEIYA2063, 2020); more specifically, cereals amount to about US\$ 25 billion per year, meat and dairy US\$ 8 billion, the sugar sector US\$ 4 billion and the vegetable oil sector US\$ 9 billion (Bouët, Odjo & Zaki, 2020). Imports of processed, semi-processed and high-value food products have been on the rise; for instance, between 2001 and 2011, they grew fivefold, from US\$ 5 million to US\$ 25 million; and around three quarters of these imports originated from outside of Africa (Traub et al., 2015). If the growing food demand for processed foods is satisfied by imports, rather than local production, then the consequences for domestic employment creation will be significant. Traub et al. (2015) point out that while importation of processed foods may still stimulate job growth in retail, it will nevertheless cause loss of potential job expansion in agroprocessing and other segments of the food value chains.

In contrast, Allen et al. (2016) argue that food imports are not necessarily a cause for alarm. First of all, an estimated 96% of marketed output in Africa is supplied through domestic markets (Awokuse et al., 2019). Second, most of food imports consist of commodities or low-processed products, hence, leaving room for much value addition in the local economy through processing, packaging, wholesaling, distribution and retailing. Third, as regards processed foods, indeed the share of imports is high in case of high-processed non-perishable items, such as vegetable oil and sugar, compared to other food categories, at 17% on average – yet, in some countries, this figure is much higher, for instance 61% in Rwanda and 57% in Tanzania. However, import shares for all other categories of processed foods are much lower, at 6% on average, which is even lower than in the case of unprocessed non-perishable commodities (Allen et al., 2016). Hence, growth opportunities clearly exist for local agroprocessors, whether in food categories where they are already dominant, or in categories so far captured by imports. In addition, prospects of regional exports in processed foods, so far largely untapped – as many countries run trade deficit in the processed food categories (Allen et al., 2016), could further enhance the sector's growth. Nevertheless, from the perspective of employment generation, even though it is often said that the demand for labor is derived from the demand for product, this is only partially true; instead, Fields (2019) suggests that in case of Africa specifically, the demand for labor is derived from demand for *and supply of* product. Hence, capturing the potential of growing food demand to stimulate employment growth in the agrifood system will essentially depend on stimulating the domestic production base (Traub et al., 2015).

4 Agroprocessing sector in Ethiopia, Ghana and Tunisia

In line with the above framework and in order to assess the potential of the agroprocessing sector in Ethiopia, Ghana and Tunisia to create jobs, it is necessary to first assess how local supply has responded to the growing demand for processed foods. Looking at the number of (formal) businesses operating in the sector, and the output and value added they create, several observations can be made. First, the three countries differ greatly in terms of the size and structure, and, accordingly, the stage of development of the agroprocessing sector. Second, even though the starting point – and hence, potentially also, the room for growth – is different in each country, all of them have recorded significant expansion of the agroprocessing sector over the last two decades. Third, in the three countries, while the agroprocessing sector is small relative to the whole economy, as measured by GDP, it accounts for an important share of the manufacturing sector, between 20% and 35% in terms of the value added. An important caveat is that these figures only refer to the formal sector; if informal businesses were included, provided that precise data is available, the size and importance of the agroprocessing sector in local economies, including its potential to create employment, would appear much greater. On the other hand, if one is interested in quality employment, then the figures relative to the formal sector may still be a good proxy of the sector's potential to create good jobs – assuming, in line with much of the literature (Ohnsorge & Yu, 2021), that formal sector jobs are (usually) better and of higher productivity than informal sector jobs.

The trends observed in Ethiopia, Ghana and Tunisia broadly follow the evidence from other developing countries. This evidence shows that as economies develop and undergo the process of structural transformation, the share of agribusiness in GDP is rising – while the share of agriculture is declining – until the economies become more industrial, and with a more diversified industry, when the share of agribusiness in GDP also starts declining (WB, 2007; Da Silva et al., 2009; Haggblade, 2011). Ethiopia, Ghana and Tunisia exhibit similar patterns in terms of the economic development and the relative size of agribusiness and agriculture. In Ethiopia, the agroprocessing sector⁴ is nascent, with less than 700 firms, as of 2013⁵, and value added of US\$ 0.7 billion, as of 2015 (Table 1). These observations are confirmed by the findings from the primary survey. Nine out of ten firms interviewed in Ethiopia stated that agroprocessing sector is still in its infancy stage. In Ghana, the size of the agroprocessing sector is the largest out of the three countries, with 17.5 thousand firms and value added of US\$ 3.5 billion. Despite being a larger sector, agroprocessing in Ghana is considered to be in the early to medium stages of development, with a large part of the agribusiness production being artisanal (Sutton & Kpentey, 2012). In Tunisia, the agroprocessing sector is more mature than in Ethiopia and Ghana, but smaller in size compared to the latter, with 12.5 thousand firms and value added of US\$ 1.4 billion. Tunisian firms are well-integrated into the world markets, especially due to close ties with the European market and a significant presence of foreign direct investment (FDI). When the population size – a proxy of potential domestic demand – is accounted for, the differences between countries are even starker. For instance, in Tunisia, there is one agroprocessing firm per around 1,000 persons; in Ghana one firm per 1,700 persons, while in Ethiopia, one firm per 167,300 persons.

Despite its relatively small size, both in absolute terms, as well as compared to the whole economy – for instance, in Ethiopia, agro-industries account for only 5% of GDP (UNIDO, 2012); and in Tunisia, 3.6% (Oueslati-Zlaoui et al., 2021) – agroprocessing plays an important role within the manufacturing sector (Table 1). Food and beverages firms account for more than a quarter of all manufacturing firms in Ethiopia and close to 20% in Ghana; and create, in both countries, 35% of the manufacturing value added. In Tunisia, these figures are somewhat lower, at 17% and 21% respectively. This results from a higher level of industrialization and more diverse manufacturing sector, and in particular, an important

⁴ Recall that the agroprocessing sector is proxied here by the food and beverages sector.

⁵ The comparable cross-country data on the food and beverages industry in the three countries is limited. The latest year for which the UNIDO data on the number of formal firms operating in the food and beverages sector is 2013; and 2015 in case of the data on the output and value added.

role of the textile industry, which accounts for close to a third of all manufacturing businesses. The evidence from other African countries, including Senegal and Cote d’Ivoire, also shows that agroprocessing is usually one of the largest contributors to the manufacturing or even total formal sector (Hebous & Tran, 2017; Allen, Heinrigs & Heo, 2018). On the other hand, the reverse is true for agriculture, which still plays a major role in terms of value added and employment in Ethiopia, but lower in Ghana and, even more so, in Tunisia (Figure A1 in the Appendix). Overall, the differences between the three countries in terms of the role that agriculture and the food sector plays, reflect the different stages of economic and industrial development and the underlying process of structural transformation, in line with the evidence from other developing countries (WB, 2007).

Table 1: Food and beverages manufacturing sector in Ethiopia, Ghana and Tunisia (2015)

	Ethiopia		Ghana		Tunisia	
	Value	%	Value	%	Value	%
Establishments (number) ¹	687	26	18453	19	12517	17
Output (million USD)	2,953	34	5,924	35	6,756	32
Value added (million USD)	689	35	3,461	35	1,350	21

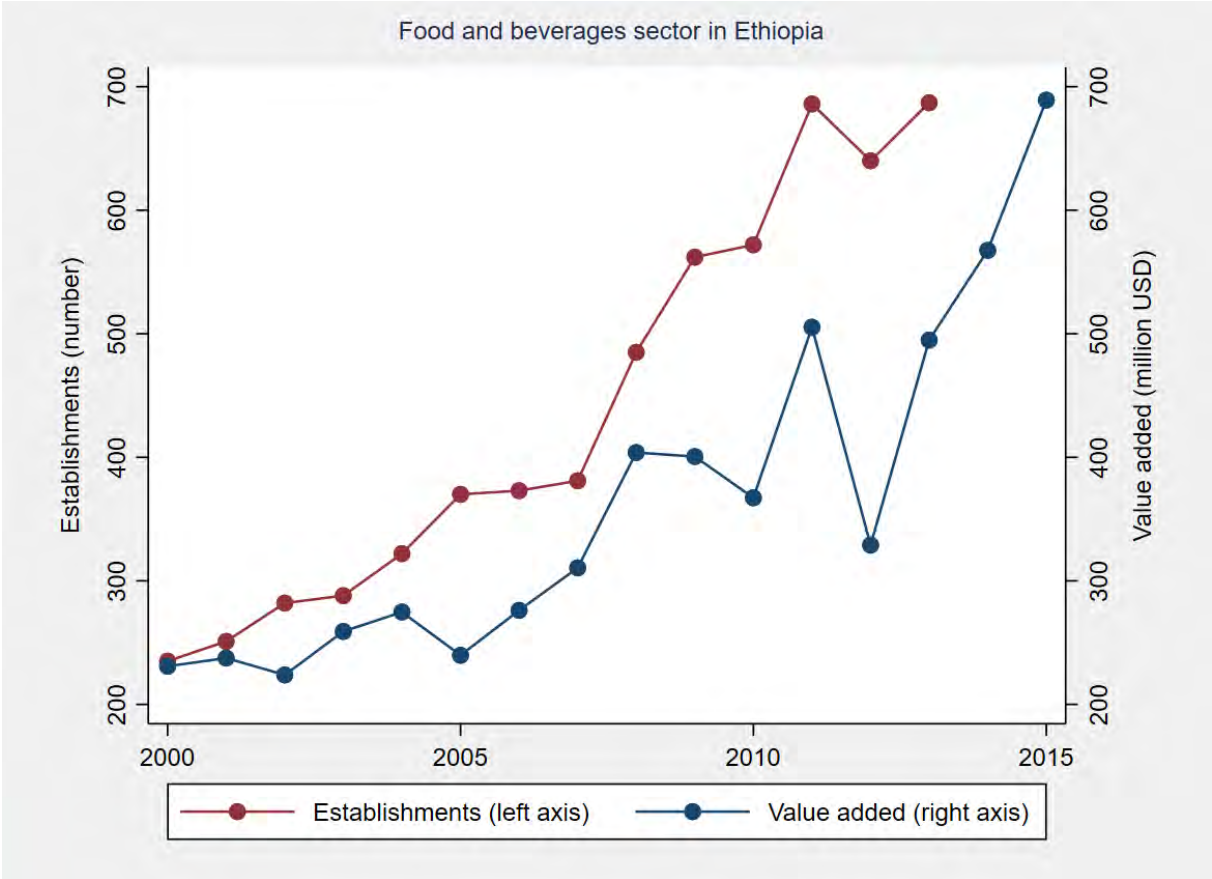
Source: Authors’ own elaboration based on data from UNIDO. Data presented in absolute value and as a share of total manufacturing. ¹ Number of establishments as per 2013.

Currently, the potential of the agroprocessing sector, specifically in Ethiopia and Ghana, remains largely untapped. Nevertheless, the growing yet unmet demand creates multiple opportunities for expansion in the near future – not only in terms of formation of new businesses, but also expansion of the existing ones. Almost all surveyed firms in the two countries revealed long-term aspirations to expand their businesses, indicating that the agroprocessing sector has room for growth. In Ethiopia, all but one firm said that supply is much smaller than demand for the processed food products, hence agroprocessing firms do not face much competition in the output market. However, depending on the product, some firms might face competition from informal businesses. Similarly, in Ghana, most of the interviewed firms recognized the growing demand for processed food products, creating many business opportunities for the sector. However, the level of local competition these firms face appear to be higher compared to the Ethiopian firms; but again, with important heterogeneity. For instance, producers of local foods, like gari, report having only few competitors on the market; but in other sectors, like the dairy sector, local producers have to compete with multinational companies that are already well-established on the market and for whom it is easier to achieve economies of scale. Nevertheless, the majority of surveyed firms expect good prospects for their businesses in the future and some of them have already been expanding their operations, mainly through capital investment, especially machinery, and technical and product innovation. Importantly, all respondents emphasized the importance of quality and safety of the food products and regarded it as a means to achieve competitive advantage; and a number of them have made efforts to comply with standards defined by the Food and Drug Authority and Ghana Standards Authority. In Tunisia, six out of ten businesses reported that they are presently expanding their operations, either by adding a production unit and extending their product line or by expanding into new markets; nevertheless, the future prospects were perceived not as good as in Ethiopia and Ghana; and mostly related to the European markets rather than the domestic market.

The food and beverages sector has undergone a dynamic expansion over the last two decades, as shown in Figure 2 for Ethiopia and Figure 3 for Tunisia; the relevant yearly data is not available for Ghana. In Ethiopia, the food and beverage sector registered a threefold increase in the number of firms over that period of time, from 235 in 2000 to 687 in 2013; and similarly, a threefold increase in the value added, from US\$ 231 million in 2000 to US\$ 689 million in 2015. In Tunisia, the number of firms increased almost four times, from 3008 in 2000 to 14,920 in 2017; and the value added increased

twice, from US\$ 631 million in 2000 to US\$ 1,214 million in 2018. These figures need to be treated with caution, as the official statistics vary widely depending on the source; and in some countries, firms may be registered with different institutions, which makes it challenging to compile aggregate statistics (see, for example, Baumüller et al., 2021, for Ethiopia). Essentially, as mentioned earlier, a large share of the food economy, especially in Ethiopia and Ghana, is in the informal sector and therefore excluded from the official statistics; hence, if informal firms were included, the overall agroprocessing sector dynamics would be much higher. Haggblade (2011), for instance, estimated that the marketed volumes in the food midstream in Sub-Saharan Africa will increase six-fold by 2050.

Figure 2: Food and beverages sector in Ethiopia

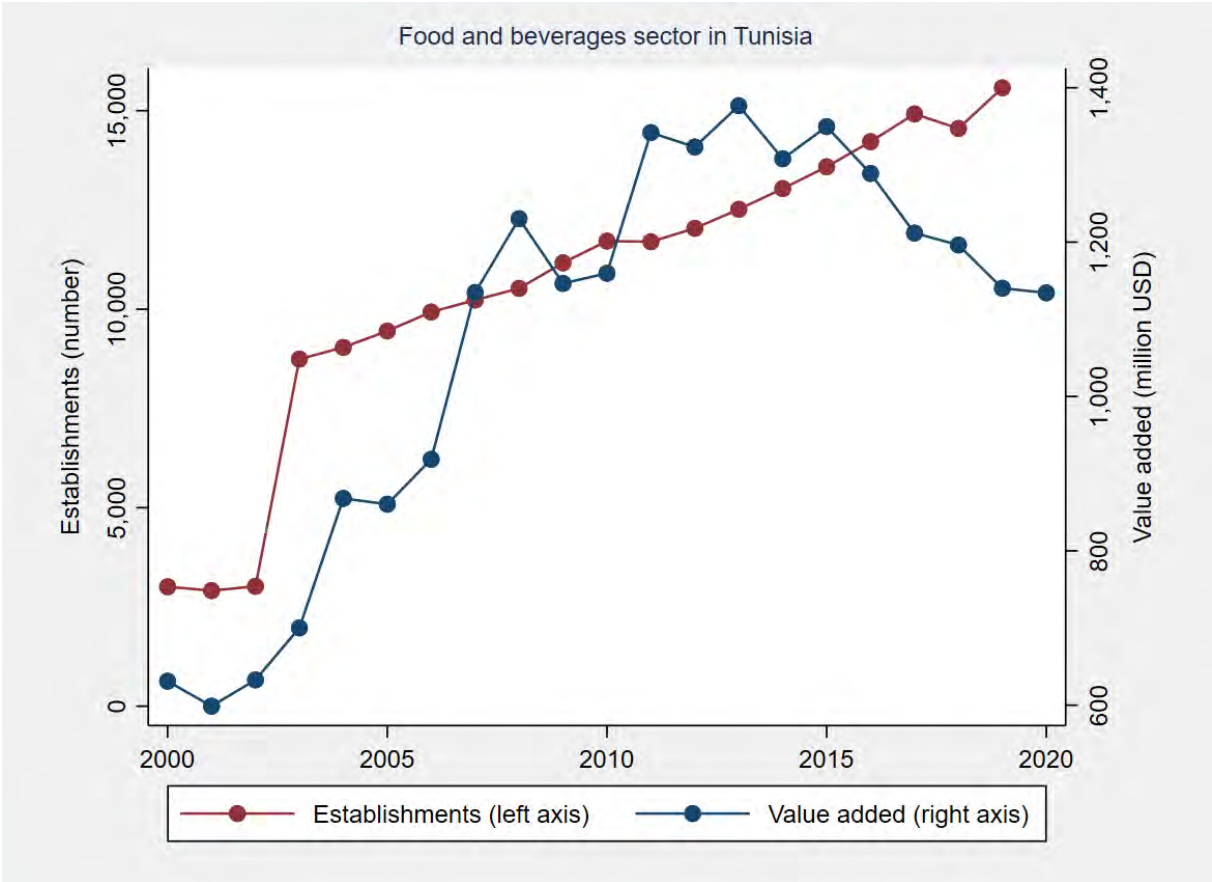


Source: Authors’ own elaboration based on data from UNIDO.

An important feature of the agroprocessing sector growth is the recent proliferation of the small and medium enterprises (SMEs). While earlier evidence pointed to a highly dualistic distribution of agroprocessing firms, with a large number of small and micro operators, mostly in the informal sector, and a limited number of large enterprises (Hollinger & Staats, 2015; Dinh et al., 2012), more recent literature has provided evidence of a burgeoning SME sector across Africa – the ‘hidden middle’ (Reardon et al., 2019). Because of their capacity to create employment, as well as their usually stronger linkages with smallholder farmers compared to micro or large firms, SMEs are critical for the food economy development (IFAD, 2021; Reardon, Liverpool-Tasie & Minten, 2021). In case of firms surveyed within the framework of this paper, the SMEs proliferation in agroprocessing is apparent in Ghana, but not in Ethiopia and Tunisia. This is mainly due to the fact that the sample size used in this analysis is small, hence does not reflect the actual distribution of firms in the two countries; second, only formal firms – which tend to be larger – are included. However, in case of Ethiopia, figures in

Baumüller et al. (2021) – which are based on a full list of all registered firms – clearly point to the importance of SMEs in the food and beverages sector.

Figure 3: Food and beverages sector in Tunisia



Source: Authors’ own elaboration based on data from UNIDO.

On the other hand, a concurrent trend of business consolidation and market concentration in agroprocessing, especially in selected value chains like coffee, tea and cocoa, previously typical of industrial countries, is now observed in developing countries as well (WB, 2007). This is mostly related to transnational activities of multinational corporations (MNCs), increasingly present in Africa (Husmann & Kubik, 2019); even though industries like grain milling have traditionally exhibited oligopolistic character, even in case of domestic businesses (Haggblade, 2011). As in the case of imports, discussed earlier, FDI in the food and beverages sector raises some concerns. FDI is a crucial source of the much-needed investment, especially in the presence of domestic financial constraints; hence, it is often considered an essential way to boost development of the agroprocessing sector in Africa, bringing modern technologies, creating employment, and benefitting domestic investors through spillover effects (Zhan et al., 2018). Yet, FDI, and especially large-scale investments, is sometimes subject of controversy over market dominance, exclusion of smallholder farmers, and limited linkages with the local economies in case of export-oriented projects (Zhan et al., 2018; Karlsson, 2014). In particular, foreign investments involving land acquisition have been criticized for negatively affecting the rights and livelihoods of local communities, leading to conflicts over resources, or being motivated by speculative rather than productive objectives (FAO, 2011; Deininger, 2011). In cases where such concerns are warranted, the expected benefits of the agroprocessing sector development may be limited for the domestic actors.

Despite the positive prospects, important challenges prevail. In all three countries, issues related to the supply of raw materials and other inputs appear among the main problems encountered by the

surveyed firms. These refer either to domestic or imported raw materials and inputs. Regarding the former, Ghanaian firms reported unreliable and irregular supplies; often due to large post-harvest losses and contamination with aflatoxins. This is in line with the evidence from other West African countries where poor vertical coordination with domestic farming is considered to be the biggest challenge hampering the agro-industry development (Hollinger & Staatz, 2015). In case of Ethiopian and Tunisian firms, dependence on imported raw materials and inputs exposes firms to various problems. 90% of Tunisian firms surveyed report large price fluctuations of imported inputs – a result of exchange rate fluctuations, and in particular, the deterioration of the Tunisian dinar over the period of the survey. Changes in input prices are then carried over to the prices of final products. In Ethiopia, 80% of firms use imported inputs, and in a large majority of cases, these are main inputs in the production process. Most of the Ethiopian firms report inputs shortages as a result of shortage of foreign currency in the country. Lack of foreign currency also hinders capital investment in the Ethiopian food and beverages sector; two of the surveyed firms reported that their expansion has been halted as they were not able to acquire new machines from abroad.

Another important issue relates to food quality and safety standards; especially in Tunisia where firms are mostly involved in exports of their products to the European Union and hence, are required to comply with stringent European standards; and in Ghana where food products sold on the domestic market are also subject to a set of food safety standards and where the cost of testing and certification is often prohibitive especially for small and medium enterprises. This is in line with the evidence from other developing regions where food safety standards remain a challenge (Grace, 2015; Reardon et al., 2021). In addition to that, firms in Ghana also reported insufficient access to finance; and firms in Ethiopia unreliable infrastructure, especially power distribution. Ampadu-Ameyaw and Omari (2015) and Omari et al. (2020) note that the agroprocessing sector has over the years been confronted with lack of appropriate processing and packaging technologies, lack of state-of-the-art equipment and lack of knowledge in good manufacturing and handling practices, all of which negatively impact quality, value and consumer acceptability. In essence, the performance of the agroprocessing sector – and the extent to which local actors will be able to respond to the growing food demand – depends on the performance of upstream and downstream segments of the food value chain (Hollinger & Staatz, 2015), as well as broader infrastructural and socio-economic conditions prevailing in each country.

5 Agroprocessing and employment

5.1 Employment in agroprocessing sector in Ethiopia, Ghana and Tunisia

To the extent that the local supply will be able to respond to the growing demand for processed foods, the agroprocessing sector, together with other businesses of the food midstream, is expected to create employment and incomes for the local population, and in particular, inclusion of women and youth (Townsend et al., 2017). The food economy traditionally occupies an important place in livelihoods, employment and income generation in Africa. Dolislager et al. (2021) estimate that agrifood system jobs, i.e. own-farm employment, wage farm employment, off-farm agrifood wage employment and off-farm agrifood self-employment, account for 62% of employment measured in full time equivalents⁶ - and the figure would be higher if measured by a simple participation rate. This is much more compared to other developing regions, including Asia (49%) and Latin America and the Caribbean (35%). In remote rural areas of Africa, the share is even higher, at 79%. While so far, most of employment has been in farming, future predictions unanimously suggest that food midstream, including agroprocessing, will account for an increasing share of the food economy jobs (Allen et al., 2016; Allen, Heinrigs & Heo, 2018).

Based on the data from several African countries, Allen et al. (2016) observe that employment in the off-farm segments of the food system is growing much more rapidly in percentage terms than employment in farming, but since the growth starts from a much lower base, the contribution of the off-farm employment to total employment in food systems remains below that of agriculture. Similar trends are observed in the three study countries, Ethiopia, Ghana and Tunisia. Employment in the food and beverages manufacturing sector is still limited in absolute terms, with around 71,000 employees in Ethiopia, 65,000 in Tunisia and 78,000 in Ghana, as of 2015 (Table 2). However, it accounts for an important share of the total manufacturing employment: 19% in Ethiopia, 29% in Ghana, and 13% in Tunisia. While more disaggregated data for the food and beverages sector is not readily available for Ethiopia and Ghana, the data for Tunisia indicates that two sectors stand out in terms of the number of employees: cereals and its derivatives, with 16,765 workers, or 20% of total food and beverages employment; and cold storage, with 14,826 workers, or 18% of total food and beverages employment (Table A2 in the Appendix), the latter is mostly oriented toward export markets. In case of Ethiopia, Baumüller et al. (2021) show that the food and beverages sector is largely dominated by the grain mill industry, which accounts for almost half of all registered firms; hence, it can be expected that this sector also employs a large share of total food and beverages sector workers.

Table 2: Employment in the food and beverages manufacturing sector (2015)

	Ethiopia		Ghana		Tunisia	
	Value	%	Value	%	Value	%
Employees (number)	70,850	19	77,696	29	62,686	13
Wages (million USD)	156	33	133	30	310	15
Output per worker (USD)	41,680	-	75,497	-	104,266	-

Source: Authors' own elaboration based on data from UNIDO. Data presented in absolute value and as a share of total manufacturing.

An important limitation of these figures is that they only represent employment in the formal sector; at the same time, it is expected that most employment in the food economy, including agroprocessing,

⁶ The figures are based on the evidence from selected African countries: Ethiopia, Malawi, Niger, Nigeria, Tanzania and Uganda. See Dolislager et al. (2021) for details.

is in the informal sector. While the readily-available data on employment in the informal sector is scarce, the literature provides some insights on the extent of employment in the food economy, including the informal sector. For instance, Allen, Heinrigs & Heo (2018) estimated the number of jobs in the food economy in West Africa based on the LSMS data; and in case of Ghana they found that 61% of total employment, which corresponds to 7.1 million people, is in the food economy. Out of those, 28% is in the off-farm segments, including food processing (6%), food marketing (16%), and food away from home (6%). Back-of-the-envelope calculations make it possible to compare the number of jobs in the formal sector, based on the INDSTAT data from UNIDO used throughout this paper, with the total number of jobs in the agroprocessing sector estimated based on the figures from Allen, Heinrigs & Heo (2018). In the case of Ghana, around 426,000 people would be employed in food processing, both formally and informally. Hence, the 78,000 formal sector jobs account for close to one fifth of all food processing jobs in the country. Of course, these figures need to be treated with caution, yet they provide insights on the order of magnitude of the total employment in agroprocessing. Nevertheless, for Ethiopia and Tunisia, these figures would probably be very different.

An important feature of the agroprocessing sector is the extent and intensity of its backward and forward linkages with other sectors. While the analysis of such linkages is out of scope of this paper, the literature provides important insights for Tunisia. Kapstein, Kim and Eggelink (2012) show that agroprocessing is the sector with the greatest extent of linkages with the rest of the economy, among all sectors. A US\$ 1 million investment in agroprocessing is associated with an economy-wide value addition of US\$ 5.4 million. For comparison, the figure for the manufacturing sector excluding agroprocessing is US\$ 3 million; and for trade US\$ 1.1 million. Out of the US\$ 5.4 million, only 35% are the direct effects in the agroprocessing, 49% are the indirect effects along the supply chain, and 15% are induced effects through increased consumer demand. Spillover effects of investment in the agroprocessing sector are even stronger when measured in terms of number of jobs created. In total, a US\$ 1 million investment is associated with creation of 584 new jobs; 20% of these jobs are created directly in the agroprocessing sector, 69% along the supply chain, and 12% in the wide economy as a result of induced effects. Hence, the potential of the agroprocessing sector is much greater than what is considered in this paper in terms of jobs created directly in the agroprocessing sector.

Table 3: Patterns of employment across the rural-urban continuum in Africa

	Hinterland	Intermediate (% of full-time equivalents)	Peri-urban	Urban
Own-farm employment	53	35	26	6
Farm wage employment	4	3	2	1
AFS wage employment	4	4	5	11
AFS self-employment	18	21	21	20
Non-AFS wage employment	9	18	25	36
Non-AFS self-employment	13	20	22	26

Source: Authors' own elaboration based on figures from Dolislager et al. (2021). Figures represent the shares of full-time equivalents. AFS: agri-food system.

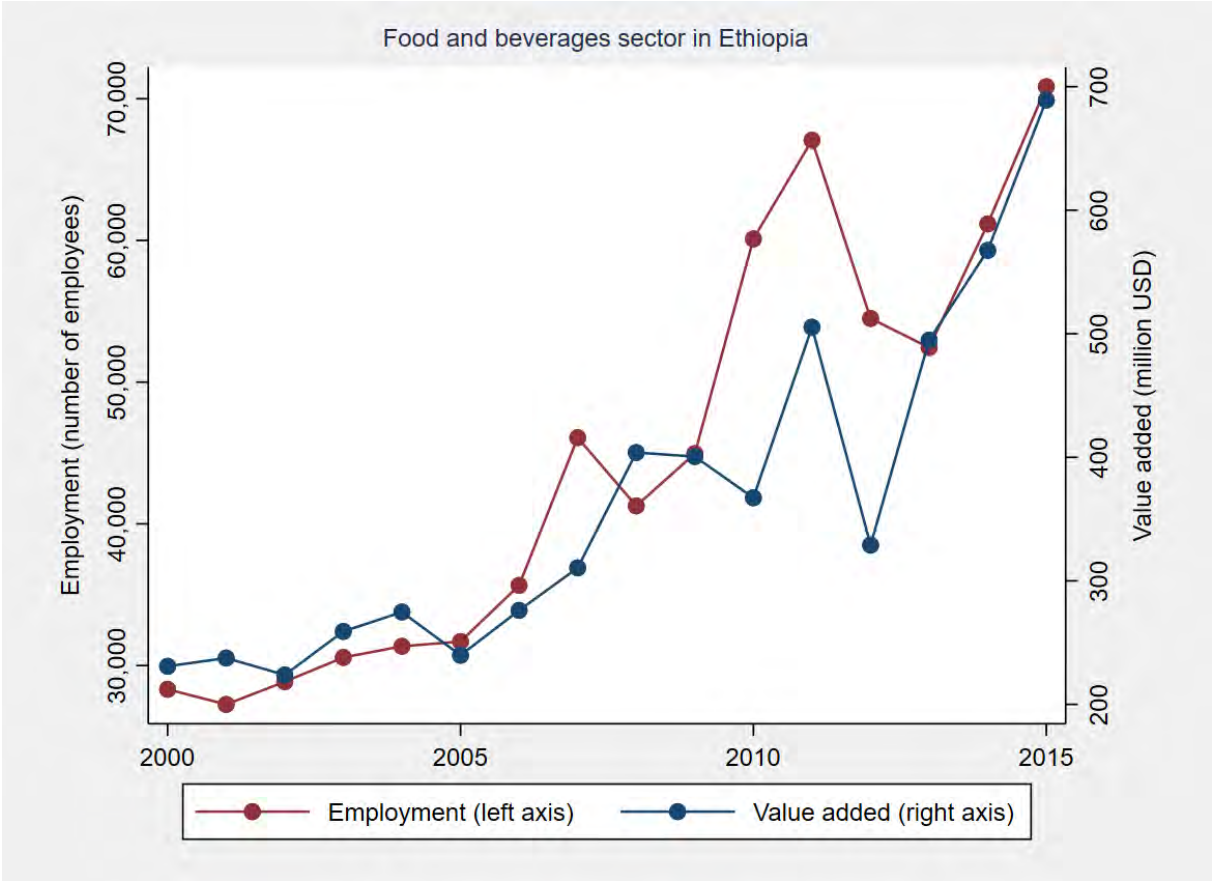
A related aspect is the extent to which growth of the agroprocessing sector may affect spatial patterns of employment and livelihoods. Broadly, food economy is considered to be the main employer especially in rural areas (Dolislager et al., 2021) and many small-scale agroprocessing activities take place in rural areas and close to primary producers (IFAD, 2021). Considering its strong supply chain linkages, growth of the agroprocessing sector could then have important implications for rural development. On the other hand, some argue that agglomeration of population and purchasing power in cities or coastal areas might pull agri-food system activities and employment away from the rural hinterland toward peri-urban areas, especially in the context of poor infrastructure and information asymmetries which hinder the capacity of farmers in remote areas to respond to the growing demand

(IFAD, 2021). The analysis of the agri-food system employment by Dolislager et al. (2021) shows a variety of employment patterns along the rural-urban continuum in Africa (Table 3) – with a growing role of the non-farm agri-food system (AFS) jobs, including food processing, retail and marketing, or, broadly, food midstream, in more urbanized locations. In particular, wage employment in the food midstream, while still limited in absolute terms, is much more prevalent in urban areas than rural areas. It has to be noted that such patterns are not reported in the sample of formal agroprocessing firms surveyed for this paper; in fact, most of them are located in or in proximity of large urban areas, especially capital cities – which points to strong agglomeration effects observed for formal firms.

5.2 Employment intensity of growth in agroprocessing

In line with the predictions in the literature (Allen et al., 2016; Allen, Heinrigs & Heo, 2018), employment in the food and beverages sector has been growing very fast over the last two decades (Figure 4 and Figure 5). Between 2000 and 2015, it grew by 2.5 times in Ethiopia, and by 1.6 times in Tunisia. While precise yearly data is not available for Ghana, the scant available information suggests a fourfold increase of food and beverages employment between 2003 and 2015. Following the conceptual framework exposed above (Figure 1), it is expected that the observed rise in employment is a response to the rise in consumer demand for processed foods. To the extent that local agroprocessing firms are able to respond to the growing demand by increasing output and value added, it will, in turn, necessitate using more inputs, including labor. Agroprocessing is usually considered to be labor-intensive compared to other industries (IFAD, 2021), hence it is expected to present important potential of employment creation in the context of increasing consumer demand.

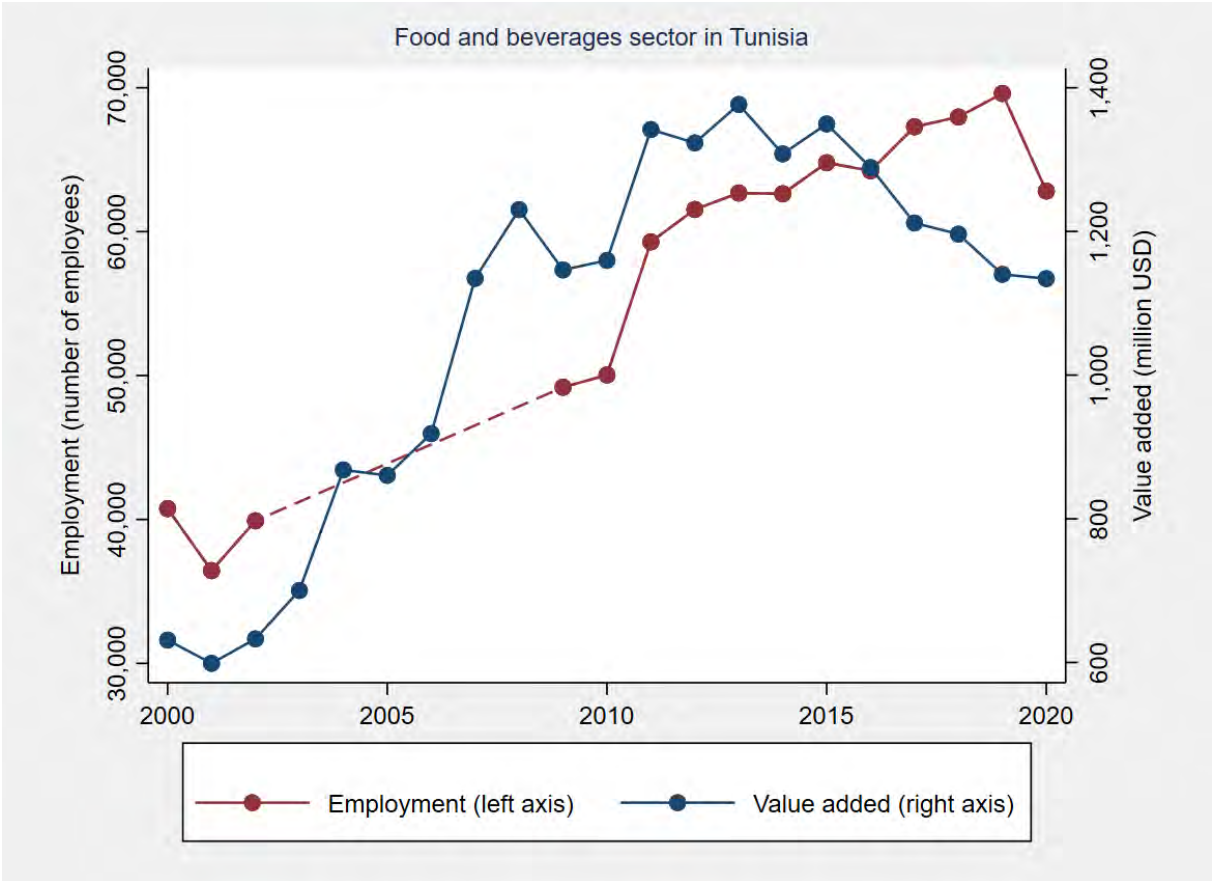
Figure 4: Employment in the food and beverages sector in Ethiopia



Source: Authors’ own elaboration based on data from UNIDO.

Figure 4 and Figure 5 show that employment evolves closely with the value added in Ethiopia and Tunisia (the yearly data for Ghana is not available), even though with some variation over time and between countries. In Ethiopia in particular, employment follows value added very tightly, only with the exception of the period 2008-2013. In Tunisia, the dynamics of both indicators over time was also broadly similar until 2017; since then they diverged, not only in terms of the pace, but also the direction of change. Employment elasticities of output, presented in Table 4 below for Ethiopia, Ghana, and Tunisia, provide insights on how labor-intensive growth in agroprocessing is. The elasticities are computed for each sector of manufacturing, and with respect to the sectoral value added. The figures need to be treated with caution, especially when drawing inferences about the performance of labor markets and manufacturing sectors. This is because employment elasticities are computed based on historical data and may suffer from the omitted variable bias (Kapsos, 2005). In addition, they tend to be sensitive to the time period specified in the analysis. Here, employment elasticities are computed for the last two decades, from 2000 to 2020, even though the coverage varies by country and sector, depending on data availability. For comparison, employment elasticities for other African countries are also presented in Table 5. Again, the sample of countries is dictated by data availability; only countries with timeseries of more than five consecutive years were included in the calculations.⁷

Figure 5: Employment in the food and beverages sector in Tunisia



Source: Authors’ own elaboration based on data from UNIDO. Dashed line corresponds to missing data for employment between 2003 and 2008.

The figures in Table 4 indicate that the employment elasticities of output in the food and beverages sector were 0.85 in Ethiopia, 0.55 in Ghana, and 0.64 in Tunisia over the period of analysis. While the

⁷ The only exception is Ghana, for which the data on employment in the food and beverages sector is only available for 2003 and 2013-2015. Nevertheless, because it is one of the main study countries in this paper, Ghana was retained in the sample.

elasticities are positive but clearly below one, meaning that employment grows slower than the sectoral value added, food and beverages sector ranks high compared to other sectors in all three countries and, with exception of Ethiopia, its employment elasticity is higher than that of all manufacturing sectors together. In the three countries, the employment elasticity of output in the food and beverages is also higher than that of the aggregate sample of African countries, 0.37. This is slightly below the aggregate figure of total manufacturing, 0.43. Broadly, the aggregate figures are similar to those found in the literature; for instance, AfDB (2019) estimated the employment elasticity of growth in Africa, all sectors considered, at 0.41 over the period 2000-2014. This figure is considered to be very low, and interpreted by many as indicating *jobless growth* on the continent (AfDB, 2018). Fields (2019) argues that slower employment growth does not necessarily point to incapacity of the African economies to create jobs. Since Africa does not have a massive unemployment problem – once informal jobs are included, there is little room for economic growth to result in employment for the unemployed. Instead, labor markets in Africa exhibit a very tight fit between employment growth and labor force growth. Hence, the main challenge is not to create jobs, but to create good jobs (Fields, 2019). In this context, if one assumes that formal sector creates better jobs than the informal sector, then the results in Table 4, which are based on the data for the formal sector only, are meaningful in that they reflect the potential of the food and beverages sector to create good jobs.

Table 4: Employment elasticities of output in manufacturing over 2000-2020

	Ethiopia (2000-2015)	Ghana (2000-2015) ¹	Tunisia (2000-2020) ²	Africa (2000-2020) ³
Total manufacturing	0.96	0.36	0.17	0.43
Food and beverages	0.85	0.55	0.64	0.37
Tobacco	-0.11	n.a.	-0.78	-0.07
Textiles	-0.07	0.26	-0.58	0.11
Wearing apparel	0.62	0.69	2.29	0.51
Leather	0.57	0.57	0.38	0.36
Wood products	-0.06	0.23	1.49	0.26
Paper	0.52	0.41	2.09	0.31
Printing and publishing	0.51	0.37	n.a.	0.35
Coke, refined petroleum products	n.a.	-1.23	0.36	0.18
Chemicals	0.63	0.01	-0.33	0.17
Rubber and plastics	2.02	0.12	0.16	0.43
Non-metallic mineral products	0.82	0.45	0.09	0.37
Basic metals	0.48	0.20	-0.31	0.14
Fabricated metal products	0.60	0.43	n.a.	0.41
Machinery and equipment n.e.c.	0.57	0.47	0.41	0.22
Electrical machinery	0.19	0.24	0.38	0.36
Motor vehicles	0.64	0.51	1.03	0.27
Other transport equipment	0.59	0.72	-1.21	0.26
Furniture	0.58	0.34	0.41	0.48

Source: Authors' own elaboration based on data from UNIDO. Several sectors not reported due to small number of observations: office, accounting and computing machinery; communication equipment; medical, precision and optical instruments; recycling. ¹ Data for the food and beverage sector available only for 2003 and 2013-2015. ² Data for the food and beverages sector available only for 2000-2002 and 2009-2020. ³

Sampled countries: Algeria, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Morocco, Niger, Senegal, South Africa, Tanzania, Tunisia, and Zambia. Data coverage varies by country and by sector.

The figures in Table 4 and Table 5 provide several key messages. First, in Ethiopia, Ghana and Tunisia, the food and beverages sector presents relatively high employment generation potential, both in absolute terms and compared to other sectors of manufacturing. However, this is clearly not true for every country in Africa; and in aggregate, the employment elasticity of output in the food and beverages sector in Africa is slightly below that of total manufacturing. Second, there is a wide variation between countries; with employment elasticities in the food and beverages sector ranging from negative figures in some cases to figures close to one. Hence, the context matters and one has to be careful when drawing general conclusions based on evidence from selected countries only. In particular, any policy implications need to account for endowments and circumstances prevailing in a country of interest. Third, because of the fundamental arithmetic relationship between employment elasticity and productivity growth, the two indicators should be interpreted jointly. Under the positive growth scenario, employment elasticities between zero and one, as in the case of the three study countries, indicate that the growth of the sectoral value added is a result of both employment growth and productivity growth. From the policy perspective, it is important that employment growth and productivity growth are jointly pursued instead of prioritizing one over the other, especially if the objective is to create *good jobs*.

Table 5: Employment elasticities of output in the food and beverages sector in Africa

	Food and beverages		Total manufacturing	
Algeria	0.33	2011-2017	-0.13	2011-2017
Botswana	-0.04	2000-2020	0.17	2000-2020
Burundi	0.33	2007-2015	0.36	2007-2015
Egypt	0.34	2000-2019	0.16	2000-2019
Eritrea	-0.19	2000-2018	-0.18	2000-2018
Ethiopia	0.85	2000-2015	0.96	2000-2015
Ghana	0.55	2003, 2013-2015	0.36	2000-2015
Kenya	0.21	2000-2020	0.23	2000-2020
Malawi	-1.70	2000-2012	-0.60	2000-2012
Mauritius	0.11	2000-2020	-0.55	2000-2020
Morocco	0.56	2000-2019	0.43	2000-2019
Niger	0.52	2000-2018	0.66	2000-2018
Senegal	0.49	2000-2020	0.59	2000-2020
South Africa	0.26	2000-2020	-0.09	2000-2020
Tanzania	0.14	2003-2020	0.21	2003-2020
Tunisia	0.64	2000-2002, 2009-2020	0.18	2000-2020
Zambia	-0.45	2000-2017	0.36	2000-2017

Source: Authors' own elaboration based on data from UNIDO. Periods of the analysis indicated in columns and based on data availability.

Comparing the value added created by the food and beverages manufacturing sector (Table 1) and the labor force employed in the production process (Table 2), and assuming that the data is precise enough to make such comparisons, it is worthwhile noting a huge disparity in the value added created with relatively similar quantity of the labor force. This might point to the underlying differences in capital and labor intensity of the production process; and also, disparities in labor productivity in the food and beverage manufacturing sector in the three countries. Regarding the former, food and beverages manufacturing appears to be labor-intensive in all three countries. For instance, Kapstein, Kim and Eggelink (2012b) estimate agroprocessing to be the least capital-intensive sector of the Tunisia economy, with the output-to-capital ratio at 7.7. In Ethiopia, Getahun and Fetene (2020) show that the food and beverage sector is among the manufacturing sectors exhibiting the highest labor intensity, with significant variation over time. More specifically, the capital intensity of the food and

beverages manufacturing was below the average of other manufacturing sectors before year 2000; but quickly caught up and outperformed other sectors in the early 2000s; from 2008 onward, it declined and now follows the average trend in the manufacturing sector. Within food and beverages manufacturing, the beverages sector exhibits much higher capital intensity while the food sector is more labor intensive. Capital-intensity tends to also be correlated with the size of agroprocessing firms, with larger firms being more likely to use more and better-quality machinery (IFAD, 2021; Reardon et al., 2014).

These results are corroborated by the findings from the primary survey, where 80% of firms reported that their production process is based on utilization of labor; the same holds true for the future expansion plans. In Tunisia, on the other hand, even though currently, most of the surveyed firms have production systems that are based on labor, close to 80% of respondents stated that the agroprocessing sector is moving toward more mechanization and automation; hence, it will create less jobs in the future. In Ghana, firms largely rely on manual labor or machinery that require a relatively large number of operators. Thus, for many respondents, mechanization appears to have the potential to create more employment due to increased production capacity. This, however, depends on which tasks are to be replaced by the machines. In line with that, one firm reported that the acquisition of an additional automated line led to recruitment of only 50 more people, whereas if the line were to be operated manually, about 1000 people would be required. In general, all of the respondents emphasized that manual labor is inefficient and unreliable, which in turn often prevents the companies from taking advantage of sudden increases in demand as they find it difficult to adjust production volumes due to lack of readily available labor.

Figures in Table 2 also point to huge differences in labor productivity in food and beverages manufacturing between the three countries. Output per worker amounts to USD 41,680 in Ethiopia, USD 75,497 in Ghana, and USD 104,266 in Tunisia, as of 2015. To the extent that wages reflect the marginal product of labor, these differences are also evident in the aggregate cost of wages and salaries. In particular, in Tunisia, despite somewhat lower number of workers compared to Ethiopia and Ghana, the aggregate wages are twice higher, at US\$ 310 million compared to US\$ 156 million in Ethiopia and US\$ 133 million in Ghana, as of 2015. In Tunisia and Ghana, the aggregate wages in the food and beverages manufacturing were falling over the last three years for which the data is available (2013-2015), despite the growing number of workers. In contrast, wages continued rising in Ethiopia. In addition, while in Tunisia and Ghana the share of food and beverages sector wages in total manufacturing wages corresponds to the share of workers, this is not the case in Ethiopia, where workers in the food and beverages sector account for 19% of all manufacturing workers, but their wages account for 33% of all manufacturing wages (Table 2).

5.3 Quality and inclusiveness of employment in agroprocessing sector

There are notable differences between the three countries with respect to the type, quality and inclusiveness of the jobs they offer. While employment creation in terms of the number of jobs dominates the debate on employment in Africa, especially in the context of the pressing youth employment challenge, the qualitative aspects of employment are increasingly recognized, in line with the Decent Work Agenda of ILO. The four pillars of the Decent Work Agenda, i.e. employment creation, social protection, rights at work, and social dialogue, constitute an integral part of the 2030 Agenda for Sustainable Development, and, in particular, Goal 8 which calls for “the promotion of sustained, inclusive and sustainable economic growth, full and productive employment and decent work”. Various aspects of employment quality are considered, including remuneration, contractual arrangements, social protection, occupational safety and health, working hours, industrial relations etc. Inclusiveness of employment refers to granting equal opportunities for employees at the workplace, irrespective of their gender, age, race, disability status, etc.

Jobs in agroprocessing sector in the three countries present a large heterogeneity; they appear to be of relatively low quality in Ethiopia, somewhat better quality in Ghana, and rather good quality in

Tunisia. In Ethiopia, agroprocessing sector offers mostly unskilled or low-skilled jobs; hence, no particular formal education level or skills are required. Instead, all of the surveyed firms provide short-term trainings at work at insignificant cost. Therefore, finding workers is usually not a problem. In rare cases where special skills are needed, firms resort to recruiting from abroad for a short period of time; or sending their workers abroad for training. In contrast, formal education is a key requirement for agroprocessing jobs in most firms in Ghana. The majority of the surveyed firms stated that they recruit workers with, ideally, at least senior high school level, even though some also currently have illiterate workers; for more complex tasks, firms require tertiary level education, i.e. Higher National Diploma at least. Most respondents reported that recruiting skilled labor is an important problem for agroprocessing companies in Ghana, as the formal education system does not provide necessary practical skills. In particular, it is difficult to find workers with specific technical skills, like quality control. Thus, most firms have to offer trainings to their workers, either in technical skills, or/ and in safety and hygiene regulations. In Tunisia, workers in the agroprocessing sector are also relatively well-educated, with around 50% having a secondary level, and 30% college education. 80% of firms provide formal technical training to their manual workers. Two of the surveyed firms recognized the importance of soft skills, and provided their workers training in communication skills. Most firms collaborate with formal training centers in that respect; whereas one, a state-owned company, opened their own training center in collaboration with other training institutes. Regarding the future employment creation prospects, around two-thirds of the surveyed firms in Tunisia expect to create jobs for manual workers, even though often on a casual rather than permanent basis. On the other hand, no company was planning to recruit high-skilled workers in the foreseeable future.

Among the three countries, there is also a diversity of prevailing contractual arrangements with workers. In Ethiopia, the majority of firms offer permanent written contracts to most of their workers; the share of workers with permanent contracts ranges between 44% to 100%. Only two out of ten companies report high turnover, mainly because of the low wages they offer. However, no exact information is available with regard to the average wages paid by the Ethiopian agroprocessing firms. Respondents also stated that workers in their companies work in a regulated timeframe, i.e. eight hours per day; and are compensated for extra working hours. In Ghana, companies use a mix of contractual arrangements, including both casual and permanent workers with written contracts. It was also noted that some of the staff have other jobs at the same time, which often led to absenteeism. The average monthly salaries reported by the surveyed companies ranged between GH¢ 450 and GH¢ 1000, or US\$ 80 and US\$ 180; one company reported a broader range of US\$ 70 to US\$ 200. Permanent workers earn more compared to casual workers. However, interviewed workers in the same firms reported much lower salaries, in the range of GH¢ 150 - GH¢ 600 per month. Workers reported working 5 to 6 days within a week for about 8 to 12 hours; all of them work overtime when necessary, and most reported that they are paid extra for the overtime. In general, the relations between firms and workers in the agroprocessing sector in Ghana appear to be somewhat strained. Most of the surveyed firms reported multiple issues on the side of their workers; apart from absenteeism, these also include inappropriate attitude, lack of discipline, lack of interest in the job, or pilfering of raw materials. These problems lead to very high turnover that most of the companies in Ghana face. In Tunisia, agroprocessing firms mostly offer permanent contracts to majority of their workers, even though in two of the surveyed firms the share of workers with permanent contracts was only 25%. The remaining jobs are offered on a temporary or seasonal basis. Almost half of the respondents reported that lack of workers in the peak season is the main constraint for their companies. For instance, two companies expected that in the time of harvest, they would need more than 200 additional workers. Most of the companies in Tunisia stated that turnover is very low. The level of monthly salaries, as reported by the interviewed workers, ranged between TND 550 and TND 1020 net, or US\$ 190 and US\$ 350, respectively. Interviewed managers reported similar figures. All but one interviewed worker reported working 48 hours per week; and stated that overtime hours are well-paid in addition to the basic salary.

Agroprocessing sector appears to be inclusive in terms of gender and age. In Ethiopia, in 60% of companies, female workers accounted for at least half of all workers, in some companies their share

was as high as 70% to 100%. In Ghana, too, labor force employed in agroprocessing is mainly female. In the surveyed companies, female workers accounted for between 40% and 80% of all workers; with majority of companies having at least half of their labor force female. This is in line with findings in Abbadi et al. (2019) which suggest that on average, women constitute 70% of labor force in the agroprocessing sector in Ghana. In Tunisia, the patterns seem to depend on the sector of activity. For instance, in companies in cereals and derivatives sector, and in the red fruit sector, female workers constitute between 80% and 100% of all workers; in the dairy sector, this is around 50%; while in sectors like poultry, oils and fats, and salt, workers are predominantly male.

The typical age of workers in Ghana ranges between 20 and 50 years; with some heterogeneity between firms. Some tend to employ more youths, aged 20-25 years, and state that the agroprocessing sector offers a lot of potential for youth employment. Others seem to prefer older, more tenured workers; even though it largely depends on the specific tasks and job position. In Tunisia, the average age of workers in agroprocessing seems to be somewhat higher, between 35 and 50 years, as stated by the respondents. In addition, interviewed workers in Ghana and Tunisia unanimously stated that they do not observe or experience discrimination in the workplace. For instance, in Ghana, workers reported that remuneration they receive is based on the tasks they perform, and it does not depend on gender or age. Also, it was confirmed that no child labor is allowed in their workplace. In Tunisia, workers stated that their wages depended on their educational level, tenure and discipline. In fact, employers were said to use an evaluation grid to promote employees; the perception was that such system allows gender equality as well as equal rights between workers.

5.4 Workers' perceptions about jobs in agroprocessing sector

In Ghana and Tunisia, the primary data collection also included FGDs with workers of the selected companies; however, not every company agreed that their workers be interviewed. The sample of workers included both blue-collar workers, for instance, machine operators, sorters, cleaners, cooks, drivers, store keepers etc.; and white-collar workers, for instance clerks, administrators, officers responsible for audit or quality control, managers etc. The former constituted the majority of participants. Most of the surveyed workers were permanent workers with contracts; hence, the results could have been different if more casual or seasonal workers were also interviewed. Nevertheless, the results of the FGDs provide some insights with respect to the perceptions and attitudes of workers with regard to their jobs in agroprocessing; and allow to triangulate, at least partially, information provided by the firms' owners and managers in the KIIs. In Ethiopia, FGDs with workers were not possible due to the deteriorating socio-political situation over the survey period.

In general, both in Ghana and Tunisia, perceptions about agroprocessing jobs appear to be rather positive. In Ghana, most workers consider jobs in agroprocessing to be good and desirable, mainly because the sector is very dynamic and presents important future potential; agroprocessing was also identified as a sector employing a large number of the workforce in Ghana, along with agriculture and rubber manufacturing. In addition, many respondents recognized the learning opportunities that it offers, which, ultimately, may lead them to open their own businesses provided that they have access to finance. Alternatively, skills acquired at the workplace were considered as a ladder toward securing better jobs in the future. Similar observations were made by firm owners or managers who stated that retaining qualified workers is a challenge. Broadly, interviewed agroprocessing workers in Ghana were satisfied with their jobs; albeit with some exceptions. On the other hand, earnings were considered to be generally too low compared with the cost of living; in addition, not all workers were paid on time. This was mainly because the companies themselves were paid for their products with delay. Even though everyone stressed the importance of the hygiene and safety procedures that their employers required, workers raised complaints about health impacts of the working conditions, including heat stress, use of allergenic substances in the production process, physical distress and fatigue due to long working hours. Nevertheless, good practices and appropriate training on safety measures were said to minimize the risk of injuries and accidents in the workplace. With regard to social protection, only

some workers were covered by the social security system and enjoyed benefits such as medical care. However, in case of absence caused by illness, workers usually did not receive any compensation. None of the workers knew whether income taxes were paid by their employers on their behalf.

Even though interviewed workers were mostly satisfied with their jobs, employment in agroprocessing is rarely considered as a career path of choice. Rather, workers take up agroprocessing jobs because their low level of education prevents them from getting more desirable jobs, such as public sector jobs; concurrently, lack of access to finance prevents people from opening their own businesses, which would also be considered as a more preferable option compared to wage jobs in agroprocessing. Second, geographical proximity of agroprocessing firms was given as another important reason for choosing these jobs. Similar insights were provided by interviewed workers in Tunisia. In general, the level of job satisfaction appears to be higher in Tunisian agroprocessing firms, compared with Ghana. The jobs are considered to be better jobs than other jobs available in the proximity, mainly because they are stable and offer better wages compared to other sectors. 46% of the workers stated that their earnings are sufficient to cover their daily expenses. Workers in Tunisia are covered by health insurance and the social security system. The level of job tenure is relatively high in Tunisia compared to Ghana. 60% of the interviewed workers have been working for more than five years in the agroprocessing sector and 46% have more than ten years of job tenure with the current employer.

6 Conclusion

This paper has analyzed the potential of the agroprocessing sector to create good jobs in Africa, based on the evidence from three countries: Ethiopia, Ghana and Tunisia, and both primary qualitative and secondary quantitative data on formal agroprocessing firms. The food economy occupies an important place in livelihoods, employment and income generation in Africa, accounting for 62% of employment in full-time equivalents, which is more than in any other region of the world. So far, most of the employment has been in farming. However, a change in the structure of employment patterns within the food economy is anticipated in view of rapid demographic and socio-economic changes that Africa is undergoing, including population growth, urbanization and rising incomes. Because these changes imply transformation of the consumption patterns, with an increasing demand for high-value processed foods, it is expected that they will drive growth of the agroprocessing sector and, hence, employment.

So far, the potential of the agroprocessing sector in Africa remains largely untapped, with an important variation between countries. Agroprocessing sectors in Ethiopia, Ghana and Tunisia differ greatly in terms of the size and structure, and, accordingly, the stages of industry lifecycle. In Ethiopia, agroprocessing is still nascent, and mostly oriented toward the domestic market where the supply is lagging behind the demand. On the other side of the spectrum is Tunisia, where the domestic market is relatively small, agroprocessing is more mature and export-oriented, mainly toward the European markets. Finally, in Ghana, with a growing size of the domestic as well as regional market, agroprocessing sector is already relatively big, but an important share of agroprocessing activities are still artisanal. Second, even though the starting point – and hence, potentially also, the room for growth – is different in each country, all of them have recorded significant expansion of the agroprocessing sector over the last two decades. Third, in the three countries, while the agroprocessing sector is small relative to the whole economy, as measured by GDP, it accounts for an important share of the manufacturing sector, between 20% and 35% in terms of the value added. The agroprocessing sector is also known to have intensive linkages with other sectors; hence, growth in agroprocessing is expected to have important economy-wide effects.

Currently, employment in the agroprocessing sector is low. The formal sector employs between 60 and 80 thousand people in each of the study countries. However, this is only a small share of the total employment in agroprocessing activities, and the figure is around five times higher if employment in the informal sector is included. As of now, employment in agroprocessing activities accounts for only around 5% of total employment in the food economy. However, over the last two decades, it has grown very fast. In Ethiopia, Ghana and Tunisia, agroprocessing sector exhibits high employment elasticities of output, between 0.55 in Ghana and 0.66 in Tunisia to 0.85 in Ethiopia which is higher than the employment elasticities of most of the other sector of manufacturing. This suggests that the agroprocessing sector presents relatively high employment generation potential, both in absolute terms and compared to other sectors of manufacturing. However, this is clearly not true for every country in Africa; and in aggregate, the employment elasticity of output in the food and beverages sector in Africa is slightly below that of total manufacturing. Hence, the context matters and one has to be careful when drawing general conclusions about any potential advantage that agroprocessing might have in employment generation. Finally, if the objective is not just to create jobs, but to create good jobs, it is important that employment growth and productivity growth are jointly pursued.

Generally, agroprocessing is considered to be labor-intensive, and as such, it offers prospects for job creation driven by expansion of business activities. However, while in Ethiopia agroprocessing firms expect to continue relying on labor rather than capital, in Ghana and Tunisia more firms shift toward mechanization and automation. The extent to which these processes will replace jobs depends on which tasks are going to be mechanized or automated. According to respondents, on the one hand, mechanization and automation, by enabling higher levels of production, will open opportunities for more employment creation at the extensive margin; on the other hand, at the intensive margin, manual jobs will be replaced, and even if new jobs are opened, their number will be relatively low.

Bringing in more capital into production structure might also have implications for labor productivity in agroprocessing sector. Currently, as measured by output per worker, labor productivity is very low in Ethiopia compared to Ghana and Tunisia. There are also substantial differences in the type and quality of jobs in the agroprocessing sector in the three countries. In Ethiopia, agroprocessing jobs are largely unskilled or low-skilled, and offer low wages. In Ghana and Tunisia, agroprocessing jobs require at least secondary education on average, and important training opportunities are offered to workers at the workplace. While salaries offered by the agroprocessing sector are considered to be too low in Ghana, they are higher than those offered by other jobs available to workers. Social protection coverage is also unequal between countries; only in Tunisia all (permanent) workers benefit from health insurance and the social security system. Nevertheless, in general, jobs in the agroprocessing sector are largely considered to be good and stable jobs. Importantly, female workers account for a large share, oftentimes majority, of total employment in agroprocessing. Hence, increasing availability of such jobs, especially in geographical proximity, might have important impacts on gender equality by offering opportunities of labor market participation and income generation.

In all three countries, the agroprocessing sector is expected to continue growing and creating employment in the near future. The extent to which this potential will be realized depends on a number of factors. Despite the fact that agroprocessing is recognized by policy-makers in Ethiopia, Ghana and Tunisia as presenting important future potential, multiple challenges remain that hinder expansion of agroprocessing businesses. Access to raw materials and other inputs is by far the biggest challenge than firms in all three countries must confront. Because of unreliable and irregular supply; as well as persisting quality and safety problems with domestically supplied raw materials, the majority of agroprocessing firms depend, at least partially, on imported inputs. This, in turn, exposes them to wide price variations and uncertainty in the cost structure, especially if the domestic currency is weak or subject to large fluctuations. In this context, it is necessary for policy-makers to adopt a comprehensive strategy in order to support agroprocessing development, especially in agriculture. Secondly, macroeconomic stability, especially with respect to monetary and exchange rate policies, is crucial considering linkages with international markets, whether in terms of imports or exports.

Among other challenges listed by surveyed businesses, access to finance and reliable infrastructure, especially electricity, are placed very high. In Ghana, inadequacy of the formal education curriculum makes it difficult for firms to find skilled workers with a particular set of technical skills. Therefore, policies supporting agroprocessing development should also include skill development, both in the formal education system as well as in adapted vocation training programs. Finally, in Ghana and Tunisia, agroprocessing businesses, especially small and medium enterprises, find it challenging to comply with food quality and safety standards imposed by domestic and international regulators. While the importance of such standards is well recognized by the businesses, the certification capacity is inadequate and the related costs are too high. Hence, appropriate institutional structures and regulations should be put in place to support agroprocessing firms in complying with food quality and safety standards. It has to be emphasized that this study focused on agroprocessing businesses operating in the formal sector; it has to be acknowledged that a large share of agroprocessing activities are in the informal sector. Thus, policies targeting informal businesses might be different from those suggested here.

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Appendix

Table A1: Sample of the food and beverages firms

No.	Main products	Size	Number of workers	Ownership	Market orientation
Ethiopia					
1	Juice	Medium	100	Domestic private	Domestic
2	Flour	Small	10	Domestic private	Domestic
3	Biscuits	Large	300	Joint venture	Domestic
4	Multiple food & beverage	Large	13,000	Foreign	Domestic & export
5	Flour	Large	105	Domestic private	Domestic
6	Alcoholic & non-alcoholic beverages	Large	830	Joint venture	Domestic & export
7	Multiple food & beverage	Large	308	Domestic private	Domestic
8	Multiple food products	Micro	5	Domestic private	Domestic
9	Alcoholic beverages	Large	620	State	Domestic & export
10	Coffee	Large	1,400	Domestic private	Domestic & export
Ghana					
11	Powdered pepper	Micro	4	Domestic private	Domestic & export
12	Multiple food products	Small	25	Domestic private	Domestic
13	Multiple food products	Small	20	Domestic private	Domestic
14	Dairy	Small	6	Domestic private	Domestic
15	Gari mix & crackers	Small	7	Domestic private	Domestic & export
16	Noodles	Large	240	Foreign	Domestic & export
Tunisia					
17	Dairy	Large	823	Domestic private	Domestic & export
18	Salt	Large	367	Joint venture	Domestic & export
19	Red fruit	Large	1,500	Foreign	Domestic & export
20	Olive oil	Large	300	State	Domestic & export
21	Biscuits	Large	1,005	Domestic private	Domestic & export
22	Poultry	Large	2,200	Domestic private	Domestic & export
23	Oil & fats	Large	320	Domestic private	Domestic & export
24	Pastries	Micro	5	Domestic private	Domestic
25	Dairy	Large	500	Domestic private	Domestic & export

Source: Authors' own elaboration.

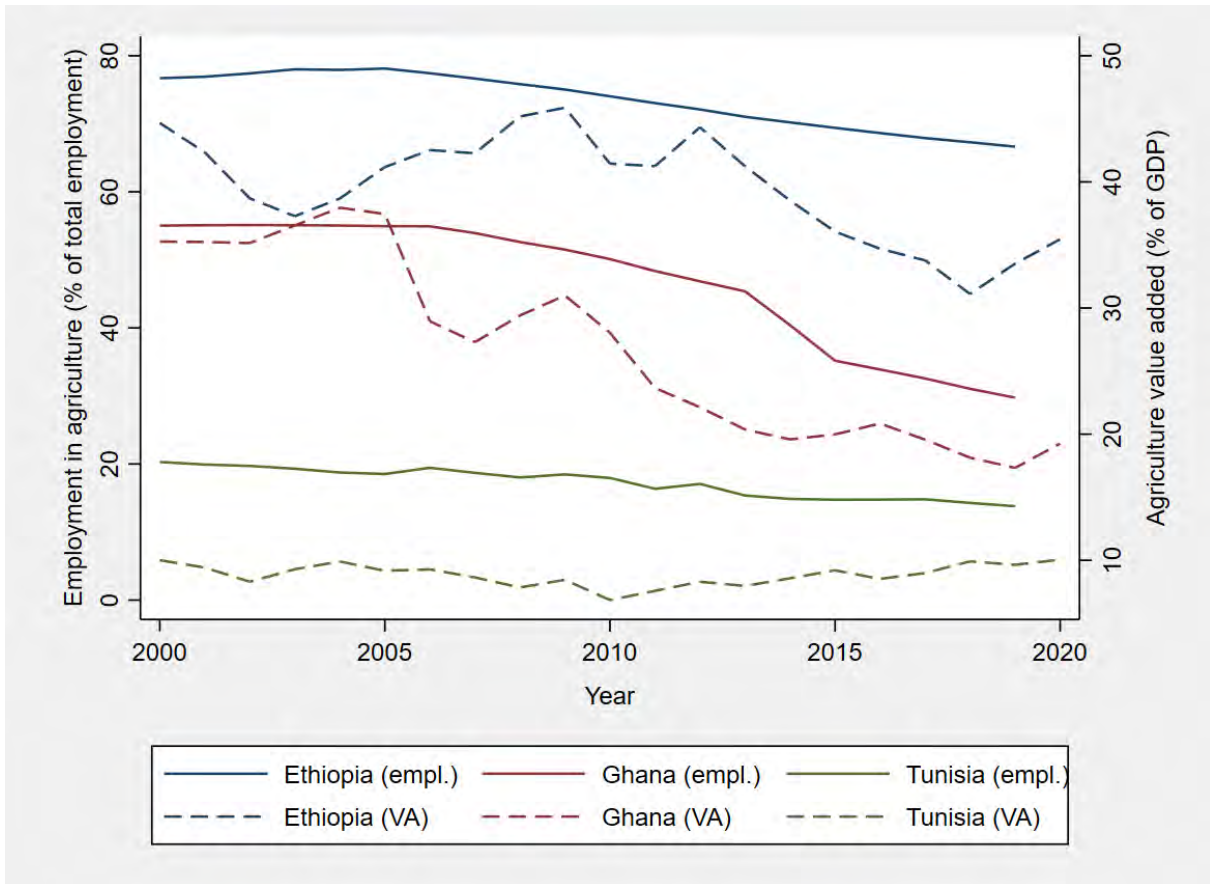
Table A2: Food and beverages manufacturing employment in Tunisia by activity (2019)

Activity	Employment		
	Totally exporting firms	Other than totally exporting firms	Total
Vegetable oils and animal fats	1,240	7,038	8,278
Fruits & vegetables	2,080	4,632	6,712
Cold storage	11,035	3,791	14,826
Seafood	2,053	4,010	6,063
Cereals and derivatives	508	16,257	16,765
Beverages	68	9,243	9,311
Milk and derivatives	82	7,394	7,476
Sugar and derivatives	100	4,293	4,393
Meat	0	2,248	2,248
Other food processing industries	2,026	6,378	8,404

Source: Oueslati-Zlaoui et al. (2021) based on data from Industry and Innovation Promotion Agency, 2019.

Totally exporting companies are defined by the Tunisian Industry and Innovation Promotion Agency as companies that generate at least 80% of their sales from export..

Figure A1: Agricultural value added and employment in Ethiopia, Ghana and Tunisia



Source: Authors' own elaboration based on data from WB World Development Indicators.



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