

Faculté des bioingénieurs

Inclusiveness of off-farm employment in agri-food systems in Tanzania

Auteur : Céleste Vansnick
Promotrice : Prof. Goedele Van den Broeck (UCLouvain SST/ELI/ELIE)
Lecteurs : Prof. Frédéric Gaspart (UCLouvain SST/ELI/ELIE)
Dr. Kaat Van Hoyweghen (KULeuven W&T/A&OW)
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Glossary

AFS Agri-food system.

AVC Agri-food value chain.

EA Enumeration Area.

FDI Foreign direct investment.

FTE Full-time equivalents.

HIC High income country.

ICLS International Conference of Labour Statisticians.

ILO International Labour Organisation.

ISIC International Standard Industrial Classification.

LIC Low income country.

LMIC Low middle income country.

LSMS-ISA Living Standards Measurement Study-Integrated Surveys on Agriculture.

MIC Middle income country.

NBS National Bureau of Statistics.

SSA Sub-Saharan Africa.

1 Introduction

Agri-food systems (AFS) employment is now identified as a major sector to drive pro-poor growth in developing countries (Allen et al., 2016; Christiaensen and Maertens, 2022; Kubik et al., 2022). This sector is seen as a link between rural areas, where farming is predominant and urban areas, where more capital intensive sectors are taking place (Mellor, 2017).

In that landscape, the off-farm segment of AFS is contributing to the structural transformation of the large proportion of the population living off agriculture (Barrett et al., 2022; Kubik et al., 2022). Off-farm sector in AFS has expanded in the last decades in Sub-Saharan Africa (SSA) (Reardon, 2015; Yeboah and Jayne, 2016). This sector is supposed to be more inclusive towards women and youth as it offers low skills, less technology demanding employment opportunities that are more scattered across the country (Christiaensen et al., 2021).

Although the development of the off-farm sector in AFS has been identified as one of the drivers of structural transformation, few studies have examined its inclusiveness in detail. The literature agrees that in general there are more women and young people employed in this sector (Egger et al., 2022; Davis et al., 2023). But what is the real employment situation for women and young people living in sub-Saharan Africa?

Strengthening the links between various economic sectors of the country is a major challenge for stimulating economic growth and reducing poverty through the creation more and better quality jobs (Allen et al., 2016). Also, women and youth are important resources for the economy that are not currently appreciated at their fair value. The results obtained in this study are expected to help to draw conclusions about employment policies and by extension to contribute to the development of new employment opportunities for women and youth to enable them to escape from precariousness.

This study covers employment in Tanzania as an initial analysis that can serve as a comparison for other SSA countries. Tanzania is a country with a stable socio-economic situation (“Tanzania Overview”, 2022). Moreover, a lot of research has been carried out on this country, which allows us to criticise the results obtained in this work. In addition, no study has assessed the inclusiveness of off-farm sector employment in Tanzania yet.

Therefore, this study focuses on assessing employment within the off-farm sector in AFS in Tanzania. First, we will evaluate the evolution of the number of jobs created between 2011 and 2020 in this sector. We will assess the employment evolution of all sectors combined and compare trends among women and young people with men and adults. The same analysis will then be carried out by sector comparing farming, off-farm within AFS and non-farm outside AFS. We will also measure the unemployment rate. A rural-urban separation will be used in these analyses to add a spatial dimension to the results.

Secondly, we will assess the inclusiveness of the off-farm sector in AFS using a logistic model. Inclusiveness will be assessed concerning women, young people, and people living in rural areas. The aim is to determine whether these factors and/or their interactions have an impact on the chances of being employed within the off-farm in AFS sector. Finally, the results will be discussed in the light of the literature and implications for employment policies will be developed.

2 Literature review

2.1 Structural transformation

To start reading this study, it is important to understand what lies behind the structural transformation. In 1954, Lewis published his two sector model to describe the mechanisms underlying economic transformation from farm to non-farm activities. This model attempts to explain how structural transformation takes place during the economic development of a country. In other words, how a low income country (LIC) based on subsistence agriculture (labour intensive) sector with large population growth and underemployment can move through the different stages of development and become a high income country (HIC) with its economy based on high productive (capital intensive) and industrial sector.

This model is based on several assumptions. First, there is a surplus of labour in the agricultural sector (where the marginal production of labour is zero) that can be transferred to the industrial sector without any loss in product. Secondly, the quantity of land is fixed. Thirdly, the wage rate in agriculture is right below the wage in the industrial sector. Finally, the industrial sector is hiring labour until the marginal product of labour equals the wage rate to reach profit maximisation (figure 1).

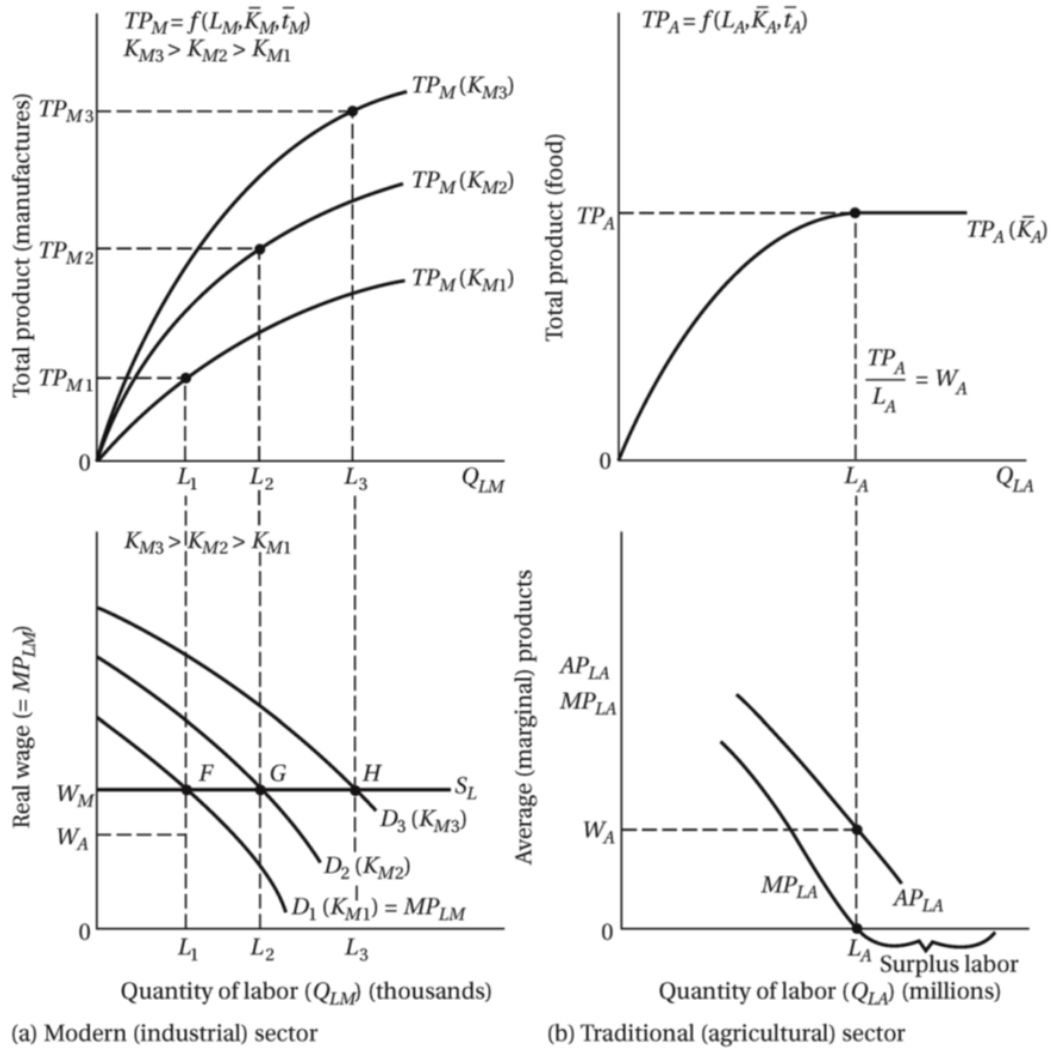


Fig. 1: Lewis two-sector model (Maertens, 2021)

With a totally elastic labour supply, the demand for labour in the productive sector will always be fully met by the large population as the wage level is higher than in the agricultural sector (figure 1). Managers of this productive sector will use the profit generated by workers into capital investments to keep improving labour productivity. Eventually, this labour movement coupled with technological progress is achieving rapid economic growth. This rapid and more secure growth of non-farm incomes results in a direct movement from the primary sector to the secondary and tertiary sectors (Christiaensen et al., 2021).

This model remains theoretical as it relies on strong assumptions. Also, there is empirical evidence of its limitations. First, growth in one sector is not automatically spread to all other sectors of the economy. Especially under segmented labour market conditions as it is often the case in LICs. Mobility is an important constraint to growth diffusion that Lewis did not take into account, particularly in LICs where the different regions are not always well connected. Lack of education can also be a constraint for a more homogeneous labour market (Hull, 2009).

Secondly, Lewis's model ignores technological improvement and productivity growth in the agricultural sector (Figueroa, 2004). However, a strong agricultural sector that provides food at an affordable price is one of the important factors for general economic growth in all sectors. This dimension was sometimes set aside because the relative share of employment within the agricultural sector declines with structural transformation, but the agricultural sector remains important and requires resources and favourable policies (Timmer, 1988).

Also, Lewis's theory is only based on two sectors. This vision is too simplistic and distorts reality (Figueroa, 2004; Mellor, 2017). The different sectors need different types of growth to achieve poverty reduction. On the one hand, the more productive sectors need employment intensive profile. On the other hand, the less productive sectors need growth productivity intensive growth. Finally, each country has its own particularities and it is important to have a precise vision of the situation on the ground in order to establish real poverty reduction (Hull, 2009).

In contrast to Lewis's theory, theories on development and poverty reduction are now more focused on agriculture. The pro-poor growth consists of directly targeting efforts to increase the productivity of the poorest sectors of the economy (Mellor, 1999). First, growth in the agricultural sector leads to a direct increase in wages in this sector. As a large proportion of the population lives from agriculture (especially the poorest one), this has a direct effect on poverty reduction. Secondly, this spreads throughout the economy by impacting the poor rural non-farm sector thanks to production, consumption, and investment linkages (Mellor, 2017).

However, to accomplish the positive spillover effects on other sectors of the economy agriculture needs strong linkages. Nevertheless, the African continent tends to lack this kind of connection (Valdés and Foster, 2010). To expand production linkages, one solution brought by the literature is to develop the off-farm in AFS sector (Barrett et al., 2022; Christiaensen and Maertens, 2022; Kubik et al., 2022).

2.2 Agri-food systems transformation

2.2.1 Different stages of agri-food systems transformation

The AFS includes all agri-food value chains (AVC) (including R&D) from the input suppliers of farmers to the final consumers of agri-food products. The AFS therefore includes the agricultural sector but also all the other sectors which ensure all the stages from harvest to sale to the final consumer. These post-harvest stages represent processing, packaging, storage, sale, and related logistics are called the "mid-stream segments". The literature observes the growing importance of this mid-stream segment but also a rapid change in its structure (Reardon, 2015). Finally, the off-farm within AFS sector includes all activities that occur before and after agricultural production (Yeboah and Jayne, 2016).

In developing countries, food systems changed rapidly during the past decades. There are three different structural stages identified in food systems. First, the traditional system is characterised by short and local value chains with more labour intensive technology. Secondly, the transitional stage entails that value chains become (spatially) longer but remain fragmented, with a mix of labour and capital intensive technologies. The third stage is the modern stage with longer and more consolidated values chains together with capital intensification and the appearance of private standards (Reardon et al., 2019).

Along with this transformation, the off-farm segment within food value chains and agri-food systems has become more important and has consequences on the rural labour market (Mergenthaler et al., 2009; Reardon, 2015; Reardon et al., 2019). The employment shifts from informal small-scale farming to hired on medium and large-scale farms and other mid-stream segments (Maertens and Swinnen, 2012). Exports from high value

chains create an important share of good quality jobs that help to fight rural poverty (Ayenew et al., 2017; Fabry et al., 2022).

On the one hand, income inelasticity of demand for food (Engel's law) leads to a decrease in food prices thanks to productivity gains induced by technology. However, the poorly efficient land markets and the low development AVC have limited the consolidation and diversification in agriculture. The direct consequence is limited social protection and a prevalence of self-employment. Of this fact, the income level in agriculture increases slowly compared to more rapid and secure non-farm outside AFS sector (Christiaensen et al., 2021).

On the other hand, income demand for products coming from modern supply chains is more elastic. For now, the consumption of food products is made up of 90-95% local products in developing countries (Reardon, 2015). However, local suppliers must adapt to growing demand. If they do not adapt quickly, consumers will seek their goods from foreign companies (Mergenthaler et al., 2009).

The off-farm sector needs to be considered as one sector of its own because it is very different from agriculture and AFS as a whole. This sector is the link between agriculture and industry. It responds to several weaknesses of the agricultural sector (seasonality, perishability) but it also offers growth with job creation possibilities and links rural areas where food is produced and urban areas where the majority of this food is consumed (Reardon et al., 2019; Barrett et al., 2022; Christiaensen and Maertens, 2022; Kubik et al., 2022).

It is important to note that this transformation is neither a smooth nor a compartmentalised evolution. In fact, multiple stages coexist at the same time depending on the type of product, the region, etc. (Reardon et al., 2019). Yet, spatial waves across regions and continents can be discerned over time. First in the 1980s included East Asia (outside China) and South America. Secondly, during the 1990s, the transformation spread in Central and South America and began in South East Asia (except for "transition" countries) and South Africa. Thirdly, mainly in the 2000's the "transition" countries and some South American countries were catching up with their neighbours. Finally, in the

2000s more parts of Africa experienced the transition such as southern and eastern Africa with emergence of West Africa (Reardon et al., 2019).

2.2.2 Drivers of agri-food systems transformation

First, the AFS transformation has taken place through government action directly targeting this objective. Secondly, comes liberalisation and privatisation of the sector that creates a "food business climate". Liberalisation allows private sector to develop a food industry that changes the food system landscape. Moreover, attracting foreign direct investment (FDI) leads to globalisation and has a direct impact on the domestic economy (Reardon, 2015).

After comes the "meta-conditioners" including income growth and infrastructure investment. Income growth impacts food consumption through higher purchasing power (Engel's and Bennet's law) but also through increasing opportunity cost of labour for women. Also, infrastructure investment reduces transaction costs and allows for spatially longer AVC through standards and technologies (Reardon et al., 2019; Barrett et al., 2022). At the same time, urbanisation also pulls the AFS transformation. When urbanisation is low, AVCs remain short and local. However urbanisation is higher and it influences the value chains structure as food is produced in rural areas (where it is cheaper to produce) and is consumed in cities (Reardon et al., 2019).

At the first stage of AFS transformation, the production will be spatially distributed according to their perishability. The faster a food product expires, the closer production has to be. Over time, transport technologies will allow to produce more remotely. To feed the growing urban population, the rural-urban value chain has to adapt quickly (Mergenthaler et al., 2009; Reardon et al., 2019). Moreover, as urban residents tend to have higher income levels, urbanisation will further increase the effect of income growth and stimulate demand for more and better food (Barrett et al., 2022).

The change in diets can be characterised by three phenomena. First, according to Ben-
net’s law, an increase in income level is followed by a diversification of diets, as the rise
in the share of non-cereals food decreases with higher income levels. The consequence is
growth in value chains of non-staple products (vegetables, fruits, meat, etc.). Secondly,
consumers eat more processed and purchased food. Jointly driven by an increase in in-
come level, urbanisation, the proportion of the non-farm sector in employment and an
increase in the agricultural opportunity cost strengthens the development of processed
food products (Kubik et al., 2022).

Finally, there is a shift in the composition among grains. There are three explanations
for this, first, the use of seed for livestock which is a form of investment in agriculture.
Secondly, there is a growing demand for convenient food. Finally, demand for better
quality grain increases. Drivers can also be identified at the midstream level, with shifts
within the AVC (retail store, wholesale, processing, etc.) and at the upstream level by
investment in technology and farming intensification or evolution in the farm input sup-
ply chain (Reardon et al., 2019).

2.3 Employment in agri-food systems

2.3.1 Transformation of employment

Structural (and so including AFS) transformation has a large impact on both the con-
sumer and producer side. As this study focuses on employment share and inclusiveness
of off-farm within AFS sector, we will now discuss the effect of the AFS transformation
on employment. First, during the early stages of development, employment in AFS is
strongly correlated to jobs in farming. Most of the time, labour in agriculture is seasonal,
scattered throughout space, informal, and at low productivity level. The low labour pro-
ductivity induces low and variable income and partly leads to high fertility rates among
rural-agricultural populations (Christiaensen et al., 2021).

In Africa, the structural transformation is coupled with a decline in the share of man-
ufacturing in employment because the low productivity of agriculture holds workers in
this sector. Therefore, an increase in productivity could deliver workers for other sectors.

However, Wuyts and Kalima argue for another reason, the surplus of labour is moving between agriculture and informal sectors without cutting the links with any of them. They are calling this phenomenon "disguised unemployment". According to them, the jobless growth in the formal sector is a major reason for this situation and is an obstacle to effective economic transformation (Wuyts and Kilama, 2016).

For a long time, the AFS sector has had an important place in employment, income generation, and livelihoods in Africa. However, the food economy is experiencing changes regarding the structure of employment. The off-farm within AFS sector is expected to grow driven by rapid demographic growth coupled with socio-economic development that has consequences on the demand and supply of the agroprocessing sector. The term "Agroprocessing" reports all transformation of agricultural products, whether mechanical, biological, chemical, or a combination of these (Hollinger and Staatz, 2015).

Agri-food systems transformation has multiple effects on employment. First through the evolution of demand for food products. On the one hand, according to Engel's law employment is expected to move from AFS to non-farm outside AFS sector even in rural areas (Christiaensen and Maertens, 2022). On the other hand, Bennett's law indicates that employment should move from farming to off-farm within AFS sector driven by the growing demand for nutrient and protein-rich, convenient and processed food (Christiaensen et al., 2021; Kubik et al., 2022).

The rise of income, including through inputs in agricultural technology (such as mechanisation), allows the rural population to follow the structural transformation at the national level and switch towards the industrial and services sectors that remove workers from agriculture (Mellor, 2017). The development of the off-farm sector (any food-linked manufacturing and services that are not in the primary sector) within the rural area is important to differentiate and smooth the source of income. This part of AFS employment is particularly interesting because they generally are more labour-intensive, less technology demanding than non-farm sectors, and more spatially scattered. As a result, they are more likely to improve inclusiveness by employing women and less or unskilled workers (as the youth) (Christiaensen et al., 2021).

2.3.2 Quantity of employment

For the time being, different authors observed that in Sub-Saharan African countries, the share of agriculture in employment remains the most important even though this share is declining. Also, the off-farm within AFS sector does increase but the strength of the trend depends on the countries. It varies from 9% to 23% of employment (Yeboah and Jayne, 2018; Davis et al., 2023). About AFS, figure 2 shows that not only it is the most important sector on the African continent, but the share of agriculture in this sector remains dominant. On the other continents, the shares of the AFS sector are lower. Moreover, the proportions of the agricultural/non-agricultural sector are more balanced (close to 50/50), with the exception of Asia, where agriculture remains important (Davis et al., 2023).

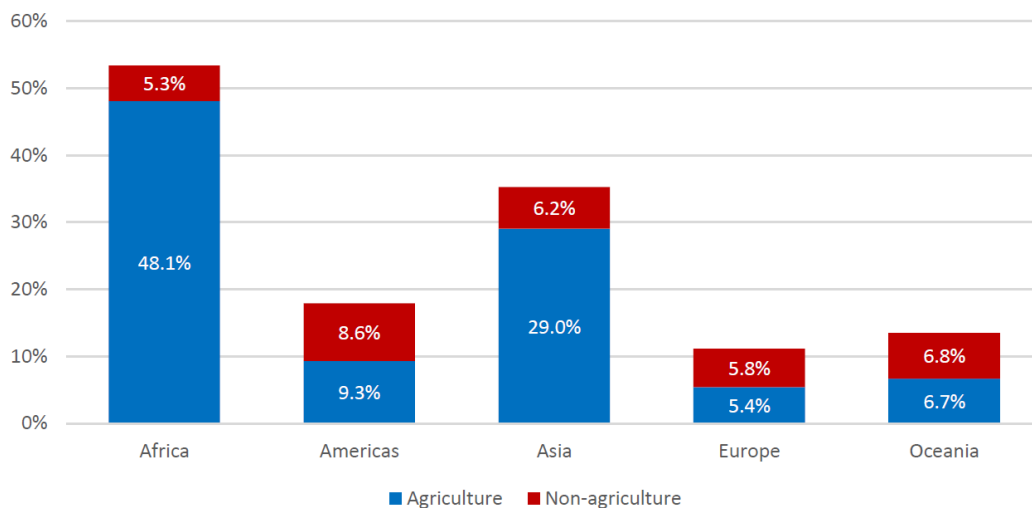


Fig. 2: Share of employment in agri-food systems in total employment by continent in 2019 (Davis et al., 2023)

When analysing these trends, it is important to keep in mind that it is not straightforward to characterise employment in AFS. On the one hand, farm labour often constitutes family labour rather than hired labour. They typically do not spend complete full time equivalents (FTE) on the farm throughout the year. On the other hand, officially hired workers are less common in agriculture than in other sectors (Norton et al., 2022). In LICs, with rapid population growth, even though there is a decrease in the share of employment in agriculture, there is still an increase of agricultural employment in absolute value. This absolute value is expected to continue to grow before declining (Christiaensen et al., 2021).

Regarding future trends of employment in AFS, Christiaensen et al., 2021, describes an evolution from a surplus to a shortage. Five processes can be identified. First, as mentioned before, the rapid population growth will further increase the absolute number of workers in agriculture partly because the amount of land available for cultivation is expanding at the extensive margin. This explains why, in the short term, the transition out of agriculture is not necessarily coupled with a decrease in the agricultural labour force (Christiaensen et al., 2021, Kubik et al., 2022).

Secondly, with the rise of labour productivity in agriculture, there will be fewer workers in agriculture, with better work conditions, producing more and relatively cheaper food for the rest of the country. Thirdly, to exit labour out of agriculture well developed downstream AFS manufacturing sectors are needed. As consumers' habits are changing, they become more dependent upon AFS manufacturers. It results in employment creation in food transformation and services (Christiaensen et al., 2021).

The fourth point is the difficulty to provide employment for young people which is particularly present in SSA. Population growth is not accompanied by job-creating economic growth. This imbalance leads to a growing difficulty for youth to find employment and results in intra or international immigration. The departure of these young workers represents a missed opportunity for the general development of the country through the "demographic dividend" ("a boost in economic productivity that occurs when there are growing numbers of people in the workforce relative to the number of dependents" (UNFPA, n.d.)). Finally, the socio-demographic change (as decreased fertility rates, in-

creasing proportion of women in the agricultural labour force, etc.) is pushing the rural labour force to go from the agricultural sector to non-farm within AFS sectors and eventually to non-food sectors (Christiaensen et al., 2021).

2.3.3 Quality of employment

Agriculture remains an important part of employment and this sector can affect Africa's development in several ways (economic growth, poverty reduction, etc.). Likely, the influence of agribusiness will also become important (Kubik et al., 2022). Nowadays, the vast majority of AFS jobs in Africa are agricultural jobs, particularly in rural areas (Davis et al., 2023). Given the importance of the agricultural sector, improving the quality of agricultural jobs while facilitating the transition out of agriculture could make a difference in Africa's development (Christiaensen et al., 2021)

Even if labour participation is increasing in Sub-Saharan Africa, poverty remains high. According to the international labour organisation (ILO), in 2018, 33% of workers in SSA lived in extreme poverty while 22% lived in moderate poverty even though they were employed (Kubik et al., 2022). Currently, agricultural labour productivity remains low in most SSA countries. New generations are less inclined to work for low-paying farm work. In addition, emigration and agricultural exports offer fewer employment opportunities than before. Jointly, the demand for food continues to grow and diversify, which in turn creates employment opportunities in the non-agricultural sectors. As mentioned above, labour productivity is not intrinsically lower than in other sectors (Christiaensen et al., 2021).

However, underemployment in agriculture is high in the earlier stage of development. It is linked first, to the seasonal nature of agricultural production and secondly, to the high fertility rate within agriculture. To increase the productivity of labour in agriculture, it will require the use of technology to make labour more efficient and competitive with other sectors. In any way, the path to come out of agriculture will pass through an increase in labour productivity. Thus less people will remain in the primary sector but employment quality will be improved because jobs are more remunerative and therefore competitive with the non-farm sector (Christiaensen et al., 2021).

As a result, LICs are where the largest agricultural population is concentrated. As it will not change quickly, the main objective could be to improve the quality of employment instead of removing it from agriculture. In contrast to the Lewis model, a possibility could be to invest in agriculture and especially in agri-food firms that could offer different types of employment, increase labour productivity and wages while ensuring a minimum service of accessibility to food within the country to avoid the situation of HIC where farm labour shortage has become common (Christiaensen et al., 2021).

In regards to the AFS sector, the literature seems to be divided regarding the quality of employment. On the one hand, in Ghana, within AFS people are generally satisfied with their job even though earnings are considered to be too low for the cost of living. But in Tunisia, mean wage levels are higher within AFS than in other sectors (Kubik et al., 2022). Moreover, in Senegal, the horticultural sector offers good quality jobs even for women and youth (Fabry et al., 2022). On the other hand, Davis et al., 2023 report that many workers are exploited within the AFS sector. This includes child and vulnerable populations labour, human trafficking, precarious working and safety conditions, gender inequalities, and low wages (Davis et al., 2023).

2.3.4 Inclusiveness of employment towards women and youth

Exiting agriculture is a step of the structural transformation. Structural transformation takes place mainly through youth because young people are more likely to leave the agricultural sector (Christiaensen et al., 2021). On average they are more educated and can adapt to changing conditions of the labour market. Jointly, they have less access to land (farm too small to share among the children, underdeveloped land rental market, parents not ready to transfer the farm to their children, etc. (Christiaensen et al., 2021)).

To compensate for this lack of access to farm work they are more willing to devote less time to their own farm and work more for other farmers or in other sectors. In general, employment among young people more or less follows the path of their elders, but they are more constrained than them. This leads them to accept lower-quality jobs (Fox and Thomas, 2016; Schwebel et al., 2019).

Accessibility to off-farm AFS jobs appears to be higher than non-food ones. This observation is exacerbated by the rural situation of people. To increase employment among youth it is important to promote both off-farm and non-food jobs because of its accessibility, employment in AFS has greater chances to reach the rural poor population (Christiaensen et al., 2021). Young people suffer from discrimination not only for employment but also for access to capital. Financial institutions refuse to lend money to young people, particularly in the agricultural sector, which restrains them from setting up their own businesses. (Allen et al., 2016).

Even though youth are better educated than their elders, youth are employed in low-skilled and informal jobs when their elders have a better chance of obtaining formal and better quality jobs (Quak and Flynn, 2019). For this reason, an important objective for more youth employment is to push them to acquire new competencies and skills for employment. That way, their new vision could lead to an increase in AFS productivity. The lack of high-skilled youth prevents unemployment and underemployment to decrease among the youth population (Allen et al., 2016). On the other hand, the private sector needs to create more sustainable and quality jobs for youth employed in formal and informal through links between the labour market and the development of companies (Quak and Flynn, 2019). However, this employment transition will be slow and will start in the informal sector (Fox and Thomas, 2016).

In any case, the level of job quality is not high enough for young employees to choose a career in the agri-food industry. It is still seen as a not very innovative sector with few evolution opportunities. In general, workers in agro-processing work there because they only need a low level of education, and they do not have enough capital to launch their own businesses (Schwebel et al., 2019; Kubik et al., 2022).

With regards to women, they are more confronted with precarious jobs than men because they generally are less educated than men and they lack access to land, (social) capital, information and technology. This situation leads women to be in an inferior negotiating position with companies and suffer from unfavourable employment conditions. For example, they will experience lower wages, longer working hours, and worse contractual specifications, such as lower prices (Maertens and Swinnen, 2012).

There is a gender pay gap between men and women even if its range varies from one country to another it is often there and in disfavour of women (Van den Broeck et al., 2023). More precisely in Tanzania, there is a significant gap between the wage of men and women. Especially, in the informal sector where the majority of the population is employed, especially the most precarious people such as women and young people (Lambin and Nyssölä, 2022).

As it is for youth, AFS employment is more accessible for them. First, because it requires low skills labour force and secondly, the entry capital requirement is generally low. Moreover, those types of firms are also geographically closer. Sometimes, women can be culturally and socially maintained only within the agricultural sector of the family farm, but in other cases, they can also be excluded from agricultural activities. Where they are excluded from agriculture, they have a preference to diversify into non-farm activities. These traditional gender roles push women to invest more in non-agricultural activities. It is therefore important to create jobs within sectors that are not already largely dominated by men (Allen et al., 2016; Christiaensen et al., 2021).

In those regions, it is even more important to give opportunities for wage employment outside of agriculture within rural areas. Those jobs can lead to women's empowerment which will move forward the structural transformation through the decrease of the fertility rate (Arslan et al., 2019). It follows that in some areas, the off-farm AFS sector is mainly managed by women. Women account for up to 80% of workers in this sector in some regions. (Davis et al., 2023). However, this figure is not enough since many women are still lacking job opportunities even within this sector (Egger et al., 2022).

In both cases of young people and women, the location of employment opportunities is a key element to ensure access. A major part of employment in the AFS is emerging in secondary cities and towns. This characteristic enhances the capacity to help poverty reduction through the creation of new employment opportunities for further remote people. Most of the poor population is living in the rural hinterlands of these secondary towns (Christiaensen et al., 2021). However, in the case of Tanzania, economic growth is the most significant in urban areas driven by capital intensive sectors such as telecommunications, mining, banking or construction. The growth rate of AFS is constantly lower than in these sectors. This phenomenon is increasing inequalities between rural and urban populations and automatically leads to rural-to-urban migration (Allen et al., 2016).

3 Data and methods

3.1 Research area

This study focuses on the United Republic of Tanzania, which is a southeast SSA country. Its area is 947,000 km² and the population is 61.5 million inhabitants around a third of whom lives in urban areas (“Tanzania Overview”, 2022). In 2015, the adult literacy rate was measured at 78% including 73% for women and 83% for men (World Bank, 2015). Even with rapid population growth, Tanzania has achieved relatively strong economic growth and declining poverty rates. The country’s economy suffered from the global pandemic of 2020 but economic activity is now recovering (“Tanzania Overview”, 2022). According to the World Bank country classification by income, Tanzania is now considered a lower-middle income country (LMIC) (World Bank, 2023b).

Concerning policy, the "Development Vision 2025" was launched in 2021 with the main goal of reaching Middle income country (MIC) status by 2025. Moyo et al., 2010, developed a four sectors (agriculture, manufacturing, non-manufacturing industry and services) projection model for the Planning Commission to select targets, methodology and application of the Development Vision. Among these targets, the major one is the drop in the share of employment in agriculture. The aim is to reduce it from 75% (2010) to 41% (2025) (Wuyts and Kilama, 2016). In 2014, the World Bank identified several sectors in which Tanzania has a comparative advantage. Those sectors are processed grains, wheat and meat, high value vegetable and fruits, light manufacturing of wood, paper, and leather processing, and finally tourism. The mainland of Tanzania (Tanganyika), is the centre of AFS activities and therefore represents an important location for growth opportunities (Allen et al., 2016).

As expected, in Tanzania the share of food in total expenditure decreases with increasing income. Expenditure on livestock products also increases with income. In urban areas, consumption of livestock products is twice as high as in rural areas. Moreover, these products are purchased in urban areas while they are self-produced in rural areas (Allen et al., 2016). More precisely, in Tanzania, the daily energy intake from processed foods per capita is 800 kcal in urban areas against 300 kcal in rural areas (Cockx et al., 2019).

Currently, the average unemployment rate is at 2.6%, including 3.4% for women and 2% for men (World Bank, 2023). On the other hand, the share of employment in agriculture was 65% (World Bank, 2019), with 67% of women and 64% of men. In Tanzania as in many other LMICs, a gender gap exists on both access to farm work and return of it. The World Bank estimated that closing this gap in agricultural production could result increase GDP and poverty reduction (M Yaa Pokua Afriyie et al., 2022).

In opposition to Europe and Asia, in Africa, the structural transformation is accompanied by a decline in manufacturing contribution. The consequence is a transfer of labour from agriculture to services or informal sectors where productivity remains low (close to agricultural productivity). This did not lead to significant poverty reduction even with strong economic growth (Mazungunye and Punt, 2022). More precisely, in the case of Tanzania, the structural transformation takes the form of a decrease of the share of agriculture in output but the share in labour in agriculture remains "stubbornly high" (Wuyts and Kilama, 2016).

Regarding the employment of women, they account for about half of the agricultural labour force (Mmasa, 2013; M Yaa Pokua Afriyie et al., 2022). Despite their significant presence in the AFS sector, women are more likely to leave school after primary school than men. In addition, women are less involved in production choices and also have less access to resources. These are the main reasons why Tanzanian women have fewer opportunities for decent employment conditions. Evidence of this is the differences between women-owned and man-owned businesses. Indeed, when the owner is a woman, the business tends to be smaller and less productive because women start their company without having any experience in the business world, whereas men who start their company have already worked as wage employees before (Allen et al., 2016).

With regard to youth employment, they represent a large part of the population as the under 25 represents 63% of the Tanzanian population (Allen et al., 2016). The share of young people involved in farming activities in terms of the percentage of FTE jobs was 63.2% in 2015. The youth employment share was 10% in the off-farm within AFS and 26.9% in the non-farm sector (Yeboah and Jayne, 2018). 23% of them are economi-

cally inactive, because of advanced education or because of time investment in children's education (mainly for women). Also, there is a decline in the number of young people employed in agriculture with age. Indeed, the 15-24 year olds are more numerous in the agricultural sector while the 25-34 year olds are moving away from the primary sector to off-farm in AFS or non-farm (Allen et al., 2016; Yeboah and Jayne, 2018).

3.2 Data definition and description

For this research, we are using the living standards measurement study-integrated surveys on agriculture (LSMS-ISA) data sets (World Bank, n.d.). This data set was developed by the World Bank. As mentioned above, this study focuses on labour information at individual level in Tanzania where the national bureau of statistics (NBS) developed the national panel survey (NPS). The two rounds analysed are the 2010-2011 and the 2019-2020 survey rounds. As the aim is to capture the evolution in this country we took the most distant rounds in time. The very first round in Tanzania (2008-2009) had to be excluded because the definition of wage employment was not comparable to the one used in subsequent surveys (Van den Broeck and Kilic, 2019).

The objective of the NPS is to have quality data available at the household level to enable different institutions to assess the evolution of poverty in the country and the implications of policies put in place. These studies are multidisciplinary and integrate many socio-economic dimensions such as demography, work, access to health care, consumption patterns, well-being etc. The 2011 survey round took place from October 2010 to September 2011 and the 2020 one from January 2019 to January 2020 (National Bureau of Statistics, 2011; National Bureau of Statistics, 2020). For the analysis, the module used is mainly section E which deals with labour. Other modules were used to add other variables. For 2011, these variables come from sections B "Household member roster", C "Education", N "Household assets" and R "Recent shocks to household welfare". For 2020, these are the same sections as in 2011 with the addition of sections M "Household assets" and N "Family/household non-farm enterprises".

The LSMS-ISA data set is built following a 2 stages stratified sampling design. The first stage corresponds to the enumeration area (EA) with the probability of selection proportional to cluster size within a stratum. The second stage is at the household level. It is stratified into eight administrative zones which are divided into rural and urban clusters using "geospatial location variables, mass location assignments, and other available location data". In the end, the data set consists of 16 strata. In rural areas, a cluster equals a village while this equals a census in urban areas (National Bureau of Statistics, 2011; National Bureau of Statistics, 2020).

First, we define our population of interest as the labour force at the country level. We define the labour force as the household members of working age that are not enrolled in school (Van den Broeck and Kilic, 2019). By following conventions, the age range corresponding to working age is from 15 to 64 years old (OECD, 2015). We focus on employment, defined as economic activities ¹ over the past 12 months reported by respondents. This allows us to take into consideration the seasonal effects of employment, which result from fluctuations in labour demand and employment over the year (Yeboah and Jayne, 2016). We also consider jobs in the last 7 days to include the newly employed population. Finally, we take informal employment into account as we base our analysis on population responses and not on the administration's records.

However, it is important to note the new definition of employment was updated during the international conference of labour statisticians (ICLS) in 2013. The new definition aims to separate paid and profit employment from own use production of goods and services in order to describe employment situation more precisely (figure 3) (Beegle, 2023; Gaddis et al., 2023). The NBS does take into account this new definition in the 2020 questionnaire.

¹"economic activity takes place when resources such as capital goods, labour, manufacturing techniques or intermediary products are combined to produce specific goods or services. Thus, an economic activity is characterised by an input of resources, a production process and an output of products (goods or services)" (Eurostat, 2023)

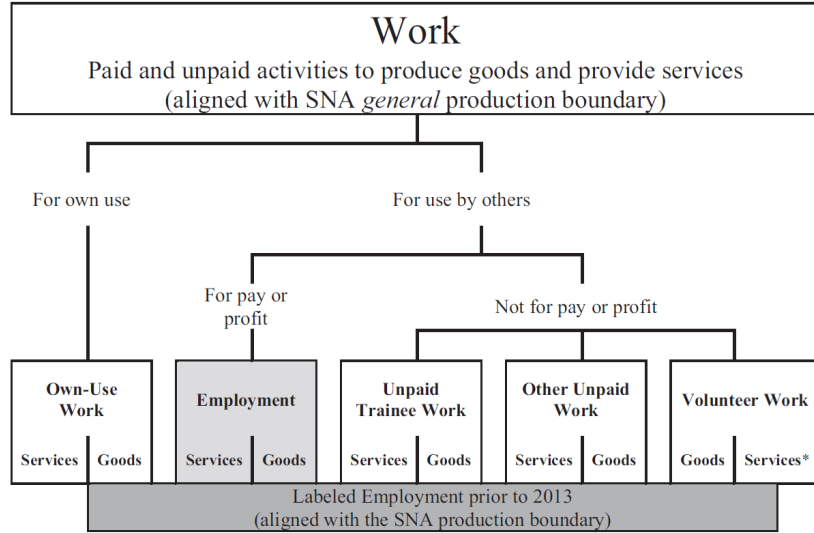


Fig. 3: ILO employment definition since 2013 (Gaddis et al., 2023)

In the 2020 survey round, there is a proper subsection for "own use production of goods" within the labour section, (that we did not take into account). As this specification does not exist in the 2011 survey round we can expect that this "own use" part was included in the definition of employment in general. This effect is particularly present within women (Allen et al., 2016), the farming sector and rural areas because those groups are more involved in their own use production of goods and services than the other men, non-farm sector and urban areas (Beegle, 2023; Gaddis et al., 2023). Regarding the situation for youth, it can be expected that this group is also less involved in paid or profit employment.

Two other differences exist between the two survey years due to questionnaire evolution. The 2020 survey round was more openly asking about agricultural activities (crops, livestock and fishing) whereas the 2011 questionnaire focused only on household farming. Also, in 2020, the questionnaire clearly includes the status of apprentices within the "wage job" category, whereas the term "apprenticeships" is never mentioned in the 2011 questionnaire.

Secondly, we divide our population into four different categories. We determine within the population if they are employed or not (1) and if they are employed, in which sector they are employed. The employment is divided into three sectors that are farm (2), off-farm within AFS (3) and non-farm outside AFS (4). First, the farm sector includes

growing crop, livestock, hunting and fishing activities (Appendix A table A.1). Secondly, the off-farm within AFS incorporates all activities preceding and following agricultural production (Appendix A table A.2). Thirdly, the non-farm outside AFS sector covers all jobs that do not fall into the above categories (Yeboah and Jayne, 2016). Note that sector differentiation is based on the international standard industrial classification (ISIC) code developed by the United Nations Statistics Division and collected from the population during the interviews. The choice was made to delete observations that have a non-existent ISIC code.

Thirdly, concerning inclusiveness we focus on women and youth. We divide the employed labour force by gender and age categories. On the one hand, gender is divided by a women/men classification. On the other hand, the respondents are classified into two categories. The youth is people aged 15 to 24, adults are aged 25 to 64 (Yeboah and Jayne, 2018; Van den Broeck and Kilic, 2019). We decided to merge the more commonly used categories of young adults (25-34) and adults (35-64) into one category first to enhance the focus on young people.

For the 2011 survey round, the initial sample size is 20,559 individuals while they are 5,587 for 2020. The labour force represents 9,292 individuals in 2011 and 2,665 in 2020. This significant decrease between the initial sample size and the labour force is due to a large number of individuals under the age of 15. In 2011, the sample consists of 4,996 men and 4,296 women. There are 2,880 young people and 6,412 adults. For 2020, men represent 1,420 individuals and women 1,245. Young people are 715 and adults are 1,950. In the end, the analysis covers 11,957 individuals from the two survey rounds.

3.3 Descriptive analysis

For the descriptive analysis, a survey design has been developed to raise the results at the national level. To do so, we use weighting factors developed by the NBS (National Bureau of Statistics, 2011; National Bureau of Statistics, 2020). The objective is to determine the evolution of the importance of off-farm within AFS in terms of employment. To answer this question, we assess the evolution of the proportion of off-farm in AFS sector employment within total employment between 2011 and 2020. After that, the addition of location, gender and age filters enable to characterise of this evolution within focus groups that are women, youth and rural areas.

3.4 Regression

The second research question aims to assess the inclusiveness of off-farm within AFS employment towards women and youth. To do so, the population selected to carry out the analysis are the members of the labour force who are defined as employed. We use logistic regression and test three different models with employment in off-farm within the AFS sector being the dependent variable (Y) (equations 1, 2 and 3). Y is a binary variable described as 1 if employed in the off-farm within the AFS sector and 0 if not. For all models analysed, the standard errors are clustered at the household level.

$$\ln \left[\frac{p(1|Y_i)}{1 - p(1|Y_i)} \right] = \alpha + \beta G_i + \gamma A_i + \delta L_i + \zeta X_i \quad (1)$$

$$\begin{aligned} \ln \left[\frac{p(1|Y_i)}{1 - p(1|Y_i)} \right] = \alpha + \beta G_i + \gamma A_i + \delta L_i + \eta(G_i \times A_i) + \theta(G_i \times L_i) \\ + \iota(A_i \times L_i) + \kappa(G_i \times A_i \times L_i) + \zeta X_i \end{aligned} \quad (2)$$

$$\begin{aligned} \ln \left[\frac{p(1|Y_i)}{1 - p(1|Y_i)} \right] = \alpha + \beta G_i + \gamma A_i + \delta L_i + \lambda M_i + \mu H_i + \nu D_i + \xi E_i + \pi W_i \\ + \rho L S_i + \sigma L H_i + \tau A S_i + \upsilon H S_i + \phi D M_I + \zeta X_i \end{aligned} \quad (3)$$

The first model is based on the three independent variables whose impact on employment in the off-farm within AFS sector is to be assessed. These variables are gender (G), being under 25 years old (A), and the rural or urban character of the location (L). There is also a control variable that includes the year in which the survey took place (X) (equation 1). This model serves as the basis for the following two models. Then, in the second model, the interactions between the three independent variables are added to the basic model.

Finally, the third model is the basic model with the addition of ten independent control variables. Those variables are push and pull factors that can influence the choice to work in off-farm within AFS sector. The push factors are first, the marital status (M) which is a binary variable defined as 1 if married and 0 if not. The household size (H) is a continuous variable which includes the number of individuals in a household. The dependency ratio (D) is a continuous variable that represents the number of dependent members (younger than ten) over the number of non-dependent members (ten and above) in a household.

Then we have livestock (LS) and landholding (LH) which are continuous variables showing the number of livestock or land held by the household. Two types of shock experienced by the household are taken into account. On the one hand, agricultural shocks, which are droughts, floods and loss of livestock (AS). On the other hand, household shocks, are the death of a household member or a family member (HS). The latter two are binary variables coded as 1 if a shock has occurred and 0 otherwise.

About pull factors, education (E) is a binary variable used as 1 if at least primary education has been completed and 0 otherwise. The welfare (W) is a categorical variable with 8 classes. It corresponds to the respondent's answer to "How satisfied or dissatisfied would you say you are with your life as a whole?". It can also be considered as a push factor. All those variables were selected according to Van den Broeck and Kilic, 2019, keeping the available data for the 2011 and 2020 rounds. Summary statistics for these variables are available in appendices A (A.3 and A.4).

4 Results and discussion

4.1 Quantity of employment over time

The results of descriptive analyses will be described in two parts. Both parts will compare year 2011 and year 2020 in order to evaluate the evolution of the Tanzanian employment context. The first part is a spatial characterisation of the whole population within working age and not enrolled in school (the labour force) as well as with gender and age filter. Secondly, we zoom into the sector distribution of employment of the labour force with gender and age filter. Graphs illustrating the results can be found in Appendix B.

4.1.1 Overall employment rates

To start, employment rates in rural and urban areas have evolved differently over time. Rural employment dropped from 96% to 82% while urban employment increased from 78% to 94% between 2011 and 2020 (table 1). However, we observe that the national employment rate remains constant at 91%. This number is slightly lower than the World Bank estimation (97% for 2011 and 98% for 2020 (World Bank, 2023)) (table 1) but this difference is explained by the integration of economically inactive people in the definition of labour force for our analyses.

Table 1: Author's estimates from Tanzania National Panel Survey (2011 and 2020)

Notes: Proportions are corrected with sampling and attrition weights.

*The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$*

% Employment among labour force	2011	2020	p
National	0.91	0.91	
Rural	0.96	0.82	***
Urban	0.78	0.94	***
N	9,121	2,665	

Secondly, when data is disaggregated by gender we observe the same trend for men and women but not at the same magnitude. While the employment rate of men living in rural areas decreased by 4 percentage points (from 98% to 94%), it decreased by 22 percentage points for women (from 94% to 72%) in the same regions (table 2). Likewise for urban areas, the men’s employment rate increased by 9 percentage points (from 88% to 97%) but women’s employment rate has risen by 22 percentage points (from 70% to 92%) (table 2). Regarding the gender gap, the urban employment rate difference between men and women is not significant anymore in 2020.

Table 2: Author’s estimates from Tanzania National Panel Survey (2011 and 2020)

Notes: Proportions are corrected with sampling and attrition weights.

*The significance is tested by a Student’s t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$*

% Employment among labour force	2011			2020			Evolution Y1<Y2	
	Women	Men	<i>p</i>	Women	Men	<i>p</i>	<i>p</i> -Women	<i>p</i> -Men
National	0.87	0.95	***	0.86	0.96	***		
Rural	0.94	0.98	***	0.72	0.94	***	***	*
Urban	0.70	0.88	***	0.92	0.97		***	***
N	4,905	4,216		1,42	1,245			

These results are consistent with table 1 as they show a rural-to-urban migration of employment. The gender separation in the analysis shows us that women are more sensitive to this employment movement. However, we cannot say whether women have migrated from rural to urban areas to find employment or whether some women have lost their jobs in rural areas and other women have found employment in urban areas. In any case, this result seems logical since the participation rate of women is generally higher in cities than in rural areas (Cockx et al., 2019; Egger et al., 2022).

Subsequently, data are divided into youth and adult categories. There is the same trend as in previous tables that shows a reduction of the employment rate in rural areas combined with an increase in the employment rate in urban areas. As for gender, the age disaggregation shows differences between the two groups. First, for rural areas, adult em-

employment rates decreased from 97% to 88%. In parallel youth employment rate dropped from 94% to 66% (a 28 percentage points reduction) (table 3). In regards to urban areas, the employment rate increased from 86% to 95% for adults and from 59% to 91% (a 32 percentage points increase) for young people (table 3). Regarding the age gap, the urban employment rate difference between youth and adults is not significant anymore in 2020. As for gender, we can not tell if this illustrates a movement of the population from rural to urban areas or a reverse change in employment possibilities in these two regions.

Table 3: Author's estimates from Tanzania National Panel Survey (2011 and 2020)

Notes: Proportions are corrected with sampling and attrition weights.

*The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$*

% Employment among labour force	2011			2020			Evolution Y1<Y2	
	Youth	Adult	<i>p</i>	Youth	Adult	<i>p</i>	<i>p-Youth</i>	<i>p-Adult</i>
National	0.84	0.94	***	0.84	0.93	**		
Rural	0.94	0.97	***	0.66	0.88	***	***	***
Urban	0.59	0.86	***	0.91	0.95		***	***
N	2,822	6,299		715	1,950			

We see in table 1 a decrease in the employment rate in rural areas coupled with an increase in the employment rate in urban areas. This movement of employment is mostly driven by women and youth (table 2 and table 3). Behind these results is perhaps not an intense rural exodus driven by women and young people as one might think at first glance. The explanation probably lies in the change in the definition of employment between the two survey rounds.

As mentioned above, this new definition has a particular impact on female employment and rural areas, which is consistent with the results obtained. It can be noted that compared to the other categories, there has been little change in the jobs of men in rural areas. This confirms that women are more likely to manage production for their own consumption (Beegle, 2023; Gaddis et al., 2023). As young people are more likely to be involved in unpaid jobs and family labour it is probably the same effect that emerges from these results (Yeboah and Jayne, 2018).

This theory is all the more plausible as 83% of the labour force work on their own farm in rural areas (Sauer et al., 2019). That means that those jobs are likely to be both profit and own use production depending on the season (Gaddis et al., 2023). Furthermore, the majority (two-thirds) of migration in Tanzania is from one rural area to another. On the other hand, this type of migration is most often explained by personal reasons (family, etc.) whereas rural-urban migration is more often linked to reasons such as employment, better services, etc. Finally, work is more related to migration in the first cities (Cockx et al., 2019). However, it can't be denied that poverty reduction is faster in urban areas than in rural areas and therefore increased inequality between regions. This situation leads to an acceleration of rural exodus to urban areas (Allen et al., 2016).

4.1.2 Employment rates in different sectors

In this part, the same analysis is applied but the data are also disaggregated by sectors. First, unemployment rose from 4% to 18% in rural areas and dropped from 22% to 6% in urban areas. About the farm sector, it fell from 92% to 31% (61 percentage points) in rural areas while it increased from 33% to 84% in urban areas (table 4). Finally, the off-farm within AFS sector and the non-farm outside AFS sector follow the opposite trend as general employment. In rural areas, the employment rate in the off-farm sector increased from 3% to 6% and it increased from 26% to 53% for the non-farm sector. Meanwhile, the off-farm sector remained more or less the same and the non-farm sector decreased from 55% to 25% in urban areas (table 4).

Table 4: Author's estimates from Tanzania National Panel Survey (2011 and 2020)

Notes: Proportions are corrected with sampling and attrition weights.

The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

% Labour force	2011	2020	p	N
<i>National</i>	<i>(N = 9,121)</i>	<i>(N = 2,665)</i>		
Unemployed	0.09	0.09		1,619
Farm	0.75	0.69	*	7,514
Off-farm	0.04	0.05		531
Non-farm	0.34	0.33		4,248
<i>Rural</i>	<i>(N = 6,230)</i>	<i>(N = 1,069)</i>		
Unemployed	0.04	0.18	***	739
Farm	0.92	0.31	***	5,517
Off-farm	0.03	0.06	*	262
Non-farm	0.26	0.53	***	2,259
<i>Urban</i>	<i>(N = 2,891)</i>	<i>(N = 1,596)</i>		
Unemployed	0.22	0.06	***	880
Farm	0.33	0.84	***	1,997
Off-farm	0.07	0.05		269
Non-farm	0.55	0.25	***	1,989
N	9,121	2,665		

A large increase in the farm sector can be observed in urban areas. The underlying reasons for this surprising trend can be found in the changes made to the 2020 questionnaire. As the question on the agricultural sector covered all activities (cultivation, livestock and fishing) more broadly and not just the household farm, this may inflate the figures for urban areas. Nevertheless, Yeboah and Jayne, 2018, still identified growth in self-employment in the agricultural sector within urban areas. Concerning the drastic decrease in the agricultural sector in rural areas, this confirms the hypothesis of the new definition of employment. Excluding goods produced for personal consumption has an important impact on employment in the farm sector, especially in rural areas (Beegle, 2023; Gaddis et al., 2023).

In table 4, there is an increase in off-farm employment in rural areas while it is decreasing in urban areas. This result is consistent with the literature arguing that off-farm is growing faster in rural regions (Yeboah and Jayne, 2016). It is important to note that this sector has doubled in rural areas. Only as it was initially very low the increase seems insignificant especially compared to other sectors (Yeboah and Jayne, 2018). Finally, the same trend is particularly important for the non-farm sector. It could be a development of new non-farm enterprises in rural areas which leads to new employment opportunities. This trend was already observed in 2010 and seems to have extended after (Kinda and Loening, 2010).

As before, the data are now also disaggregated by gender. First, in rural areas, the women's unemployment rate is higher than men, with 28% for women against 6% for men. And the gender gap increased as it was only a 4 percentage points difference in 2011. In urban areas, the gap between men and women's unemployment rates went from 12 percentage points to an insignificant gap. Regarding farm sector employment, there are no significant differences between men and women in rural areas. However, the trend of farm employment diminishing in rural areas and increasing in urban areas is confirmed here. Although the shares of women's employment in farming are systematically lower than men, we can note that there is no significant gender gap in the farm sector in rural or in urban areas (table 5).

Table 5: Author's estimates from Tanzania National Panel Survey (2011 and 2020)

Notes: Proportions are corrected with sampling and attrition weights.

The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

% Labour force	2011			2020			Evolution Y1<Y2	
	Women	Men	<i>p</i>	Women	Men	<i>p</i>	<i>p</i> -Women	<i>p</i> -Men
<i>National</i>	<i>(N = 9,121)</i>			<i>(N = 2,665)</i>				
Unemployed	0.13	0.05	***	0.14	0.04	***		
Farm	0.74	0.76	*	0.68	0.70			*
Off-farm	0.05	0.03	***	0.06	0.03	*		
Non-farm	0.27	0.42	***	0.24	0.43	***		
<i>Rural</i>	<i>(N = 6,230)</i>			<i>(N = 1,069)</i>				
Unemployed	0.06	0.02	***	0.28	0.06	***	***	*
Farm	0.91	0.93		0.30	0.32		***	***
Off-farm	0.04	0.02	*	0.08	0.04	*	*	
Non-farm	0.20	0.32	***	0.38	0.69	***	***	***
<i>Urban</i>	<i>(N = 2,891)</i>			<i>(N = 1,596)</i>				
Unemployed	0.30	0.12	***	0.08	0.03		***	***
Farm	0.33	0.34		0.83	0.85		***	***
Off-farm	0.08	0.05	*	0.05	0.03			
Non-farm	0.44	0.69	***	0.19	0.33	***	***	***
N	4,905	4,216		1,420	1,245			

Regarding the off-farm within AFS sector, in rural areas, the gender gap rose from 2 to 4 percentage points between 2011 and 2020 in favour of women's employment. In urban areas, this gap went from 3 percentage points to an insignificant gap. Finally, the non-farm sector in urban areas decreased for both men and women. On the one hand, women's employment in this sector went from 44% to 19%. On the other hand, men's employment rate decreased from 69% to 33%. In the end, the gender gap in the employment rate in the non-farm sector dropped by 11 percentage points and remains in men's favour (table 5).

In rural areas, the gender gap went from 12 to 31 percentage points. This illustrates that the development of this sector greatly benefits men more than women. This is not surprising as women have less access to this kind of employment (Kinda and Loening, 2010; Maertens and Swinnen, 2012). As seen in previous results (table 2), in 2020 women's employment is higher in cities than in rural areas. This confirms that women's employment opportunities are higher in cities (Cockx et al., 2019). However, this trend is the same for all sectors analysed except the off-farm sector. This result confirms the hypothesis that off-farm in AFS employment is more scattered in space and more inclusive towards women in rural areas (Christiaensen et al., 2021).

Although the results for the off-farm sector were not expected to be high, one reason that can explain the low rate of employment within off-farm employment in AFS is the sub-sectors considered for the analysis. Marketing and logistics were not taken into account in the off-farm definition because the ISIC codes were not accurate enough in 2011 to isolate them. In Tanzania, this sub-sector represented 80% of the post-farm AFS employment in 2015 (Sauer et al., 2019). In fact, processing was estimated at only 10% of this employment mainly because food transformation companies have a high capital/labour ratio than other traditional enterprises. However, the higher participation rate of women in the off-farm within AFS sector is consistent with the literature (Sauer et al., 2019).

Eventually, the age disaggregation of data shows us that rural unemployment is twice as important for youth than for adults. As unemployment has increased in rural areas between 2011 and 2020, this led to an increase in the age gap of unemployment of 19 percentage points. On the opposite, in urban areas, the age gap of unemployment went from 26 percentage points to an insignificant one (table 6).

Table 6: Author's estimates from Tanzania National Panel Survey (2011 and 2020)

Notes: Proportions are corrected with sampling and attrition weights.

The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

% Labour force	2011			2020			Evolution Y1<Y2	
	Youth	Adult	<i>p</i>	Youth	Adult	<i>p</i>	<i>p</i> -Youth	<i>p</i> -Adult
<i>National</i>	<i>(N = 9,121)</i>			<i>(N = 2,665)</i>				
Unemployed	0.16	0.06	***	0.16	0.07	**		
Farm	0.73	0.76	*	0.69	0.69			*
Off-farm	0.02	0.05	***	0;02	0.06	***		
Non-farm	0.21	0.40	***	0.17	0.39	***		
<i>Rural</i>	<i>(N = 6,230)</i>			<i>(N = 1,069)</i>				
Unemployed	0.06	0.03	***	0.34	0.12	***	***	***
Farm	0.91	0.93	*	0.29	0.32		***	***
Off-farm	0.01	0.04	***	0.04	0.06			*
Non-farm	0.16	0.30	***	0.36	0.58	***	***	***
<i>Urban</i>	<i>(N = 2,891)</i>			<i>(N = 1,596)</i>				
Unemployed	0.41	0.14	***	0.09	0.05		***	***
Farm	0.27	0.36	**	0.83	0.84		***	***
Off-farm	0.03	0.08	***	0.02	0.06	***		
Non-farm	0.36	0.63	***	0.11	0.31	***	***	***
N	2,822	6,299		715	1,950			

In regards to the farm sector, the difference between youth and adults became insignificant in rural and urban areas which is not surprising since young people are still invested in this sector (Yeboah and Jayne, 2018). However, we still observe a large decrease in farm employment in rural areas combined with a large increase of this sector in urban employment that shows that we leave aside the part of production for own consumption in 2020 (table 6) (Beegle, 2023; Gaddis et al., 2023).

Moreover, in the off-farm within AFS sector age gap became insignificant in rural areas while it remains at 4 percentage points in favour of adults in urban areas. Although the AFS sector seems to be more available for women, these results show us that this is not

the case for young people. Participation in the non-farm sector increased over time, both for youth and adults. However, the age gap increased by 8 percentage points in rural areas while it decreased by 7 percentage points in urban areas (table 6).

It should be noted that people employed in the off-farm within AFS sector are mainly self-employed (from 63% in 2011 to 93% in 2020). Also, youth have particular issues with access to capital, technologies and markets that could facilitate their investment (Allen et al., 2016). Further analysis should estimate if youth have more difficulty starting their own enterprise than women. Self-employment requires a minimum level of capital and knowledge, both of which are low among young people (Allen et al., 2016). Sauer et al., 2019 show that youth are negatively correlated with self-employment in AFS but the intensity of this correlation decreases when young people become adults. Furthermore, a more precise analysis of the sub-sectors of the off-farm in AFS employment could show that some of these sub-sectors are more available for women and others (which we have not considered here) could be more accessible for youth.

In overall AFS, which means included farming, the youth employment rate increased. Even if the agri-food business is growing in Tanzania, it is difficult to assess if this development is due to attraction for this sector or because this sector is seen as a safety net. (Benfica et al., 2019). The literature hypothesises that most young people are not interested in AFS as a career path but choose this way as an alternative to unemployment (Allen et al., 2016; Wuyts and Kilama, 2016; Benfica et al., 2019).

As with the previous results (tables 4 and 5), we observe an important increase in non-farm employment in rural areas. As for women, we see that youth benefit less from this increase in job opportunities than their elders. Although this increase in rural areas is not surprising, this sector is providing an increasingly large number of jobs (and more than the off-farm in AFS sector) (Yeboah and Jayne, 2016). What is more surprising, is the decline in the non-farm sector in cities. Especially as these jobs are stagnating at the national level. This observation should be part of further research to characterise the employment situation in Tanzania.

4.2 Inclusiveness of off-farm employment in AFS agri-food systems

The basic model (M1) reveals that the odds of being employed in the off-farm sector are increased by a factor of 1.943 for women. By contrast, these odds decreased by a factor of 0.465 for youth and 0.508 for rural populations (Table 7). In other words, it means that women have more chance to find a job in the off-farm in AFS sector than men. However, youth have less chance than adults to be employed in this sector. Finally, people living in urban areas have more chances to work in the off-farm in AFS sector than people living in rural areas. All the results remain consistent with the descriptive analysis.

Table 7: Author's estimates from Tanzania National Panel Survey (2011 and 2020). Odds ratios are reported and standard errors are between parentheses. The significance is tested by a Wald χ^2 test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Variables	M1		M2		M3	
	Odds ratio		Odds ratio		Odds ratio	
Women	1.943	***	1.833	***	1.808	***
	(0.178)		(0.254)		(0.178)	
Youth	0.465	***	0.497	*	0.538	***
	(0.060)		(0.162)		(0.076)	
Rural	0.508	***	0.517	***	0.676	**
	(0.057)		(0.086)		(0.077)	
Wom#Youth	-		1.418		-	
			(0.536)			
Wom#rural	-		1.120		-	
			(0.220)			
Youth#Rural	-		0.899		-	
			(0.394)			
Wom#Youth#Rural	-		0.458		-	
			(0.244)			
Year	0.879		0.868		0.981	
	(0.116)		(0.115)		(0.127)	
Marital stat	-		-		0.818	
					(0.084)	
Hhsize	-		-		0.998	
					(0.020)	
Dependency ratio	-		-		1.134	*
					(0.072)	
Primary education	-		-		1.449	**
					(0.170)	
Welfare	-		-		1.021	
					(0.025)	
Livestock	-		-		0.977	**
					(0.008)	
Landholding	-		-		0.862	**
					(0.044)	
Ag_shock	-		-		0.771	*
					(0.094)	
HH_shock	-		-		1.364	**
					(0.146)	
N	10,167		10,167		8,715	
Prob>chi ²	***		***		***	
Pseudo R ²	0.036		0.0379		0.0552	

Concerning women, these results confirm the hypothesis that the AFS sector enables women to find employment. This is consistent with the hypotheses defended by the literature, which indicates that jobs in this sector are more inclusive to women (Maertens and Swinnen, 2012; Allen et al., 2016; Dolislager et al., 2020; Christiaensen et al., 2021; Fabry et al., 2022). However, our results do not support this hypothesis for young and rural people. Both categories have more or less 50% less odds to have a job in the off-farm sector than adults or people living in cities.

The second model (M2) adds the interaction effect to the basic model. The results show that the odds ratios of the first three variables individually vary little compared to the basic model. Also, none of the interaction effects are significant (table 7). This means that there are no synergies between the three target variables. It seems that the characteristics balance out as women have more odds to be employed and young and rural people have less. This remains consistent with the results found with the first model and in the descriptive part. Although the literature tends to describe the AFS sector as inclusive of young and rural people (Allen et al., 2016; Benali et al., 2018; Van den Broeck and Kilic, 2019) the results presented here show the opposite.

With regard to youth, the results of the descriptive analysis showed us that job opportunities in the off-farm in AFS sector remained minimal. As young people remain strongly cash-constrained, they can not start their own businesses (Allen et al., 2016). Also, it seems that youth lack the practical skills to turn their business into successful companies (Sakai, 2021). Moreover, youth could have a lack of desire to invest labour or capital in the off-farm in AFS sector (Allen et al., 2016; Wuyts and Kilama, 2016; Benfica et al., 2019).

Another point might be that young people aged 15 to 24 still live mainly with their parents, and therefore they remain dependent on their elders. As a result, their choice of job will be linked to decisions taken for the household as a whole (Yeboah and Jayne, 2018). Finally, the sector is not yet sufficiently developed to meet the supply of jobs (Egger et al., 2022). One possibility is that young people will find themselves in direct competition with women in the labour market. The prevalence of women over youth in off-farm employment suggests that age would be a more discriminating factor than gender. However, this hypothesis would need to be verified by further analysis.

For rural areas, it is important to note that the rural/urban distinction used by the NBS is not defined precisely in the documentation. As mentioned previously secondary cities play an important role in AFS development and job creation in this sector (Christiaensen et al., 2021). A more precise definition of geographical zones, including different classes would clarify the situation. As in Egger et al., 2022, where the country is divided into four categories defined as rural, semi-rural, peri-urban and urban.

The last model (M3) is the basic model with the addition of several control variables. In the case of women, the odds of being employed in off-farm within AFS are increased by a factor of 1.808, which remains close to the first estimation. We observe that the trend also remains the same for young and rural people as the odds decrease by a factor of 0.538 for youth and 0.676 for rural locations.

In regard to control variables, the dependency ratio, primary education and a shock in the household are positively influencing the odds of working in the off-farm within AFS sector. The most impacting factor is that primary education increases the odds of employment by a 1.449 factor. In other words, having at least primary education increases the chance of being employed by 45% compared to non-educated people. This result is not surprising as it is consistent with previous studies (Van den Broeck and Kilic, 2019; Egger et al., 2022). Then, a family shock increases the odds by a factor of 1.364. Finally, the dependency ratio is increasing the odds of being employed by a factor of 1.134 when it increased by 1 unit.

Regarding household variables, we observe that the share of dependent members in a household pushes the members of working age to find work in the off-farm within AFS sector. There is a positive correlation between the number of children above ten and working in the off-farm sector. The push effect is even stronger in the case of households that have experienced a shock (death of a relative). In that case, the odds to be employed in the AFS sector increase by 36%. These results may be driven by men as they are pushed to find a job when their family grows, or when a person who came to the needs of the household is no longer able to do so (Egger et al., 2022). However, it has been observed that in the case of Tanzania, men were less likely to enter off-farm employment if they had a shock in the household (Van den Broeck and Kilic, 2019). A disaggregated gender analysis could allow to clarify the situation.

However, an increase of 1 unit of livestock and land decreases the odds of off-farm in AFS employment respectively by a factor of 0.977 and 0.862. Finally, an agricultural shock decreases the odds of working in the off-farm sector by a factor of 0.771 (table 7). These observations are consistent with the findings of Van den Broeck and Kilic, 2019. Most of the time, owning land and (even more so) owning livestock reduces your chances of being employed in the off-farm in AFS sector.

Other household characteristics such as marital status and household size do not have a strong influence on off-farm in AFS employment. This lack of influence may be linked to a cancellation of the negative effect on employment for women, whereas the effect will be positive for men (Egger et al., 2022). Welfare does not seem to have an impact on employment in this sector. This indicates that people working in off-farm in AFS does not feel particularly more satisfied with their life as a whole than people employed in other sectors.

Finally, the number of observations has decreased from the second model to the third one. This difference is due to the lower response rate for the question concerning well-being. Although the three regressions are statistically significant, we observe that the R^2 remain relatively low. This shows us that other factors, that have not been studied here, could play a role in being employed in the off-farm in AFS sector. A principal component analysis could help to determine which other factors facilitate access to employment in this sector.

4.3 Limitations and scope for further research

The first limitation is that this study did not assess the quality of employment. Even if there are more women employed in the off-farm within AFS sector: are working conditions in this sector as good as in other sectors? The literature still seems to be divided on this issue and we do not know the situation in Tanzania. Furthermore, are women's/youth's working conditions as good as men's/adult's working conditions within this sector? Those questions are key for assessing the reality of the situation for women and youth in Tanzania. A way to evaluate the quality of employment could be by comparing wages in the off-farm in AFS sector to minimal wage, or between gender and age. Other variables are also interesting as the existence of a written contract, maternity/paternity leave, health insurance, etc (Egger et al., 2022).

Another limitation is that data have been processed by the percentage of employment in the labour force. It would be interesting to compare them in terms of FTE. In truth, many of the respondents have multiple jobs, often combining one in agriculture and one in another sector. Using FTE would make it possible to evaluate each job in order to determine which is the most important in terms of the time allocated to this activity and the generation of income. This modification would make it possible to clarify the situation and capture the reality of the ground (Yeboah and Jayne, 2018).

Although the LSMS-ISA datasets are good sources of information, some intrinsic limitations prevented us from completing this study. First, the quality of the job could not be assessed correctly. In fact, the only variable common to the questionnaire for the two years was the salary which provides only a limited view of the different components that attest to the quality of a job. Secondly, the questions relating to working time did not make it possible to determine the FTE for the different types of jobs (wage and self-employment).

One of the limitations of this study is its ability to capture the extent of the off-farm sector within AFS. Yet, the authors seem to agree on its growing importance within the Sub-Saharan countries (Yeboah and Jayne, 2018; Christiaensen and Maertens, 2022; Kubik et al., 2022; Davis et al., 2023). Research could be done more precisely on this sector and the various sub-sectors that compose it in Tanzania. Another subject to explore is the case of young people because the results show that in the case of Tanzania, they are less represented than women in the off-farm in AFS sector which is known to be one of the most accessible.

This observation raises many questions about the situation of employment for young people in SSA. Especially since they represent the major part of the population (83.1% (The Citizen, 2022)). Also, a group that has not been studied in this work is the case of migrants. Like women and young people, they suffer from employment discrimination (Wright and Clibborn, 2019). A final point that should be further explored is the role of secondary cities and towns. This work is based on a binary rural/urban division of the population dispersion, but the organisation of the population is much more complex. It would be interesting to identify the links between the secondary towns and the off-farm within AFS sector as those regions are influential in SSA (Smit, 2016).

The next step is to replicate this analysis in other Sub-Saharan countries. Are the trends that have been identified in Tanzania common to other countries in SSA? This question is essential to expand those results at the continent level. The economy of the African continent is changing, and several indicators already show that structural transformation is faster than that experienced by Western countries. Studying these countries could make it possible to identify the key parameters that induce economic growth coupled with the convergence of inequalities within the context of SSA. Once these parameters have been identified, they could be transposed to the field through employment policies.

4.4 Policy implications

This study is showing that policies put in place before 2020 to improve employment inclusiveness in Tanzania have not been sufficient. Except for the inclusion of women in the AFS sector, women and youth are systematically less likely to be employed than men and adults. The results also indicate that the situation is particularly worrying in the non-farm outside AFS sector. This result is of concern since this type of sector is identified as an important one in Tanzania (Allen et al., 2016).

Despite a strong commitment to women in the latest five-year development plan, which aims to reduce the remaining inequalities between men and women in the labour market, there is still work to be done. The new development plan foresees an end to gender and racial inequalities in the economic activities of the country by 2025. Achieving this goal will require coherent socio-economic policies for the entire Tanzanian population (Lambin and Nyssölä, 2022). Depending on the sector, policies will prefer to improve productivity or employment opportunities. However, the results of this study show that it is essential to identify the constraints to job creation (Hull, 2009), even within the off-farm in AFS sector.

An example of important policies to put in place for better participation of women is first to promote women's education. The results here confirm that education is one of the most important variables to access employment (Van den Broeck and Kilic, 2019; Egger et al., 2022). Secondly, as off-farm in AFS does not provide enough employment possibilities yet (Egger et al., 2022), it is necessary to promote business creation within

the AFS sector. However, providing the necessary training for women who wish to start is a key element. Not only at the beginning of their operation but also later to remain competitive in the years that follow (Allen et al., 2016). Thirdly, although the cultural and social dimensions were not assessed in this study, it is important not to minimise them. Their influence on the distribution of gender roles is also important in order to be able to create an incentive that allows women to make their own employment choices.

As far as young people are concerned, 800,000 of them will enter the labour market each year (Lambin and Nyyslä, 2022). As their employment rate is the lowest of the categories analysed here, integration policies must be put in place to seize the opportunity of the large potential of this part of the population. Youth tend to be more innovative, energetic and less risk-averse, all of which would help modernise the overall economy of the country (Ng'atigwa et al., 2020). But before developing policies, it is important to know where young people are working and what their characteristics are so that policies put in place could best meet the needs of youth (Dolislager et al., 2020).

This situation implies a need for the creation of new jobs opportunity for young people entering the labour market (Yeboah and Jayne, 2018). On the one hand, there is a need for youth-friendly credit possibilities to enable young people to start their own businesses (Ng'atigwa et al., 2020). On the other hand, these young entrepreneurs need a long-term safe incubator to prevent rapid failure while learning and practising new business and technical skills. Incubators could also push technological innovation by reducing the risk of this type of operation (Allen et al., 2016). Finally, as we saw in the results, continuing to invest in the education of young people is an important point so that they can realise the potential they possess and they can improve their productivity through the new opportunities available to them (Yeboah and Jayne, 2018; Ng'atigwa et al., 2020).

As for women, AFS seems to be a good sector for young people to find employment (Ng'atigwa et al., 2020). However, the power of social norms should not be forgotten. It would be unwise to focus policies solely on this sector when the majority of these young people do not particularly want a career in AFS (Allen et al., 2016). An important issue to be addressed by policies is therefore to promote the AFS sector so that it becomes an attractive career choice for young people and women.

For both young people and women, the barriers to entering the labour market remain similar. These barriers can be classified into three categories: lack of access to land, finance, information and technology (Allen et al., 2016). However, not all young people/women have the same needs. It depends on their level of education, their access to finance, the area where they live, etc. It is needed to take into account the specificity within each category that currently suffers from employment discrimination. These policies must have a systemic vision of the situation and that they help to solve the problems which are directly linked to the employment of young people and women, but also they need to think of disabling the more distant obstacles which could stop the progression of generalised economic development as having a convenient environment and infrastructure (Lambin and Nyssölä, 2022).

5 Conclusion

This study aims to assess employment trends between 2011 and 2020 in Tanzania using the LSMS-ISA data set. The first analysis consists of evaluating the evolution of the quantity of employment at the national level, in rural and urban areas. Furthermore, the data are disaggregated by gender and age to compare the situation of women with men and the situation of young people with adults. A second analysis studies the inclusiveness of the off-farm in AFS sector. Using a logistic model, the inclusiveness towards women, young and rural people is assessed.

First, the quantitative analysis shows that although off-farm in AFS employment doubled during the past ten years, it represents only 5% of employment of the labour force in 2020. Moreover, there are more women than men employed in this sector. This confirms our initial hypothesis. In terms of age, there are more adults than young people in this sector. Finally, there is a slight increase in employment in the off-farm sector for women and adults in rural areas, but no significant change in urban areas.

Secondly, the logistic regression reveals that the off-farm sector in AFS is more inclusive towards women but not towards young people or people living in rural areas. This observation is consistent with the results obtained in the descriptive analysis. One of the most influential factors in getting a job in this sector is having at least primary education. Having dependent children and suffering a shock within the household are also identified as push factors. On the other hand, variables linked to agriculture seem to be holding people back from investing in the off-farm sector. Ownership of land or livestock and a harvest shock reduce the chances of being employed in the off-farm sector in AFS.

This master thesis represents the first stage of a larger study which aims to carry out this analysis in several Sub-Saharan African countries to assess the capacity of the off-farm sector in AFS in terms of reducing poverty and encouraging pro-poor growth. For future analyses, it would be interesting to divide adults into "young adults" (25-34 years) and "adults" (35-64 years) to clarify the age-related analyses. Logistic regressions could then be performed on a disaggregated basis in order to determine which factors have the greatest impact on the target populations. The distinction between urban and rural areas also needs to be clarified. It would be interesting to increase the number of categories analysed to assess the impact of secondary cities.

These results help us to understand better the reality of employment in the off-farm sector in Tanzania. The first point is to improve the education of young people and women and more precisely to prevent the school from stopping rather than providing new training later (Allen et al., 2016). Then comes access to credit as well as support to launch and grow their own off-farm in AFS business. However, this study also raises new questions. As the off-farm sector is more inclusive of women, why is not this the case for young people? Further analysis is needed to determine the factors that prevent young people from accessing this employment. These analyses will make it possible to specify the implications for better employment policies.

References

- Allen, A., Howard, J., Kondo, M., Jamison, A., Jayne, T., Snyder, J., Tschirley, D., & Yeboah, F. K. (2016, June). *Agri-food youth employment and engagement study (AGYEES)*. Michigan State University.
- Arslan, A., Egger, E., & Tschirley, D. (2019, March 20). *Gender gaps in youth employment: A spatial approach* [the Future of Work in Agriculture Conference of the World Bank Group]. https://farmlabor.ucdavis.edu/sites/g/files/dgvnsk5936/files/inline-files/3.%5C%20%5C%20Arslan_Gender%5C%20gaps%5C%20in%5C%20youth%5C%20emplymt_FOWAG_WB%5C%20-03-2019.pdf
- Ayenu, H. Y., Estruch, E., Sauer, J., Abate-Kassa, G., Behrendt, L., & Wobst, P. (2017). Decent rural employment and farm production efficiency: Empirical evidence from tanzania and ethiopia. *Agricultural Economics*, 48. <https://doi.org/10.1111/agec.12359>
- Barrett, C. B., Reardon, T., Swinnen, J., & Zilberman, D. (2022). Agri-food value chain revolutions in low- and middle-income countries. *Journal of Economic Literature*, 60(4), 1316–1377. <https://doi.org/10.1257/jel.20201539>
- Beegle, K. (2023, April 19). *Has women's LFP rate in rwanda fallen from 84% in 2014 to 52% in 2019?* [Development impact]. Retrieved April 26, 2023, from <https://blogs.worldbank.org/impacetevaluations/has-womens-lfp-rate-rwanda-fallen-84-2014-52-2019>
- Benali, M., Brümmer, B., & Afari-Sefa, V. (2018). Smallholder participation in vegetable exports and age-disaggregated labor allocation in northern tanzania. *Agricultural Economics*, 49(5), 549–562. <https://doi.org/10.1111/agec.12441>
- Benfica, R., Kafle, K., & Paliwal, N. (2019, August 5). *Measuring youth participation in agriculture in tanzania and malawi* [IFAD]. Retrieved May 24, 2023, from <https://www.ifad.org/en/web/latest/-/blog/measuring-youth-participation-in-agriculture-in-tanzania-and-malawi>
- Christiaensen, L., & Maertens, M. (2022). Rural employment in africa: Trends and challenges. *Annual Review of Resource Economics*, 14(1), 267–289. <https://doi.org/10.1146/annurev-resource-111820-014312>
- Christiaensen, L., Rutledge, Z., & Taylor, J. E. (2021). Viewpoint: The future of work in agri-food. *Food Policy*, 99. <https://doi.org/10.1016/j.foodpol.2020.101963>

- Cockx, L., Colen, L., De, W. J., & Gomez, Y. P. S. (2019, February 21). *Urbanization as a driver of changing food demand in africa: Evidence from rural-urban migration in tanzania*. European Commission. <https://doi.org/10.2760/515064>
- Davis, B., Mane, E., Gurbuzer, L., Caivano, G., Piedrahita, N., Schneider, K., Azhar, N., Benali, M., Chaudhary, N., Rivera, R., Ambikapathi, R., & Winters, P. (2023). *Estimating global and country-level employment in agrifood systems* (Statistics Working Paper Series No. 23-24). FAO. Rome, Italy. <https://doi.org/10.4060/cb8667en>
- Dolislager, M., Reardon, T., Arslan, A., Fox, L., Liverpool-Tasie, S., Sauer, C., & Tschirley, D. L. (2020). Youth and adult agrifood system employment in developing regions: Rural (peri-urban to hinterland) vs. urban. *The Journal of Development Studies*, *57*(4), 571–593. <https://doi.org/10.1080/00220388.2020.1808198>
- Egger, E.-M., Arslan, A., & Zucchini, E. (2022). Does connectivity reduce gender gaps in off-farm employment? evidence from 12 low- and middle-income countries. *Applied Economic Perspectives and Policy*, *44*(1), 197–218. <https://doi.org/10.1002/aepp.13189>
- Eurostat. (2023, January 6). *Glossary:economic activity* [Statistics explained]. Retrieved May 25, 2023, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Economic_activity
- Fabry, A., Van den Broeck, G., & Maertens, M. (2022). Decent work in global food value chains: Evidence from senegal. *World Development*, *152*, 105790. <https://doi.org/10.1016/j.worlddev.2021.105790>
- Figuroa, M. (2004). W. arthur lewis versus the lewis model: Agricultural or industrial development? *The Manchester School*, *72*(6), 736–750. <https://doi.org/10.1111/j.1467-9957.2004.00433.x>
- Fox, L., & Thomas, A. (2016). Africa’s got work to do: A diagnostic of youth employment challenges in sub-saharan africa. *Journal of African Economies*, *25*, 16–36. <https://doi.org/10.1093/jae/ejv026>
- Gaddis, I., Oseni, G., Palacios-Lopez, A., & Pieters, J. (2023). Who is employed? evidence from sub-saharan africa on redefining employment. *Journal of African Economies*, *32*(2), 151–174. <https://doi.org/10.1093/jae/ejac021>

- Hollinger, F., & Staatz, J. M. (2015). *Agricultural growth in west africa: Market and policy drivers*. Food and Agriculture Organization of the United Nations. Rome, Italy. Retrieved May 2, 2023, from <https://www.fao.org/3/i4337e/i4337e00.htm>
- Hull, K. (2009). Understanding the relationship between economic growth, employment and poverty reduction. *Promoting Pro-Poor Growth: Employment*.
- Kinda, T., & Loening, J. L. (2010). Small enterprise growth and the rural investment climate: Evidence from tanzania*. *African Development Review*, 22(1), 173–207. <https://doi.org/10.1111/j.1467-8268.2009.00232.x>
- Kubik, Z., Getahun, T. D., Omari, R., & Oueslati Zlaoui, M. (2022, July). *Can the agro-processing sector create jobs in africa?* (Report). Center for Development Research (ZEF). <https://doi.org/10.48565/bonndoc-57>
- Lambin, R., & Nyssölä, M. (2022). *Employment policy in mainland tanzania: What's in it for women?* (Working Paper No. 2022/67) [ISBN: 9789292671983]. WIDER Working Paper. <https://doi.org/10.35188/UNU-WIDER/2022/198-3>
- M Yaa Pokua Afriyie, O., Inaam Ul, H., & Gemma Joan Nifisha, T. (2022, March 30). *Tanzania gender assessment* [World bank]. Retrieved February 14, 2023, from <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099155103312251069/P1760510ca289d0400a40e03f6408826f07>
- Maertens, M. (2021). *Agricultural economics and food policy in developing countries- PART 2 development theories and the role of agriculture*.
- Maertens, M., & Swinnen, J. (2012). Gender and modern supply chains in developing countries. *Journal of Development Studies*, 48. <https://doi.org/10.2139/ssrn.1360664>
- Mazungunye, P. P., & Punt, C. (2022). Industrialisation for structural transformation: Economy-wide impacts of agro-processing development in tanzania. *Development Southern Africa*, 39(3), 400–423. <https://doi.org/10.1080/0376835X.2021.1947191>
- Mellor, J. W. (1999). Pro-poor growth - the relation between growth in agriculture and poverty reduction. *USAID/G/EGAD*.
- Mellor, J. W. (2017). Measuring the impact of agricultural growth on economic transformation. In J. W. Mellor (Ed.), *Agricultural development and economic transformation: Promoting growth with poverty reduction* (pp. 29–46). Springer International Publishing. https://doi.org/10.1007/978-3-319-65259-7_3

- Mergenthaler, M., Weinberger, K., & Qaim, M. (2009). The food system transformation in developing countries: A disaggregate demand analysis for fruits and vegetables in vietnam. *Food Policy*, *34*(5), 426–436. <https://doi.org/10.1016/j.foodpol.2009.03.009>
- Mmasa, J. (2013). Participation of women in agriculture in tanzania: Challenges and polocy recommendations. *Tanzania Country Level Knowledge Network Policy Brief*, (8). Retrieved May 24, 2023, from https://www.researchgate.net/publication/271074858_WOMEN-PARTICIPATION-IN-AGRICULTURE-IN-TANZANIA_FV
- Moyo, M., Simson, R., Jacob, A., & Mevius, F.-X. (2010, March 31). *Attaining middle income status - tanzania: Growth and structural transformation required to reach middle income status by 2025*.
- National Bureau of Statistics. (2011). Basic information document-national panel survey (NPS 2010-2011) [Type: dataset]. <https://doi.org/10.48529/HZ8S-3489>
- National Bureau of Statistics. (2020). Basic information document - national panel survey (NPS 2019-2020)-extended panel with sex disaggregated data. Retrieved September 19, 2022, from <https://microdata.worldbank.org/index.php/catalog/3885/related-materials>
- Ng'atigwa, A. A., Hepelwa, A., Yami, M., & Manyong, V. (2020). Assessment of factors influencing youth involvement in horticulture agribusiness in tanzania: A case study of njombe region [Number: 7 Publisher: Multidisciplinary Digital Publishing Institute]. *Agriculture*, *10*(7), 287. <https://doi.org/10.3390/agriculture10070287>
- Norton, G. W., Alwang, J., & Masters, W. (2022). *Economics of agricultural development: World food systems and resource* (4th ed.). Routledge. Retrieved January 19, 2023, from <https://www.routledge.com/Economics-of-Agricultural-Development-World-Food-Systems-and-Resource-Use/Norton-Alwang-Masters/p/book/9780367321482>
- OECD. (2015). *Demography - working age population - data* [the OECD]. Retrieved April 11, 2023, from <http://data.oecd.org/pop/working-age-population.htm>
- Quak, E.-j., & Flynn, J. (2019). Private sector development interventions and better-quality job creation for youth in africa. Retrieved May 30, 2023, from <https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/14907>

- Reardon, T. (2015). The hidden middle: The quiet revolution in the midstream of agrifood value chains in developing countries. *Oxford Review of Economic Policy*, 31(1), 45–63. <https://doi.org/10.1093/oxrep/grv011>
- Reardon, T., Echeverria, R., Berdegue, J., Minten, B., Liverpool-Tasie, S., Tschirley, D., & Zilberman, D. (2019). Rapid transformation of food systems in developing regions: Highlighting the role of agricultural research & innovations. *Agricultural Systems*, 172, 47–59. <https://doi.org/10.1016/j.agsy.2018.01.022>
- Sakai, O. (2021, January 19). *Tackling youth unemployment through entrepreneurship and skills training* % [TechnoServe]. Retrieved May 18, 2023, from <https://www.technoserve.org/blog/youth-unemployment-entrepreneurship/>
- Sauer, C., Dolislager, M., & Reardon, T. (2019). Spatialized links between the agri-food system and employment in tanzania (working paper). <https://farmlabor.ucdavis.edu/sites/g/files/dgvnsk5936/files/inline-files/luc%5C%20Sauer%5C%20Dolislager%5C%20et%5C%20al%5C%20march19%5C%202019%5C%20final%5C%20sent%5C%2010h24est.pdf>
- Schwebel, D., Estruch, E., Wobst, P., Grandelis, I., et al. (2019). Policies for youth employment in sub-saharan africa. *Youth and jobs in rural Africa: beyond stylized facts*, 47–74.
- Smit, W. (2016). Urban governance and urban food systems in africa: Examining the linkages. *Cities*, 58, 80–86. <https://doi.org/10.1016/j.cities.2016.05.001>
- Tanzania overview* [World bank]. (2022, September 23). Retrieved December 20, 2022, from <https://www.worldbank.org/en/country/tanzania/overview>
- The Citizen. (2022, July 29). *OYE strives to address youth unemployment in tanzania* [The citizen]. Retrieved May 18, 2023, from <https://www.thecitizen.co.tz/tanzania/supplement/oye-strives-to-address-youth-unemployment-in-tanzania-3895946>
- Timmer, P. C. (1988, January 1). The agricultural transformation. In *Handbook of development economics* (pp. 275–331). Elsevier. [https://doi.org/10.1016/S1573-4471\(88\)01011-3](https://doi.org/10.1016/S1573-4471(88)01011-3)
- UNFPA. (n.d.). *Demographic dividend* [United nations population fund]. Retrieved February 14, 2023, from <https://www.unfpa.org/demographic-dividend>

- Valdés, A., & Foster, W. (2010). Reflections on the role of agriculture in pro-poor growth. *World Development*, *38*(10), 1362–1374. <https://doi.org/10.1016/j.worlddev.2010.06.003>
- Van den Broeck, G., & Kilic, T. (2019). Dynamics of off-farm employment in sub-saharan africa: A gender perspective. *World Development*, *119*, 81–99. <https://doi.org/10.1016/j.worlddev.2019.03.008>
- Van den Broeck, G., Kilic, T., & Pieters, J. (2023). Structural transformation and the gender pay gap in sub-saharan africa. *PLoS ONE*, *18*(4), e0278188. <https://doi.org/10.1371/journal.pone.0278188>
- World Bank. (2015). *Literacy rate, adult total (% of people ages 15 and above) - tanzania / data*. Retrieved December 20, 2022, from <https://data.worldbank.org/indicator/SE.ADT.LITR.ZS?locations=TZ>
- World Bank. (2019). *Employment in agriculture (% of total employment) (modeled ILO estimate) - tanzania / data*. Retrieved January 2, 2023, from <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=TZ>
- World Bank. (2023, February 21). *Unemployment, total (% of total labor force) (modeled ILO estimate) - tanzania* [World bank open data]. Retrieved April 25, 2023, from <https://data.worldbank.org>
- World Bank. (n.d.). *LSMS-ISA* [World bank]. Retrieved December 20, 2022, from <https://www.worldbank.org/en/programs/lms/initiatives/lms-ISA>
- Wright, C. F., & Clibborn, S. (2019). Migrant labour and low quality work: A persistent relationship. *Journal of Industrial Relations*, *61*(2). Retrieved May 30, 2023, from <https://ses.library.usyd.edu.au/handle/2123/25544>
- Wuyts, M., & Kilama, B. (2016). Planning for agricultural change and economic transformation in tanzania? *Journal of Agrarian Change*, *16*(2), 318–341. <https://doi.org/10.1111/joac.12111>
- Yeboah, F. K., & Jayne, T. S. (Eds.). (2016). *Africa's evolving employment structure*. <https://doi.org/10.22004/ag.econ.246956>
- Yeboah, F. K., & Jayne, T. S. (2018). Africa's evolving employment trends. *The Journal of Development Studies*, *54*(5), 803–832. <https://doi.org/10.1080/00220388.2018.1430767>

Appendices

A Data information

Table A.1: ISIC codes corresponding to the farm sector (Yeboah and Jayne, 2016)

Categories	Names	ISIC divisions	ISIC codes
Section A	Agriculture, forestry and fishing	Crop and animal production, hunting and related services activities	1
		Fishing and aquaculture	3

Table A.2: ISIC codes corresponding to the off-farm in agri-food systems (Yeboah and Jayne, 2016)

Categories	Names	ISIC divisions	ISIC codes
Section C	Manufacturing	Manufacture of food products	10
		Manufacture of beverages	11
		Manufacture of tobacco products	12
		Manufacture of articles of fur	142
		Tanning and dressing of leather; dressing and dyeing of fur	1511
Section G	Wholesale and retail trade; repair of motor vehicles and motorcycles	Wholesale of agricultural raw materials and live animals	462
		Wholesale of food, beverages and tobacco	463
		Wholesale of agricultural machinery, equipment and supplies	4653
		Retail sale in non-specialized stores with food, beverages or tobacco predominating	4711
		Retail sale of food, beverages and tobacco in specialized store	472
		Retail sale via stalls and markets of food, beverages and tobacco products	4781
		Food and beverage service activities	56
Section M	Professional, scientific and technical activities	Veterinary activities	75

Table A.3: Summary statistics of control variables in the year 2011

	N	Mean	Std dev	Min	Max
Marital status (M)	7,973	0.49	0.50	0	1
Household size (H)	7,973	6.51	4.44	1	55
Dependency ratio (D)	7,973	0.90	0.75	0	7
Livestock (LH)	7,973	7.40	30.39	0	496
Landholding (LS)	7,973	1.67	1.54	0	11
Agricultural shocks (AS)	7,973	0.37	0.48	0	1
Household shocks (HS)	7,973	0.41	0.49	0	1
Education (E)	7,973	0.62	0.49	0	1
Welfare (W)	6,856	4.32	2.06	1	8

Table A.4: Summary statistics of control variables in the year 2020

	N	Mean	Std dev	Min	Max
Marital status (M)	2,336	0.53	0.50	0	1
Household size (H)	2,336	6.24	4.72	1	35
Dependency ratio (D)	2,336	0.87	0.77	0	9
Livestock (LH)	2,336	5.29	15.29	0	120
Landholding (LS)	2,336	1.32	1.80	0	30
Agricultural shocks (AS)	2,336	0.18	0.38	0	1
Household shocks (HS)	2,336	0.11	0.31	0	1
Education (E)	2,336	0.74	0.44	0	1
Welfare (W)	1,985	4.01	1.74	1	7

B Results

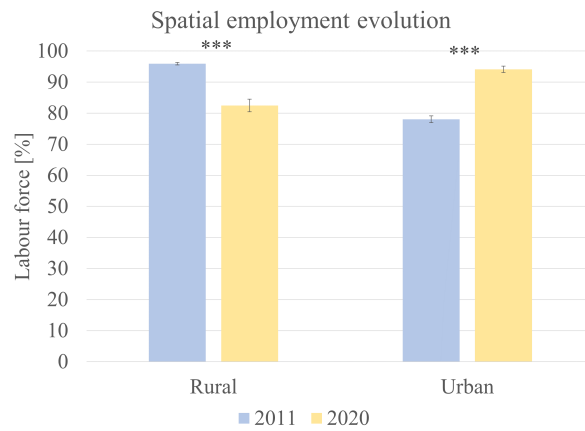


Fig. B.1: Evolution of the employment rate in rural and urban areas, author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's *t*-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

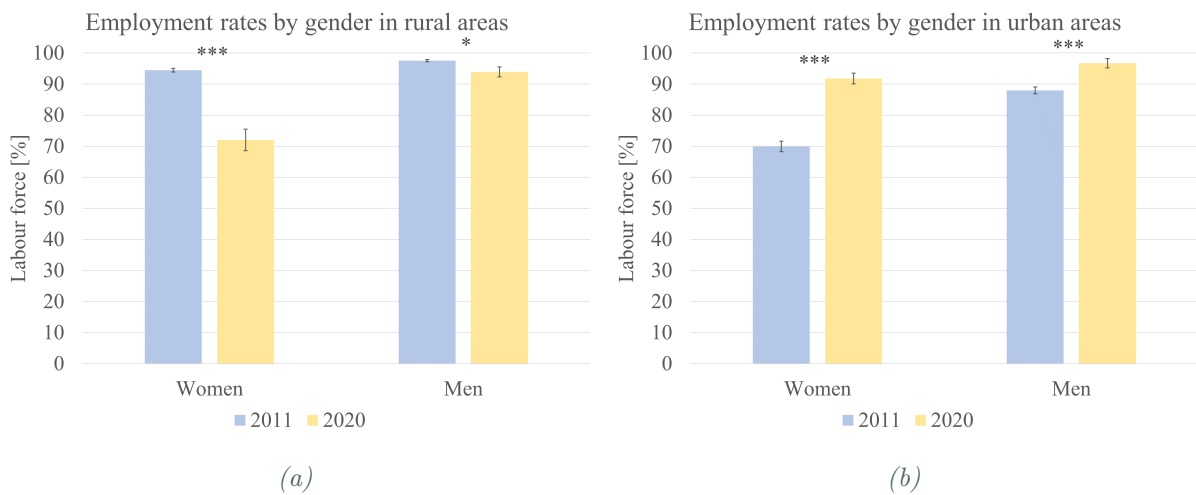


Fig. B.2: Evolution of employment rate by gender in (a) rural areas, (b) urban areas. Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's *t*-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

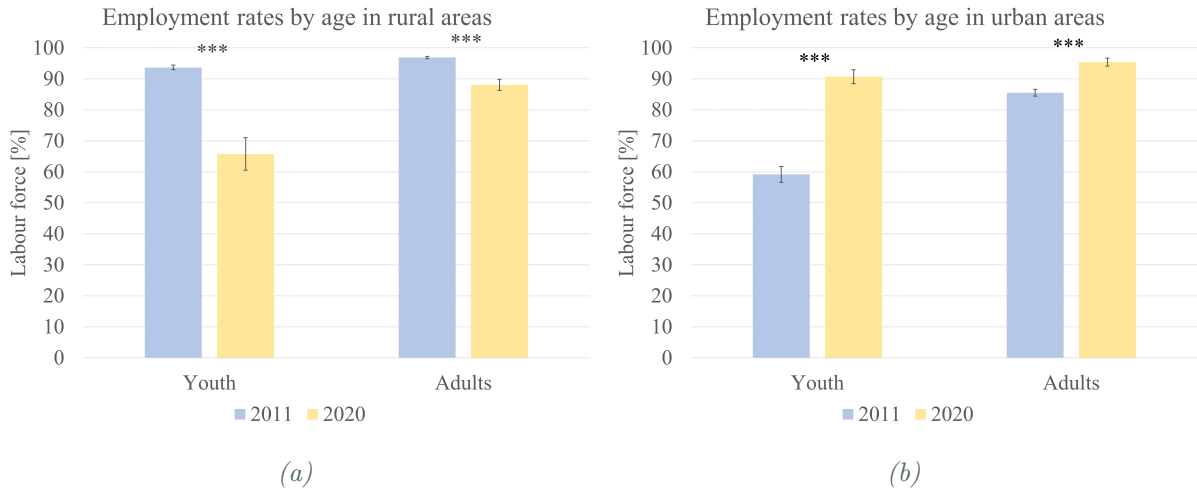


Fig. B.3: Evolution of employment rate by age in (a) rural areas, (b) urban areas. Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's *t*-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

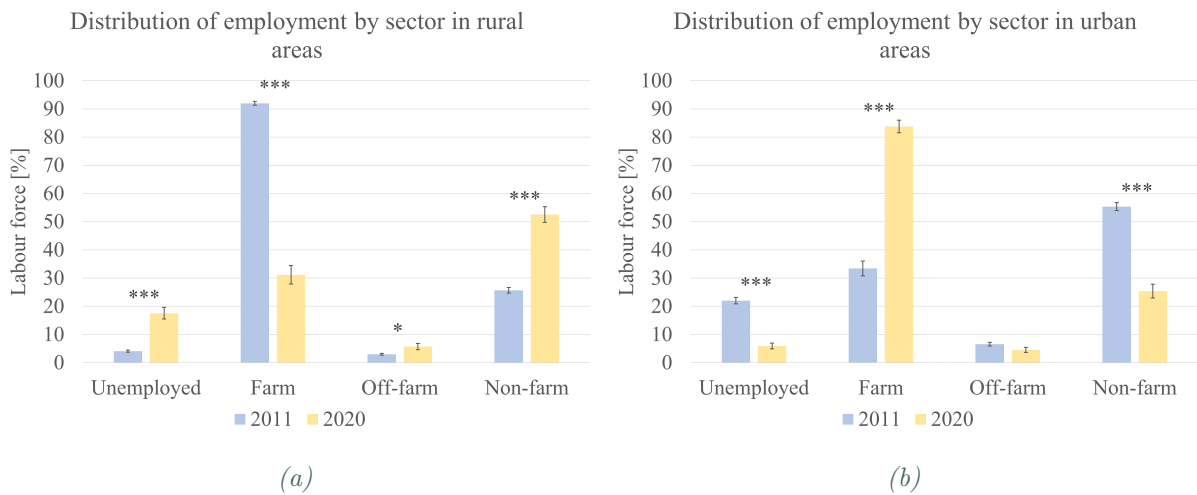


Fig. B.4: Evolution of the distribution of employment rate by sector in (a) rural areas, (b) urban areas. Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's *t*-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

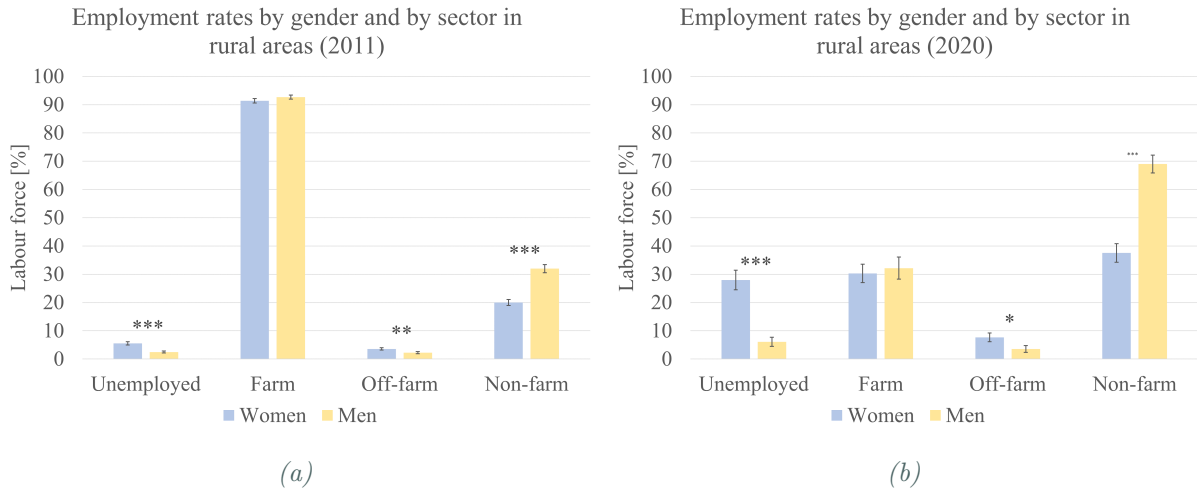


Fig. B.5: Distribution of employment rate by sector and gender in rural areas in 2011 (a) and 2020 (b). Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

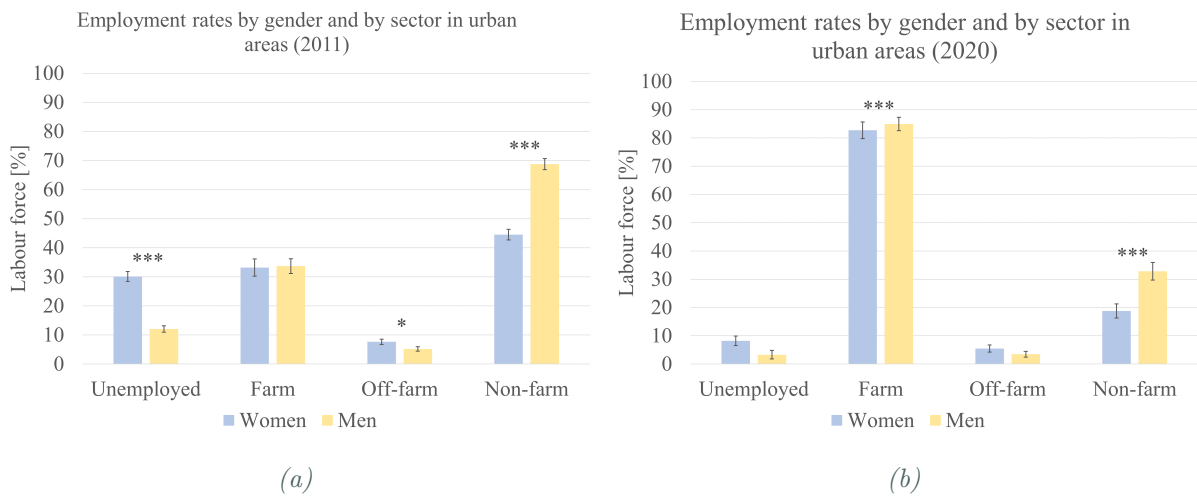


Fig. B.6: Distribution of employment rate by sector and gender in urban areas in 2011 (a) and 2020 (b). Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's t-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

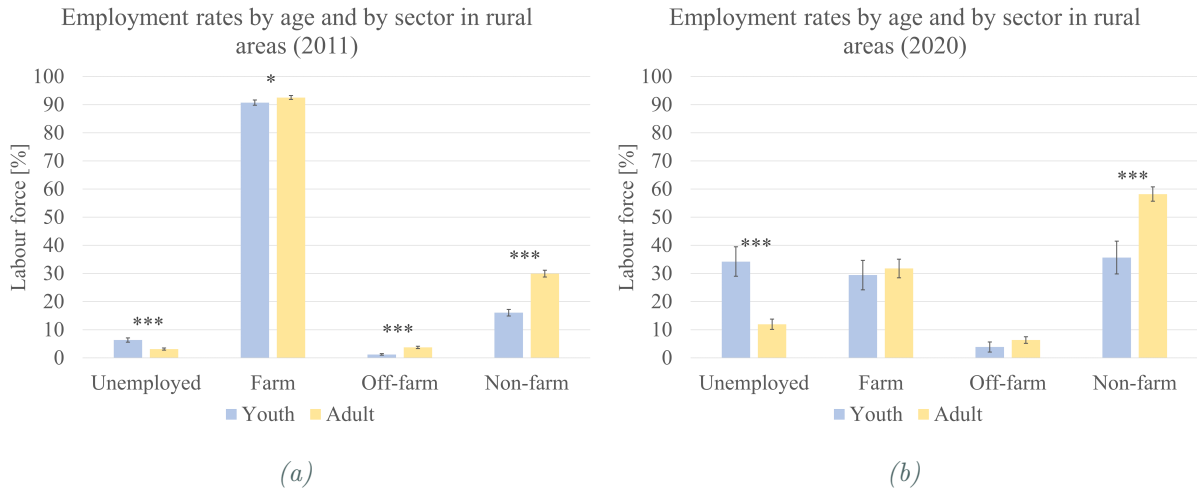


Fig. B.7: Distribution of employment rate by sector and age in rural areas in 2011 (a) and 2020 (b). Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's *t*-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

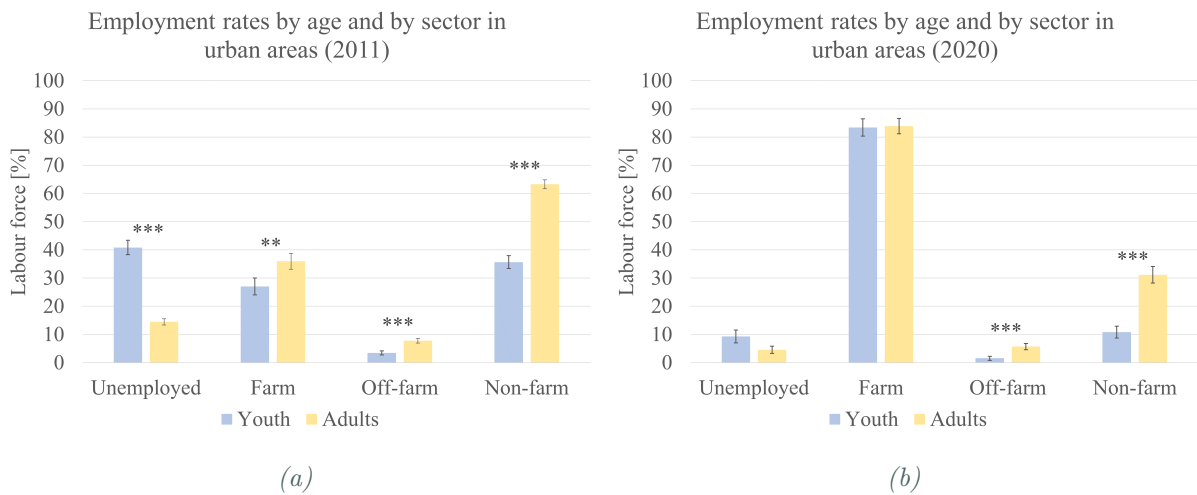


Fig. B.8: Distribution of employment rate by sector and age in urban areas in 2011 (a) and 2020 (b). Author's estimates from Tanzania National Panel Survey (2011 and 2020). The significance is tested by a Student's *t*-test : * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Inclusiveness of off-farm employment in agri-food systems in Tanzania

Vansnick Céleste

This study goes through the evolution of employment within the off-farm in agri-food systems sector between 2011 and 2020 in Tanzania. The data analysed comes from the Living Standards Measurement Study developed by the World Bank. On the one hand, a descriptive analysis of employment makes it possible to evaluate the quantity of employment generated by this sector and to compare it with other sectors (farm and non-farm outside agri-food systems). The observations are also disaggregated by gender, age and location to assess the employment situation for women, young and rural people in particular. On the other hand, logistic regression makes it possible to evaluate the inclusiveness of the sector studied towards women, young and rural people. These models also allow us to identify the important factors that attract or keep people away from the off-farm sector. The results indicate that the off-farm sector has evolved significantly between 2011 and 2020 but remains a minority compared to other sectors. The sector studied is more inclusive towards women but it is not the case for youth and people from rural areas. All the results obtained in this work testify to the complexity of the evolution of employment in Sub-Saharan Africa and the need to better understand the underlying mechanisms to propose effective employment policies that generate pro-poor growth.

UNIVERSITE CATHOLIQUE DE LOUVAIN

Faculté des bioingénieurs

Croix du Sud, 2bte L7.05.01, 1348 Louvain-La-Neuve, Belgique | www.uclouvain.be/agro