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Agrifood System Transformation in Low- and Middle-Income Countries

Cross-Country Evidence from Africa and Asia

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ABSTRACT

This paper contributes to the agrifood-systems literature by providing one of the largest cross-country assessments of agrifood-system structure and transformation currently available. Using a consistent economywide framework based on social accounting matrices across 27 African and Asian countries, the synthesis reveals three broad patterns of agrifood-system transformation. First, agrifood systems account for substantial shares of GDP and employment not only in low-income countries but also in relatively advanced lower-middle-income economies. While agrifood systems continue to grow in absolute terms, their relative importance declines with economic diversification, accounting for smaller shares of GDP and employment at higher income levels, both across countries and within countries over time. Second, agrifood systems remain major sources of employment, but the composition of new jobs is shifting beyond farming. Off-farm activities account for an increasing share of new agrifood jobs, particularly in middle-income countries, with much of this employment created in service-related off-farm activities. Third, agricultural labor productivity increased in most countries, providing encouraging evidence of ongoing transformation. However, growth in off-farm labor productivity was much less widespread across countries. Maintaining agricultural productivity growth is essential, but stronger productivity growth in off-farm agrifood activities will be increasingly important for sustaining income growth and long-term structural transformation.

Keywords: Agrifood systems, Structural transformation, Employment, Labor productivity

ACKNOWLEDGMENTS

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1. INTRODUCTION

This paper contributes to the agrifood systems literature by providing one of the largest cross-country assessments of agrifood-system structure and transformation currently available. Drawing on agrifood-system diagnostics conducted in 27 African and Asian countries at IFPRI between 2023 and 2025, it identifies common patterns in the evolution of agrifood systems while highlighting important differences across countries. The findings of this paper provide new evidence on how agrifood systems evolve during economic transformation and on the opportunities and challenges they present for growth, employment, and productivity.

Over the past decade, economic growth has slowed markedly in many developing countries. Low- and lower-middle-income economies grew by an average of 4.4 percent annually between 2014 and 2024, compared with 5.7 percent between 2000 and 2014. The slowdown has been especially pronounced in Sub-Saharan Africa, where, after a decade of rapid expansion, growth has averaged only 2.2 percent since 2014.

Although some Asian countries have successfully built labor-intensive, export-led manufacturing sectors, most developing economies have seen limited growth and job creation in manufacturing. Recent trade policy shifts are expected to further constrain opportunities to expand manufacturing for export. Against this backdrop, the agrifood systems literature has expanded rapidly during the last decade, with agrifood systems gaining renewed attention as potential engines of employment and economic growth. Much of this literature focuses on food security, nutrition, sustainability, resilience, and environmental outcomes (see, for example, Diao, Hazell, and Thurlow 2010; Teal 2011; Nico and Christiaensen 2023). While these studies have strengthened understanding of food-system outcomes, relatively few provide data-driven, economywide measurements of agrifood systems and their performance.

This synthesis paper contributes to a growing body of work led by IFPRI and collaborators that conceptualizes agrifood systems as economic systems whose structure, growth, employment, productivity, and trade performance can be measured. The International Food Policy Research Institute (IFPRI) and collaborators have completed agrifood system diagnostics in 27 African and Asian countries between 2023

and 2025.¹ The synthesis is based on the findings of these agrifood-system diagnostics. Applying a common economywide analytical framework across countries makes it possible to identify regularities that are difficult to observe in individual country studies while retaining the richness of country-level evidence. The synthesis therefore provides a bridge between detailed country diagnostics and broader cross-country understanding of agrifood-system transformation. The principal contribution of the paper is not the development of new theory, but rather the provision of systematic empirical evidence. Thus, the synthesis complements the broader food-systems literature while connecting directly to the structural transformation literature.

The synthesis focuses on changes in agrifood-system structure, the sources of agrifood employment and productivity growth, and the roles of domestic and international markets in shaping agrifood transformation outcomes across countries. Three broad findings emerge from the synthesis. First, agrifood systems continue to play a central role in economic transformation, not only in low-income countries but also in relatively advanced lower-middle-income economies. As incomes rise, urbanization proceeds, food demand diversifies, and agrifood systems increasingly extend beyond farming to include processing, logistics, trade, transportation, food services, and other activities that connect producers and consumers. While agrifood systems continue to grow in absolute terms, their relative importance declines, generally accounting for smaller shares of GDP and employment at higher income levels, both across countries and within countries over time. This declining relative importance reflects broader economic diversification during development. Within agrifood systems themselves, the share of agriculture declines most rapidly, while off-farm activities become increasingly important components of agrifood systems

Yet these structural changes within agrifood systems are not fully reflected in agrifood trade patterns. While agrifood exports remain important sources of foreign exchange earnings, they are often concentrated in a limited number of primary commodities and account for only a small share of total

¹ Please see Annex Table A1 for the coverage of 27 countries. The individual country agrifood system diagnostics were conducted under several IFPRI-led agrifood-system transformation initiatives. Publications of these agrifood system diagnostics can be found on IFPRI's website: <https://www.ifpri.org/project/agrifood-system-afs-diagnostics/#publications>

agrifood-system activity. At the same time, urbanization and income growth increasingly shift food demand toward processed food products, many of which are imported. This lag in agrifood trade transformation highlights the need for stronger domestic value addition and more diversified agrifood exports.

Second, new agrifood jobs are increasingly created in off-farm activities, particularly services. Agrifood systems are among the largest sources of employment in the countries studied, but the composition of new jobs is shifting increasingly beyond farming. In many middle-income countries, off-farm activities have become the primary source of new agrifood jobs, while in lower-income countries agriculture remains an important source of employment growth alongside expanding off-farm opportunities. As agrifood systems become more market-oriented and diversified, employment growth increasingly comes from activities beyond farming. Rising incomes, urbanization, and changing demand create jobs not only in agro-processing but also in trade, transportation, food services, input provision, and other activities that connect producers and consumers.

Third, future productivity growth in agrifood systems will increasingly depend on productivity gains in off-farm activities. The 27 countries studied provide encouraging evidence of agrifood transformation. Agricultural labor productivity increased in most countries. The expansion of more productive off-farm employment further enhances agrifood productivity growth through structural change. The cross-country evidence, however, also points to a challenge for the future. Continued movement of labor from agriculture to more productive off-farm activities contributes to productivity growth, but this contribution is likely to diminish unless productivity also rises within off-farm activities themselves. While agricultural labor productivity increased in most countries, growth in off-farm labor productivity was much less widespread. In a number of countries, rapid expansion of off-farm employment outpaced growth in off-farm output, resulting in stagnant or declining off-farm labor productivity. Future agrifood transformation will therefore depend not only on creating more jobs beyond agriculture, but also on creating more productive jobs. Maintaining agricultural productivity growth is essential, but stronger productivity growth in off-farm agrifood activities will be increasingly important for sustaining income growth and long-term structural transformation.

The remainder of this paper is organized as follows. Section 2 defines agrifood systems and describes the data and methods. Section 3 examines agrifood-system size, structure, employment, and trade across the 27-country sample. Section 4 assesses agrifood-system performance and transformation dynamics. Section 5 concludes.

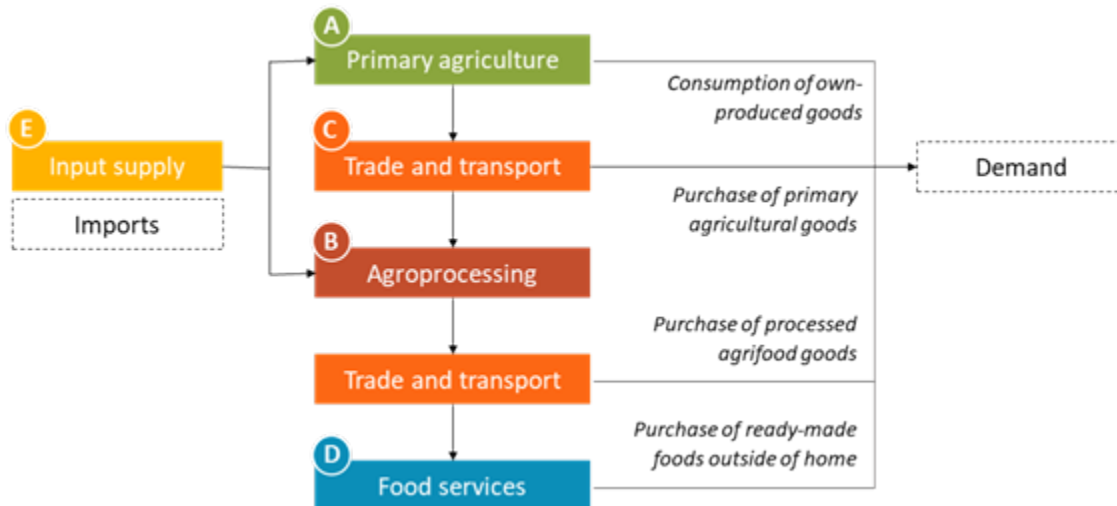
2. AGRIFOOD SYSTEM DIAGNOSTICS APPROACH

Defining the Agrifood System

We define the agrifood system (AFS) using a conceptual framework developed by Thurlow *et al.* (2025) that allows us to measure the structure, size, and performance of the AFS in terms of GDP and employment. Using this framework, a country's AFS is decomposed into five components (Figure 2.1):

- 1) **Primary agriculture (A):** on-farm economic activity within the agricultural sector including crops, livestock, fisheries, and forestry.
- 2) **Agro-processing (B):** the manufacturing sector for agriculture-related food and nonfood products including drying, freezing, milling, and canning and bottling.
- 3) **Trade and transport services (C):** services associated with the logistics of transporting and trading agrifood products between farms, firms, and final points of sale.
- 4) **Food services (D):** meal preparation services at restaurants, food stalls, and hotels.
- 5) **Input supply (E):** domestically produced goods and services used as intermediate inputs to agricultural and agro-processing, such as seeds and fertilizers for farming, electricity for agro-processing, and financial services for agro-trading.

Figure 2.1. The composition of a country's AFS structure



Source: Reproduced from Thurlow et al. (2025).

Social Accounting Matrix

The decomposition of national agrifood systems requires the use of Social Accounting Matrices (SAMs).

A SAM is an economywide database organized as a square transactions matrix for an economy in a given year, in which each cell records the value of the transactions between the two agents identified by its row and column accounts. Selling agents are identified by the rows, so that row entries record the incomes received by each agent, while purchasing agents are identified by the columns, so that column entries record the expenditures made by each agent. A SAM is thus a compact form of “double-entry bookkeeping” that is both complete and consistent: it records all transactions within the production boundary of the national accounts, and the incomes of each agent are exactly matched by the expenditures of other agents. A fundamental consequence of these conditions is that the row and column totals of a SAM must be identical. Examples of such transactions include (1) payments by each production activity account for commodities used as intermediate inputs and for factors of production; (2) flows from production activity accounts to the corresponding commodity accounts; (3) flows from commodity accounts to households, government, and the savings-investment account as domestic purchases, and to the rest of the world as exports; (4) income flows from factor accounts (labor, land, and capital) to enterprise, household, and government accounts; (5) household spending on commodities, savings, tax payments to government, and transfers to the rest of the world; (6) tax payments from production activities, enterprises, and households to government, and government spending on commodities (such as education, health, and public administration services), transfers to households, savings, and transfers to the rest of the world; and (7) flows from the rest of the world to commodity accounts as imports. Each SAM is consistent with the country’s national accounts for that year, so that total and sectoral GDP match official statistics.

The country SAMs are constructed from a range of national and international data sources, including national accounts, input-output or supply-use tables, government fiscal statistics, and balance of payments for each country; UN Comtrade trade data; FAO agricultural production data; ILO employment data; and national industrial surveys and nationally representative household surveys. Because these sources

are rarely fully consistent with one another, the SAMs are balanced using cross-entropy estimation methods (Robinson, Cattaneo, and El-Said 2001).

For this study, agriculture and agro-processing in all country SAMs are disaggregated into many detailed activities (crops, livestock, fisheries, forestry, and their processed products), which allows each of the agrifood-system components defined in Figure 2.1 to be measured separately. The country SAMs follow the standard IFPRI Nexus SAM structure (IFPRI n.d.-a). Publicly accessible versions of the country SAMs, which aggregate production into 42 activities, are available through CGSpace, CGIAR’s open-access repository (IFPRI 2025).

Importantly, the analysis does not rely on a single SAM per country. For each country, we use a set of SAMs that covers the period of the country’s agrifood system diagnostic (Table A1). For 16 countries, a SAM is available for every year of the period (for example, 2009–2022), forming an annual time series. For the remaining 11 countries, two SAMs are available, one for the initial year and one for the final year of the period (for example, 2009 and 2019). All SAMs for a country have the same row and column structure, and each is consistent with national accounts data for its year. Because all SAMs for a country share the same sectoral classification, changes in the structure of the agrifood system over time are measured consistently. Depending on data availability, the periods start between 2006 and 2014 and end between 2019 and 2024. GDP values over time are expressed in constant prices of each country’s base year, using national accounts GDP deflators, and are converted to US dollars at base-year (2022) exchange rates. Employment data come from the ILO modelled estimates (ILO 2024), which report the number of workers in 14 aggregate sectors² for each year. To match the detailed sectors of the SAMs, employment in each ILO sector is further disaggregated using the sectoral distribution of workers in each country’s household survey data, so that employment and GDP are measured for the same SAM sectors. Employment is estimated in this way for each SAM year (the initial and final years for all countries, and every year for countries with

² The 14 ILO sectors are agriculture, forestry, and fishing; mining and quarrying; manufacturing; utilities; construction; wholesale and retail trade; transport, storage, and communication; accommodation and food services; financial services; real estate and business services; public administration and defense; education; health and social work; and other services.

annual SAMs), using the ILO estimates for that year; it is not projected forward using assumed constant growth rates. Measuring sectoral employment in low- and middle-income countries over time is challenging, because labor force surveys are infrequent and many workers combine farm and nonfarm or seasonal activities, which can affect measured employment and labor productivity in agriculture relative to other sectors (Gollin, Lagakos, and Waugh 2014; McMillan, Rodrik, and Verduzco-Gallo 2014). Because the disaggregation relies on a single household survey for each country, the distribution of workers across detailed sectors within each ILO sector is held constant over the period. Changes in the structure of employment over time therefore reflect changes in the ILO estimates for the 14 aggregate sectors, while changes in labor returns are captured in the SAMs as part of sectoral value added. Because 11 countries have SAMs for the initial and final years only, employment growth (like GDP growth) is measured for all countries between these two years, as described in Section 4.

SAMs are also the core database of IFPRI's economywide models, including the Rural Investment and Policy Analysis (RIAPA) model (IFPRI n.d.-b), a computable general equilibrium (CGE) model that is calibrated to a country's SAM and is used in the country diagnostics to simulate how alternative investments and policies would affect growth, employment, and poverty. This paper does not use model simulations. All results reported in the tables and figures are calculated directly from the SAMs and the accompanying national accounts, employment, and trade data. The paper therefore describes the observed structure and evolution of agrifood systems, rather than model-based scenarios or projections.

Country Coverage

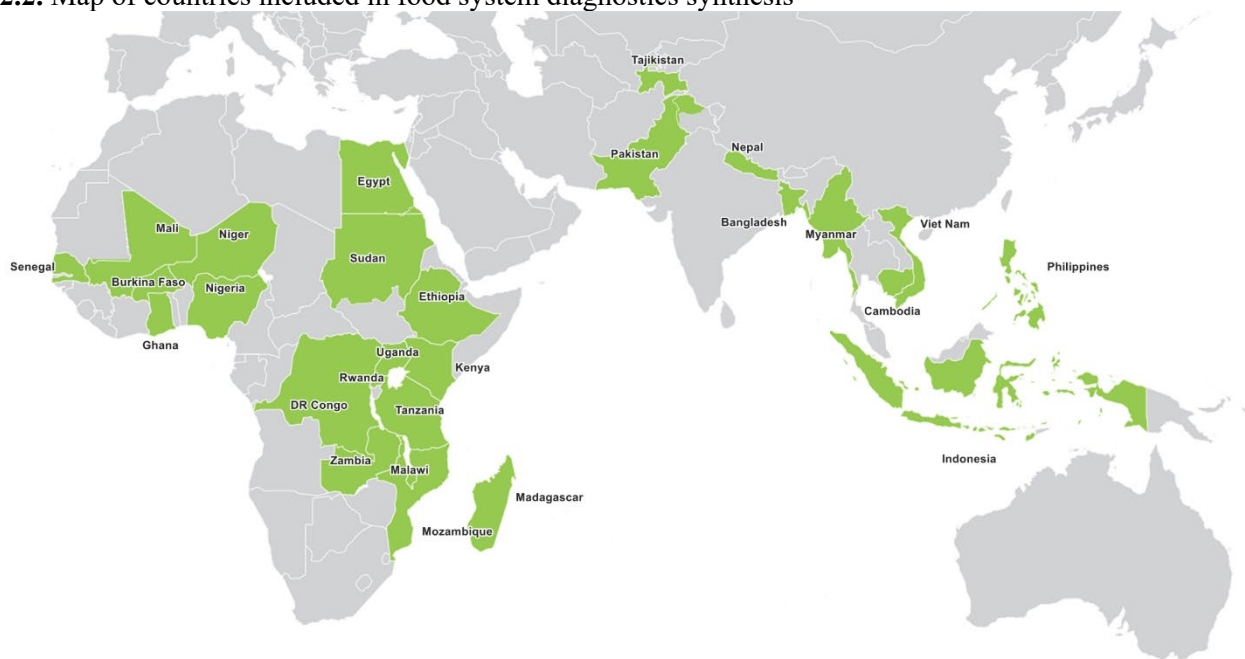
This synthesis covers national agrifood system diagnostics for 27 countries—nine in Asia and eighteen in Africa (Figure 2.2). These 27 countries account for roughly two-thirds of the world's extremely poor population and roughly half of the world's undernourished people.

Keeping in mind the disparity in per capita income across countries, we group the 27 countries into low-income countries (LIC), lower-middle-income countries (LMIC), and upper-middle income countries. There are eleven low-income countries in the sample, all in Africa. Seven of the 16 lower-middle-income countries are in Africa and the remaining 9 are Asian countries. Among the LMICs in Africa, only Kenya

(in 2014) and Tanzania (in 2020) transitioned from LIC to LMIC status during the studied period, while in Asia, five LMICs advanced from low-income to lower-middle-income status between 2015 and 2020. Meanwhile, Indonesia has become an upper-middle-income country in recent years.

On average, per capita GDP in these countries grew by 2.5 percent annually between 2009 and 2024, compared with a global average of 1.9 percent. High-growth performers—including Ethiopia and Rwanda in Africa, and Bangladesh, Cambodia, Tajikistan, and Vietnam in Asia—grew more than 4 percent per year in per capita terms. By contrast, roughly one-third of the countries (six LICs and two LMICs in Africa) experienced growth below the global average. The two LMICs in this group (Nigeria and Zambia) were adversely affected by the collapse of global commodity prices in 2014, while among the six LIC countries in this group, Madagascar and Sudan have experienced negative growth since 2009.

Figure 2.2. Map of countries included in food system diagnostics synthesis



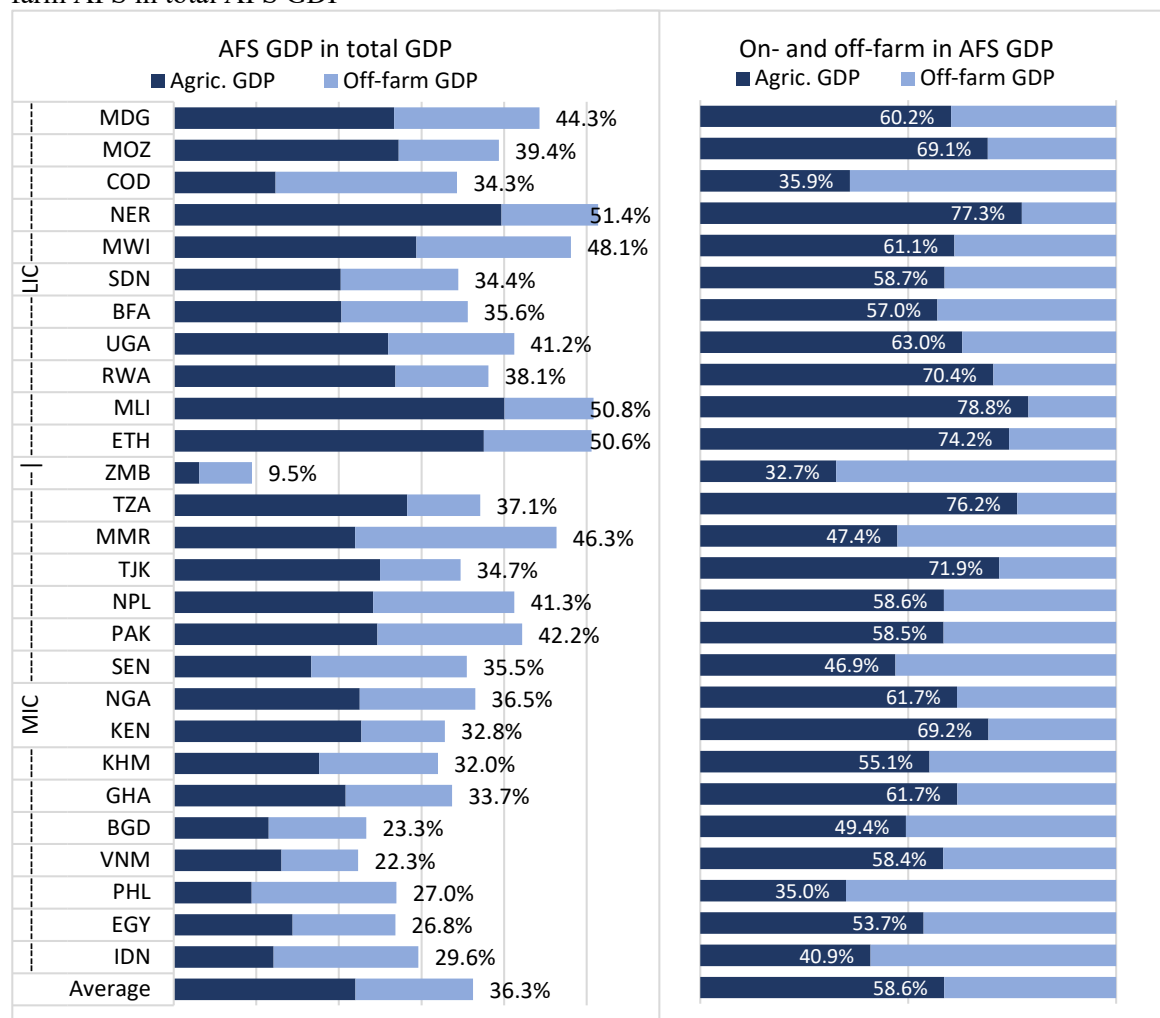
Source: Authors.

3. DESCRIBING AGRIFOOD SYSTEMS

Agrifood System Size and Structure

Agrifood systems are generally large across low- and middle-income countries but vary in their size and in their contribution to the overall economy. Across the 27-country sample, the value of agrifood system GDP ranged from less than \$5 billion in Zambia and Tajikistan to \$70 billion in Ethiopia, \$163 billion in Nigeria, and more than \$380 billion in Indonesia (see Annex A, Table A2 for all 27 countries in detail).

Figure 3.1. Shares of agriculture, off-farm AFS and total AFS in GDP and shares of agriculture and off-farm AFS in total AFS GDP



Note: The countries are ranked by per capita GNI in 2022 from the lowest to highest.

Source: Authors' calculation using country SAMs.

Globally, agrifood system GDP averages about 40 percent of national GDP for low-income countries (LICs) and roughly 30 percent for the lower-middle-income group (LMICs) (Thurlow *et al.* 2025).

Results for our sample are consistent with this pattern, with AFS GDP averaging 36.3 percent of national GDP (Figure 3.1, left panel). Some low-income countries (Niger, Ethiopia, and Malia) rely more on the agrifood system, with AFS shares exceeding 50 percent of total GDP in their economies. In contrast, in two lower-middle-income Asian countries (Bangladesh and Vietnam), agrifood systems account for less than one-quarter of the national economy.³

Primary agriculture is the largest component of most national food systems. Globally, agriculture averaged 68 percent of AFS GDP in LICs and 58 percent in LMICs (Thurlow et al. 2025). In our analysis, agriculture averaged 59 percent of total AFS GDP, varying between one-third and more than 70 percent of the agrifood system (Figure 3.1, right panel). Similar to the global estimates generated by Thurlow et al, agro-processing and trade and transport were the two largest off-farm components of the 27 analyzed food systems (Annex A, Figure A1). However, the sizes of these two sectors were smaller than Thurlow’s global estimates with agro-processing averaging 16 percent of AFS GDP (compared to 25 percent globally) and trade and transport averaging 16 percent (compared to 20 percent globally).

Agriculture is highly diverse across countries, and variation in agricultural production composition reflects the interaction of agroecological conditions and food consumption patterns. Because domestic food needs dominate most agrifood systems, livestock (including fish) and cereals are typically the largest commodity groups, accounting on average for nearly 30 percent and 20 percent of agricultural GDP and agrifood system GDP, respectively. However, differences in agroecological conditions and associated crop patterns mean that other food value chains dominate in some countries, including root crops in Ghana and Nigeria (cassava and yam), Uganda (plantain), and Rwanda (potatoes and plantain), and pulses and oilseeds in Burkina Faso (cowpeas) and Senegal (groundnuts). In some countries, agricultural composition is also influenced by export-oriented activities associated with agroecological comparative advantages. Horticulture accounts for a substantial share of agricultural GDP in Egypt and Tajikistan, while palm oil is particularly important in Indonesia. Coffee, tea, and tobacco remain important in several African countries.

³ Zambia is a notable outlier, with an agrifood system share of just 9.5 percent of GDP, possibly reflecting measurement issues related to smallholder agriculture value-added.

However, although export-oriented agriculture often reflects countries' agroecological comparative advantages, it generally accounts for a much smaller share of total agrifood-system GDP than major foods and is rarely comparable in size to livestock, cereals, and other staple food crops.⁴

While the composition of agricultural commodities varies across countries, the relative importance of agriculture as a whole within the agrifood system is closely associated with countries' income levels. Across the sample, higher-income countries tend to have smaller agricultural shares and larger off-farm agrifood sectors. The share of AFS GDP accounted for by agro-processing rises from 14 percent to 17 percent when moving from low-income to middle-income countries, while the shares of other off-farm components like trade and transport and input supply increase from 13 percent to 18 percent and from 2 percent to 4 percent, respectively (Annex A, Figure A1).

Off-farm components are generally smaller than primary agriculture in terms of AFS GDP (Figure 3.1). Together, the four off-farm components (described in Figure 2.1) account for about 40 percent of agrifood-system GDP on average, although their relative importance varies considerably across countries (Annex A, Figure A2). Regional differences are evident even among countries with similar income levels. In Asian LMICs, for example, the shares of input supply and food services are approximately 40 percent larger than in African LMICs, while the share of primary agriculture is about 6 percentage points smaller. These patterns suggest that agrifood-system composition is influenced not only by income levels but also by broader structural characteristics, including manufacturing development, urbanization, market size, and the organization of food value chains. Such variation highlights the heterogeneity that exists within off-farm agrifood systems and shapes opportunities for employment and growth across countries.

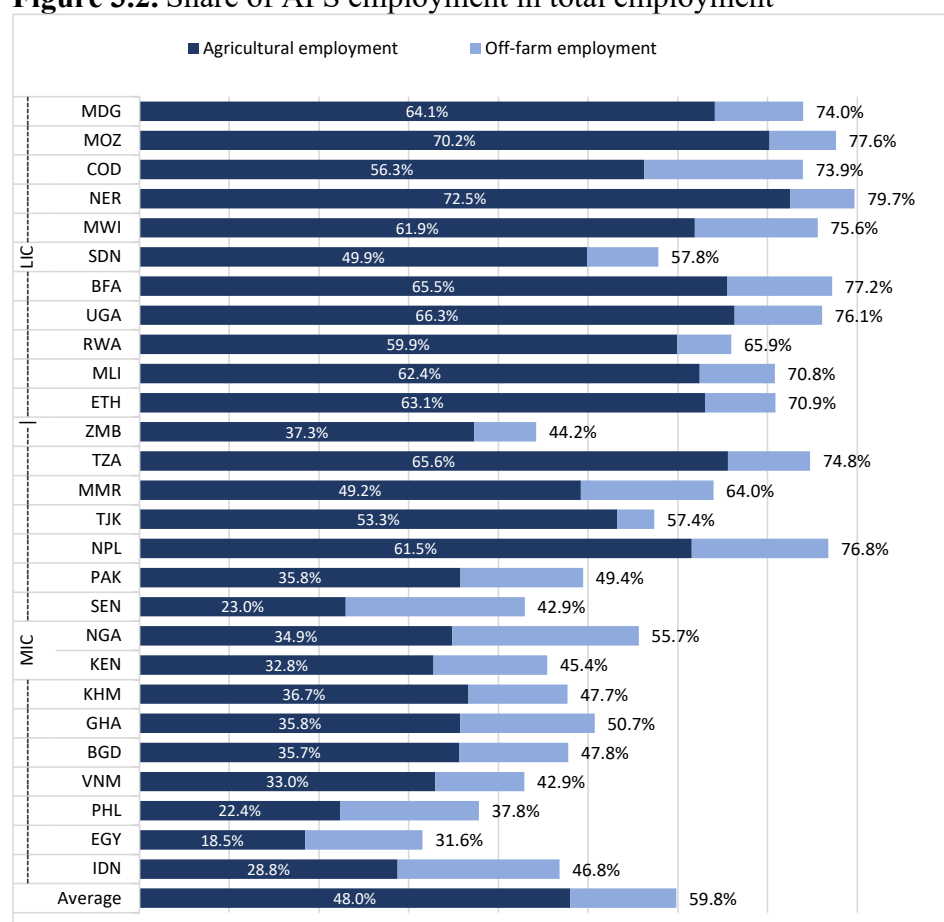
We now turn to agrifood-system employment. The agrifood system remains the largest source of employment across the 27 countries, accounting for about 60 percent of total national employment on average, a share substantially larger than its contribution to national GDP. Employment in the agrifood

⁴ See Annex B for the detail description of decomposition of agrifood system across eight value chain groups at country level.

system exceeds 70 percent of total employment in most low-income countries and remains between 40 and 50 percent in lower-middle-income countries (Figure 3.2).

Within agrifood systems, employment remains overwhelmingly concentrated in primary agriculture. On average, about 80-90 percent of agrifood system workers are engaged in primary agricultural production in LICs and 60 percent in LMICs, dominantly by working on food crop farming and livestock. However, in a handful of countries—including Senegal, the Philippines, Egypt, and Indonesia—off-farm employment accounts for 50 percent or more of agrifood-system employment (Figure 3.2).

Figure 3.2. Share of AFS employment in total employment



Source: Authors' calculation using country SAMs.

Labor Productivity in the Agrifood System

Agrifood system labor productivity is a key measure of economic transformation: higher productivity is typically associated with declining agricultural employment and the growing importance of off-farm activities. Overall, AFS GDP per worker, the standard measure of labor productivity, averaged \$2,500 per worker, about \$1,100 per worker in the sample's eleven low-income countries and \$3,500 per worker in the 16 middle income countries.

Within the agrifood system, labor productivity in agriculture (on-farm) is generally lower than in off-farm segments. In 27 countries studied here, GDP per worker averaged nearly \$2,000 for agriculture, compared with \$4,600 for off-farm segments in the agrifood system. While labor productivity in both agriculture and off-farm segments of the agrifood system is lower among LICs than among MICs, the ratio of off-farm to on farm labor productivity was generally higher (3.8) in LICs on average (all African) than in middle-income countries (2.3), because of much smaller off-farm sectors compared to a large on-farm sector in LICs (Annex A, Figure A3).

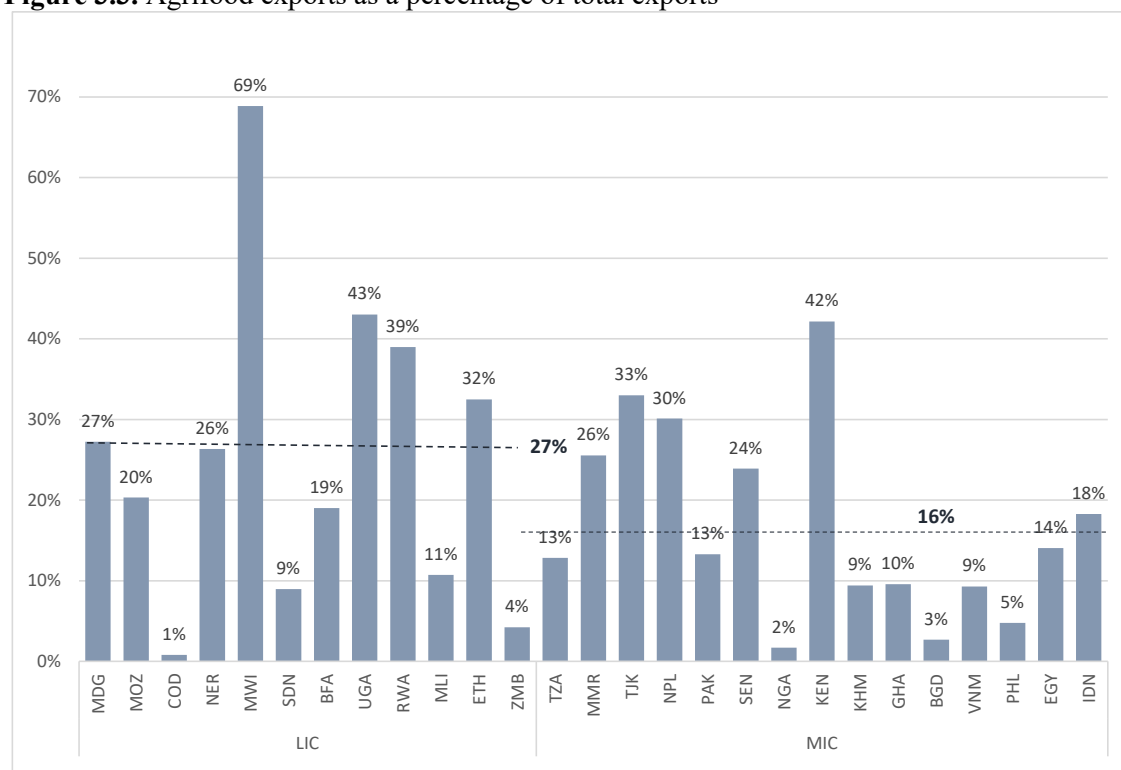
The Contribution of the Agrifood System to Trade

The contribution of agrifood trade is assessed through its role in overall trade balances and foreign exchange availability. While trade balances do not capture all sources and uses of foreign exchange, including remittances, aid flows, debt service, and capital flows, they provide a useful indicator of external pressures and foreign exchange vulnerability. Viewed through this lens, most countries in our sample face substantial external constraints. All 11 low-income countries (LICs) and 13 of the 16 middle-income countries (MICs) recorded overall trade deficits in 2022, with only Indonesia, Vietnam, and Zambia registering trade surpluses. In such contexts, export earnings play an important role in easing foreign exchange constraints and financing imports needed for economic development.

Agrifood systems contribute substantially to these export earnings. Across the countries analyzed, agrifood systems account for an average of 20 percent of total export earnings, equivalent to more than

US\$140 billion annually (Figure 3.3). Their contribution is particularly important in LICs, where agrifood exports account for 27 percent of total exports on average, compared with 16 percent in MICs. Agrifood export shares are smaller in resource-exporting economies such as the Democratic Republic of Congo, Nigeria, and Zambia, and in countries that have successfully developed export-oriented manufacturing or modern service sectors, such as Bangladesh and the Philippines. Nonetheless, agrifood exports remain an important source of foreign exchange earnings across much of the developing world.

Figure 3.3. Agrifood exports as a percentage of total exports



Source: Authors' calculation using country SAMs.

Despite the important contribution to total exports, roughly half of the countries analyzed face agrifood trade deficits. Even among countries with agrifood trade surpluses, food imports often absorb a substantial share of export earnings. In Ethiopia, Rwanda, and Tanzania, for example, agrifood exports are twice the size of agrifood imports; yet imports of processed food products still account for 40–50 percent of agrifood export earnings. These patterns suggest that strong agrifood export performance alone is often insufficient to eliminate external pressures arising from food imports.

The structure of agrifood trade helps explain these persistent imbalances. Agrifood exports are typically dominated by low-value primary agricultural products and are highly concentrated in a small number of commodities. In most countries, a single export crop or a small group of crops accounts for more than 40 percent of agrifood exports, and in some cases the share exceeds 90 percent (see Annex B, Table B1 for detail). Such concentration increases vulnerability to external shocks, including fluctuations in world commodity prices and changes in trade policies among major trading partners. By contrast, agrifood imports are dominated by processed and higher-value food products. While livestock and cereals are among the largest agricultural activities in many countries, domestic production often cannot fully satisfy demand for cereal, meat and dairy products. On average, cereal and livestock related products account for approximately 30 percent of agrifood imports across the 27-country sample. Edible oils, sugar products, and other processed foods are also highly dependent on imports in many countries.

Although some highly processed imports may be difficult to substitute in the short term, opportunities exist to strengthen domestic production of less technology-intensive food products. Improving farm productivity while strengthening local processing, logistics, and related services could reduce dependence on imports, improve food security, and help narrow agrifood trade deficits. Examples include horticulture in Ethiopia, pulses and oilseeds in Bangladesh, and poultry and egg production in Ghana.

Agrifood trade challenges are not confined only to countries relying on processed food imports, and in some countries, even primary agricultural imports remain a major driver of deficits. In Nigeria, agrifood imports are approximately thirteen times larger than agrifood exports, including substantial imports of unprocessed and minimally processed food products. Although oil exports generate considerable foreign exchange earnings, weaknesses in domestic food production and processing continue to contribute to trade imbalances. Similarly, while Bangladesh and Cambodia have developed successful export-oriented garment industries, both continue to run total and agrifood trade deficits, reflecting domestic demand for food and processed food products have not been met by domestic supply. Vietnam provides a contrasting example. Alongside the development of a competitive labor-intensive manufacturing sector, Vietnam has

also built a strong agrifood export sector with both primary and processed products. Its experience demonstrates the potential for diversification both within agrifood systems and across the broader economy.

4. AGRIFOOD SYSTEM PERFORMANCE

Assessing agrifood-system performance over time and across countries helps understand the process of agrifood system transformation. The assessment in this section focuses on agrifood system dynamics across four themes: growth, changes in the relative importance of AFS in the national economy, employment levels, and labor productivity.⁵

All four measures compare the initial and final years of each country's SAM series (Table A1). The period of analysis therefore varies across countries, from 8 years in Myanmar and Sudan (2011–2019) to 17 years in Pakistan (2006–2023). For countries with annual SAMs, the intermediate years ensure that each year's data are consistent with national accounts, but the indicators reported in this section are calculated from the first and last year only; they are not trend rates estimated from a regression. Growth rates of GDP, employment, and GDP per worker are average annual compound growth rates, calculated using initial and ending year, considering time period: $g = 100 \times ((X_T/X_0)^{1/T} - 1)$, where X_0 and X_T are the values in the initial and final years and T is the number of years between them; GDP is measured in constant prices. Changes in the share of the agrifood system in total GDP are calculated as the difference between the final-year and initial-year shares divided by the number of years and are expressed in percentage points per year. Contributions to job creation are the shares of agriculture and of off-farm agrifood activities in the total net change in employment between the initial and final years. Labor productivity is measured as GDP per worker. Unless otherwise stated, cross-country averages are simple (unweighted) averages of country values.

Agrifood System Growth

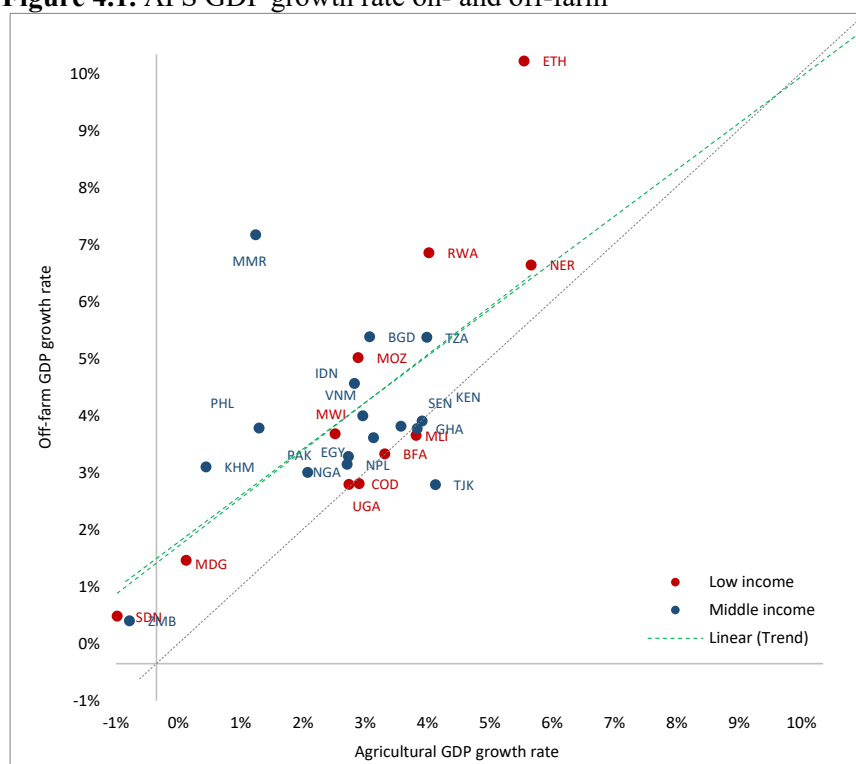
Agrifood systems generally grow alongside the broader economy, with countries experiencing faster GDP growth also tending to record faster growth in agrifood-system GDP. However, this relationship is not automatic. In some natural-resource-rich economies, rapid GDP growth can be driven by expansion of extractive sectors without comparable growth in agrifood systems. Across the 27 countries, agrifood-system

⁵ The AFS performance metrics at country level in detail can be found in Annex A, Table A2.

GDP grew by an average of 3.5 percent per year, compared with average national GDP growth of 4.9 percent. Growth performance varied substantially across countries, ranging from less than 1 percent annually in Sudan, Zambia, and Madagascar to more than 6 percent in Ethiopia and Niger. These differences raise an important question: what drives variation in agrifood-system growth across countries?

To better understand agrifood-system growth dynamics, Figure 4.1 plots the average annual growth rate of off-farm agrifood GDP against the growth rate of agricultural GDP for each country. Countries located above the 45-degree line experienced faster growth in off-farm activities than in agriculture, while the green trend line summarizes the relationship between the two growth rates across countries. A clear pattern emerges, with off-farm activities growing faster than agriculture in nearly all countries. Most observations lie above the 45-degree line, indicating that off-farm agrifood activities were the primary driver of agrifood-system growth. On average, off-farm GDP grew by 4.4 percent per year, compared with 3.1 percent for agriculture.

Figure 4.1. AFS GDP growth rate on- and off-farm



Note: The green line represents the trend of agricultural vs. off-farm AFS GDP growth rates across the 27 countries.

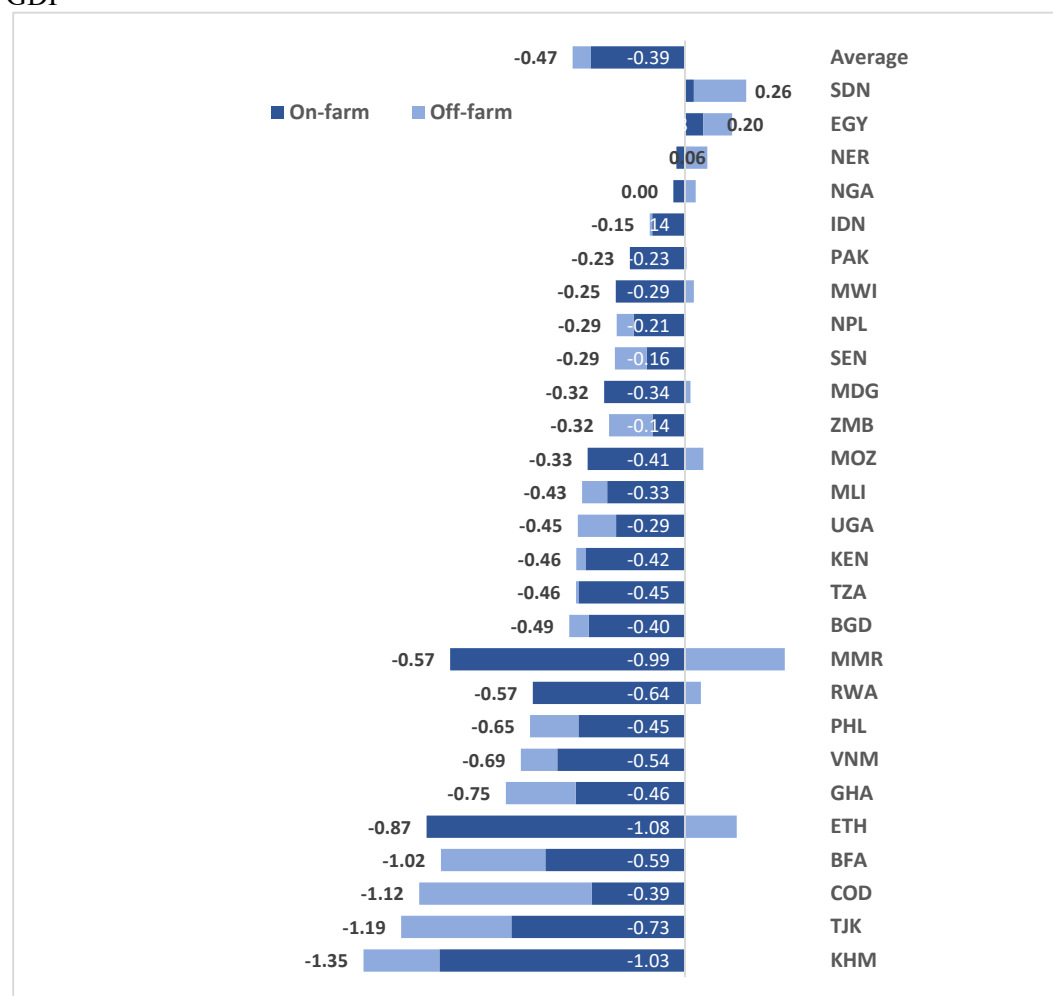
Source: Authors' calculation using country SAMs.

Figure 4.1 also shows that off-farm growth remains closely linked to agricultural performance. The positive slope of the trend line indicates that countries with faster agricultural growth also tend to experience faster off-farm growth. Countries such as Zambia, Sudan, and Madagascar combine weak agricultural growth with weak off-farm growth, while Ethiopia, Niger, and Rwanda exhibit strong growth in both components. These patterns support longstanding theories of agricultural growth linkages, suggesting that although off-farm activities increasingly drive agrifood-system expansion, their sustained growth continues to depend on a dynamic agricultural sector.

Share of Agrifood Systems in Total GDP

A second measure of agrifood-system performance is its changing importance within the national economy. A well-documented feature of economic transformation is the declining share of agriculture in GDP as economies develop. Because agrifood systems encompass not only agriculture but also processing, trade, transport, food services, and input supply activities, changes in agrifood systems need not follow the same pattern. Expansion of off-farm agrifood activities may offset the declining share of agriculture, allowing the broader agrifood system to maintain a larger role within the economy than agriculture alone. Figure 4.2 assesses the extent to which this occurs across countries.

Figure 4.2. Average annual changes in agricultural, off-farm, and AFS GDP as percentage points of total GDP



Note: Countries are ranked from bottom to top according to the magnitude of the decline in the share of agrifood-system (AFS) GDP in total GDP. Numbers shown to the left of each bar indicate annual changes (percentage points per year) in the share of AFS GDP in total GDP. Numbers shown inside the dark-blue bars indicate annual changes in the share of agricultural GDP in total GDP. The light-blue bars represent the implied annual changes in the share of off-farm AFS GDP in total GDP, calculated as the difference between the two measures.

Source: Authors' calculation using country SAMs.

Across the sample, the share of agrifood-system (AFS) GDP in total GDP declined by an average of 0.47 percentage points per year, indicating that structural transformation also generally involves a declining relative importance of the broader agrifood system, not only of agriculture. Although agrifood systems continued to expand in absolute terms in most countries, their contribution to national GDP tended to fall as economies diversified into many non-food sectors. The decline in the AFS share was driven primarily by the reduction in agriculture's share of GDP, which averaged 0.39 percentage points per year across the sample. However, the relationship between agricultural and broader agrifood transformation is

not one-to-one. In Figure 4.2, positive light-blue bars indicate countries where the share of off-farm agrifood GDP in total GDP increased over time. These countries are concentrated among low-income economies, where expansion of processing, trade, transport, and other off-farm activities partly offset declines in agriculture's GDP share. In most other countries, both agricultural and off-farm agrifood shares of total GDP declined, although the decline in off-farm activities was generally smaller than that of agriculture. Figure 4.2 therefore highlights two related dimensions of broad structural transformation: the declining importance of agrifood systems within the broader economy and the changing balance between on-farm and off-farm activities within agrifood systems.

Job Creation in the Agrifood Sector

Job creation is a third measure of agrifood-system performance. During the period covered by the diagnostics, about 5 million new jobs were created each year across the 27 countries' agrifood systems, equivalent to average annual employment growth of 1.2 percent. In every country, agrifood-system employment grew more slowly than total employment, which averaged 2.5 percent per year across the sample.

Aggregate employment growth masks important differences between on-farm and off-farm job creation. Figure 4.3a plots the growth rate of off-farm AFS employment against the growth rate of agricultural employment for each country. Countries above the 45-degree line experienced faster employment growth in off-farm AFS activities than in agriculture. Nearly all countries fall above this line, indicating that off-farm employment is expanding more rapidly than farm employment across most of the sample. On average, off-farm AFS employment grew by 4.1 percent annually, compared with only 0.5 percent for agricultural employment.

Figure 4.3b complements this growth-rate comparison by showing the contributions of agriculture and off-farm AFS activities to total economywide job creation. This distinction is important because countries with large agricultural labor forces can continue to create many farm jobs even when farm employment grows slowly. Taken together, Figures 4.3a and 4.3b show that off-farm employment growth

is widespread, but the role of farming in new job creation differs substantially across countries. These differences suggest three broad employment patterns, which may reflect different pathways or stages of agrifood-system transformation.

First, in nine countries—mostly in Asia, but also Senegal, Egypt, and Ghana in Africa—agricultural employment stagnated or declined, so all net new AFS jobs were created in off-farm activities. These countries appear along the vertical axis in Figure 4.3b. Senegal illustrates how to read the figure: total agrifood system employment increased by 1.53 million jobs between 2009 and 2019, while farm employment declined by 0.13 million. This implies that all net job creation occurred outside agriculture, with about 22 percent of total new jobs created in off-farm AFS activities and the remaining 78 percent in non-AFS sectors.

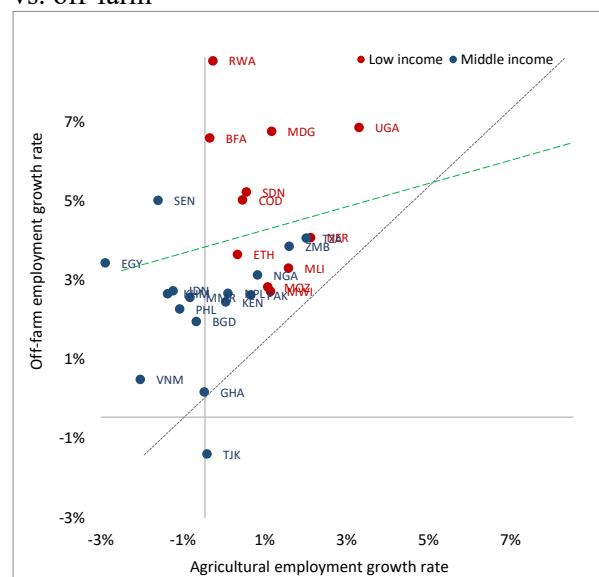
Second, six countries experienced job creation in both agriculture and off-farm AFS activities, but a larger share of new AFS jobs were created off-farm than on-farm. These countries appear in the light-green shading area above the 45-degree line in Figure 4.3b and include four middle-income countries and two low-income countries, Burkina Faso and Rwanda. This pattern suggests that diversification of employment within agrifood systems is underway even where agricultural employment continues to grow.

Third, in eight African low-income countries and Tanzania, a larger share of new AFS jobs were created in agriculture than in off-farm AFS activities. These countries appear below the 45-degree line in Figure 4.3b. In many of them, the agrifood system accounts for more than half of total job creation in the economy, meaning that farming remains the dominant source of new jobs both within the AFS and in the broader economy. Even in these countries, however, off-farm AFS employment contributed 10–20 percent of total new AFS jobs, indicating that diversification is beginning even where agriculture remains the main engine of job creation.

Taken together, these three patterns of new job creations suggest that countries are following different pathways of agrifood-system transformation. Nevertheless, a common feature across the sample is the growing importance of off-farm employment. On average across the 27 countries, about 70 percent

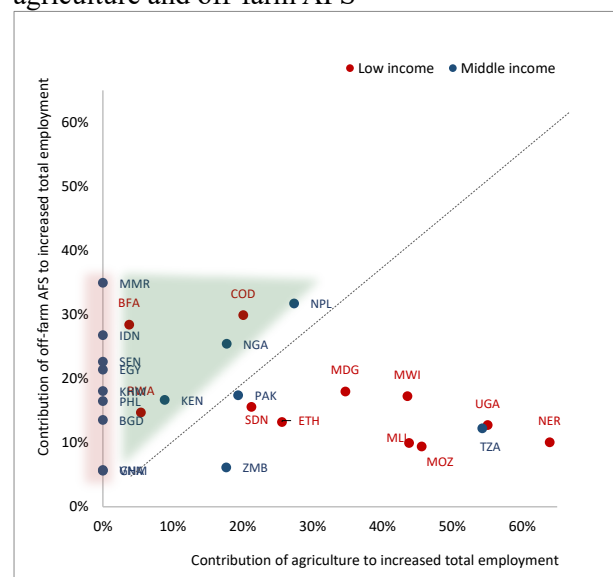
of new agrifood-system jobs were created in off-farm activities, highlighting their increasingly important role in employment creation and structural transformation.

Figure 4.3a. Employment growth rates on-farm vs. off-farm



Note: Each dot represents a country. Countries above the 45-degree line experienced faster employment growth in off-farm agrifood activities than in agriculture. The green trend line summarizes the relationship between agricultural and off-farm employment growth across the 27 countries. **Source:** Authors' calculation using country SAMs.

Figure 4.3b. Contributions to total job creation in agriculture and off-farm AFS

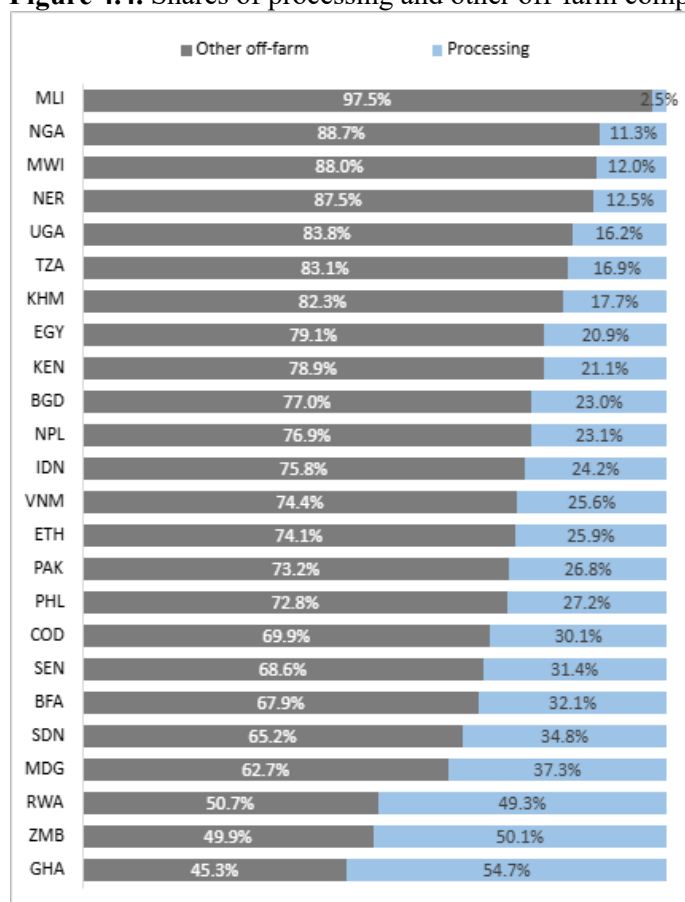


Note: Each dot represents a country. The horizontal and vertical axes show the contributions of agricultural and off-farm agrifood activities, respectively, to total job creation. The sum of the two values equals the share of the economy's total new jobs created by the agrifood system. **Source:** Authors' calculation using country SAMs

Services Dominate Off-farm New Jobs

The off-farm components of agrifood systems include agro-processing, input supply, trade and transport, and food services. While policy discussions often emphasize agro-processing as a key source of employment creation, Figure 4.4 shows that in most countries more, new off-farm jobs in the agrifood systems are created in service-related activities than in agro-processing. (Figure 4.4).

Figure 4.4. Shares of processing and other off-farm components in new off-farm AFS employment



Source: Authors' calculation using country SAMs.

This pattern reflects a broader feature of agrifood-system transformation in low- and lower-middle-income countries. As incomes rise, urbanization proceeds, and food markets expand, growth in agrifood systems increasingly depends not only on food production but also on the activities required to move, distribute, market, and serve food to consumers. The evidence from the 27 countries illustrates this process. Agro-processing accounts for less than 30 percent of off-farm agrifood employment in most countries and less than 20 percent in five countries, while trade and transport, food services, input supply, and other service-related activities together account for the majority. Given this structure, it is not surprising that most new off-farm agrifood jobs are created in service-related activities rather than in agro-processing.

The dominance of service-related job creation should not be interpreted as diminishing the importance of agro-processing. Agro-processing generally exhibits higher labor productivity and often provides greater opportunities for value addition than many service-related activities. However, because

service-related activities account for a much larger share of off-farm agrifood systems, they typically generate more new jobs during agrifood-system transformation. Moreover, although labor productivity in these activities is often lower than in agro-processing, it remains higher than in agriculture in most countries, allowing them to contribute simultaneously to employment creation and productivity-enhancing structural transformation.

Growth in Labor Productivity

The three preceding measures of agrifood-system performance—growth, structural change, and job creation—provide broadly encouraging evidence of agrifood-system transformation across the 27 countries. Agrifood systems continue to expand, off-farm activities generally grow faster than agriculture, and labor is increasingly moving from farming into off-farm agrifood activities. Together, these findings are consistent with the classic structural transformation process in which workers shift from lower-productivity agricultural activities into higher-productivity nonfarm activities (Timmer 1988; Haggblade, Hazell, and Dorosh 2007; Haggblade and Hazell 2010; Dorosh and Thurlow 2013). Labor productivity growth provides a fourth and more comprehensive measure of agrifood system performance, helping assess both the contribution of these changes to past and current transformation and their implications for sustaining transformation in the future.

Across the 27 countries studied, agrifood system labor productivity grew by an average of 3 percent annually, with low-income countries averaging 2.6 percent and middle-income countries 3.2 percent. Labor productivity growth is further decomposed into on-farm and off-farm agrifood components in Figure 4.5. Annual growth rates of agricultural labor productivity are shown along the horizontal axis, and 24 of the 27 countries are located on the right-hand side of the vertical line for zero growth, indicating positive agricultural labor productivity growth. Across the sample, agricultural labor productivity increased by an average of 3.3 percent per year. Combined with the average agricultural GDP growth rate of 3.1 percent reported earlier, this suggests that agricultural growth was generally accompanied by rising labor productivity rather than by expansion of on-farm employment alone. Only Zambia, Madagascar, and

Uganda experienced declining agricultural labor productivity, reflecting either weak agricultural GDP growth or agricultural employment growth that exceeded output growth. Together with the rapid expansion of off-farm employment documented in the previous subsections, these findings provide encouraging evidence that the expected process of agricultural transformation is underway in most countries, with labor gradually moving out of agriculture while agricultural productivity rises.

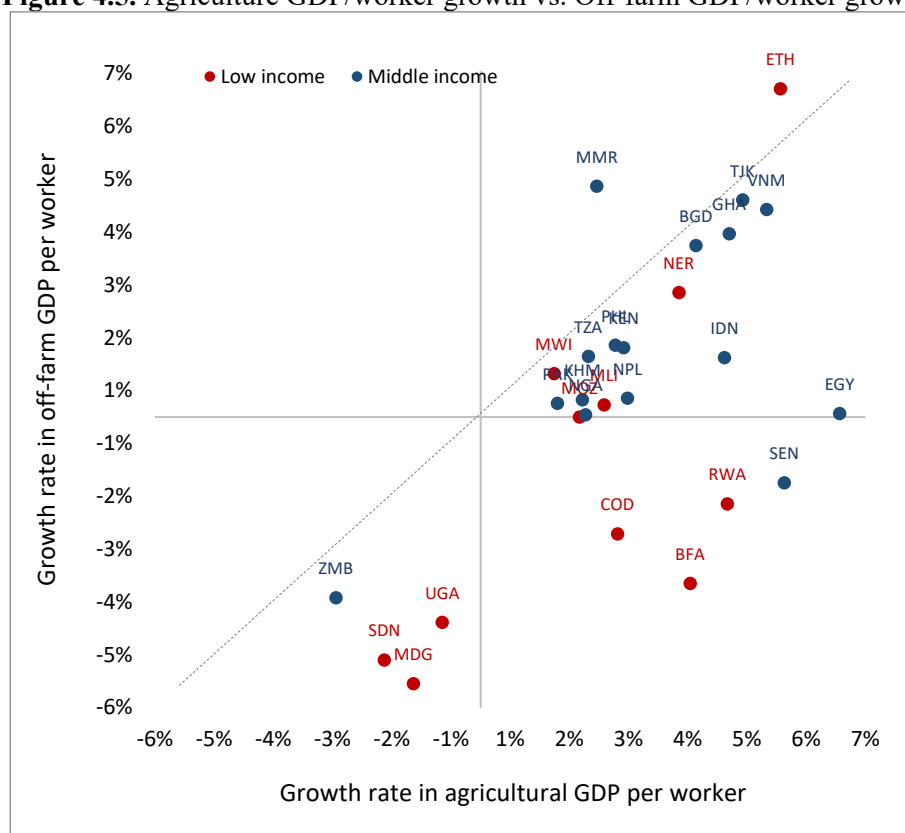
Growth rates of off-farm labor productivity are shown along the vertical axis of Figure 4.5 and reveal a more mixed pattern. Average off-farm labor productivity growth was 0.9 percent per year, substantially lower than the growth rate observed in agriculture. Nine of the 27 countries experienced stagnant or declining off-farm labor productivity. In some cases, off-farm GDP growth was rapid, but off-farm employment expanded even faster, resulting in weak productivity growth. Rwanda, for example, achieved impressive off-farm GDP growth, yet off-farm employment growth outpaced output growth, causing labor productivity gains to remain limited. These findings suggest that rapid off-farm job creation does not automatically translate into rising off-farm productivity.

This pattern raises an important question regarding the future of agrifood-system transformation. The preceding subsections show that transformation is currently being driven by the expansion of off-farm agrifood activities and by the movement of labor out of agriculture into more productive non-farm activities. As long as such labor reallocation continues, structural change itself can remain an important source of productivity growth. However, the contribution of labor reallocation naturally diminishes over time. Sustaining transformation therefore increasingly depends on productivity growth within the sectors that absorb labor.

The synthesis of country evidence mirrors concerns emerging from the broader structural transformation literature, particularly in Africa (Rodrik et al. 2019). Recent studies find that more productive manufacturing activities often remain relatively small and generate comparatively few jobs, while most nonagricultural employment growth occurs in less productive service activities (Diao et al. 2025). Agrifood systems seem to exhibit a similar pattern. Agro-processing generally offers higher labor productivity and greater opportunities for value addition, yet it remains a relatively small source of

employment. By contrast, most new jobs are created in agrifood services, trade and transport, food services, and input supply activities. Although these sectors are generally more productive than agriculture and therefore contribute positively to current transformation, their productivity level is often lower than that observed in agro-processing.

Figure 4.5. Agriculture GDP/worker growth vs. Off-farm GDP/worker growth



Source: Authors' calculation using country SAMs.

Taken together, the productivity results provide both encouraging and cautionary messages. The encouraging finding is that agrifood systems are contributing to structural transformation through rising agricultural productivity and the movement of labor into more productive off-farm activities. The cautionary finding is that future gains cannot rely indefinitely on labor reallocation alone. Sustained agrifood-system transformation will increasingly depend on productivity growth within the expanding off-farm sectors themselves. The challenge for policymakers is therefore not only to create more off-farm jobs, but also to support upgrading in agrifood services, logistics, processing, and other value-adding activities so that employment growth is accompanied by continued productivity growth and rising incomes.

5. CONCLUSION

This paper synthesizes evidence from agrifood system diagnostics conducted in 27 African and Asian countries using a common economywide framework. The country evidence confirms substantial heterogeneity in agrifood-system size, structure, and transformation patterns, underscoring the value of national-level diagnostics. At the same time, the synthesis reveals several common features of agrifood system transformation across low- and lower-middle-income countries. These common patterns not only improve our understanding of how agrifood systems contribute to economic transformation but also highlight a set of shared opportunities and challenges that are relevant for policy. Three broad messages emerge from the analysis.

Agrifood systems continue to play a central role in economic transformation even as economies develop. The evidence from the 27 countries shows that agrifood systems account for substantial shares of GDP and employment, not only in low-income countries but also in relatively advanced lower-middle-income economies. As incomes rise, urbanization proceeds, and food demand diversifies, agrifood systems increasingly extend beyond farming to include processing, logistics, trade, transportation, food services, and other activities that connect producers and consumers.

While agrifood systems continue to grow in absolute terms, their relative importance declines as economies diversify. As a result, agrifood systems generally account for smaller shares of GDP and employment at higher income levels, both across countries and within countries over time. This declining relative importance reflects broader economic diversification during development. Within agrifood systems themselves, the share of agriculture declines most rapidly, while off-farm activities become increasingly important components of agrifood systems.

Yet these structural changes within agrifood systems are not fully reflected in agrifood trade patterns. While agrifood exports remain important sources of foreign exchange earnings, they are continuously concentrated in a limited number of primary commodities and often account for only a small share of total agrifood-system activity. At the same time, urbanization and income growth increasingly shift

food demand toward processed food products, many of which are imported. This lag in agrifood trade transformation highlights the need for stronger domestic value addition and more diversified agrifood exports. The experience of countries such as Vietnam demonstrates that agrifood export diversification can complement broader economic diversification and support structural transformation.

New agrifood jobs are increasingly created in off-farm activities, particularly services. Agrifood systems are among the largest sources of employment in the countries studied, but the composition of new agrifood jobs is shifting increasingly beyond farming. In many middle-income countries studied, off-farm activities have become the primary source of new agrifood jobs. In lower-income countries, while agriculture continues to create substantial numbers of new jobs, increased new jobs are created off farms. Taken together, the evidence shows that agrifood systems continue to generate employment growth, but increasingly through a broader range of activities beyond farming.

Job opportunities created by agrifood transformation extend across the full range of off-farm agrifood activities. Rising incomes, urbanization, and changing consumer demand generate jobs not only in agro-processing but also in trade, transportation, food services, input provision, and other service activities. The employment benefits of agrifood transformation therefore reflect the development of increasingly market-oriented and diversified food systems and the expansion of domestic food markets.

Future productivity growth in agrifood systems will increasingly depend on productivity gains in off-farm activities. The 27 countries studied provide encouraging evidence of agrifood transformation. Agricultural labor productivity increased in most countries. The expansion of more productive off-farm employment further enhances agrifood productivity growth through structural change.

The cross-country evidence, however, also points to a challenge for the future. Continued movement of labor from agriculture to more productive off-farm activities contribute to productivity growth, but this contribution is likely to diminish unless productivity also rises within off-farm activities themselves. While agricultural labor productivity increased in most countries, growth in off-farm labor productivity was much less widespread. Rapid expansion of off-farm employment outpaced growth in off-farm output in a number of countries, resulting in stagnant or declining off-farm labor productivity. Future

agrifood transformation will therefore depend not only on creating more jobs beyond agriculture, but also on creating more productive jobs. Agricultural productivity growth remains essential, but stronger productivity growth in off-farm agrifood activities will be increasingly important for sustaining income growth and long-term structural transformation.

ANNEX A. SUPPLEMENTARY TABLES AND FIGURES

Table A1. SAM coverage

Country	SAM Coverage
Burkina Faso	2009, 2019
Bangladesh	2009–2022
Democratic Republic of Congo	2009, 2019
Egypt	2014–2024
Ethiopia	2009–2022
Ghana	2009–2022
Indonesia	2009–2023
Kenya	2009–2022
Cambodia	2009–2022
Madagascar	2009, 2019
Mali	2009, 2019
Myanmar	2011, 2019
Mozambique	2009, 2019
Malawi	2009–2022
Niger	2009, 2019
Nigeria	2009–2022
Nepal	2009–2022
Pakistan	2006–2023
The Philippines	2009–2023
Rwanda	2009–2022
Sudan	2011, 2019
Senegal	2009, 2019
Tajikistan	2011, 2022
Tanzania	2009–2022
Uganda	2009–2022
Vietnam	2009–2023
Zambia	2010, 2019

Note: A range of years (e.g., 2009–2022) indicates that a SAM is available for every year of the period; two years separated by a comma (e.g., 2009, 2019) indicate that SAMs are available for the initial and final years only.

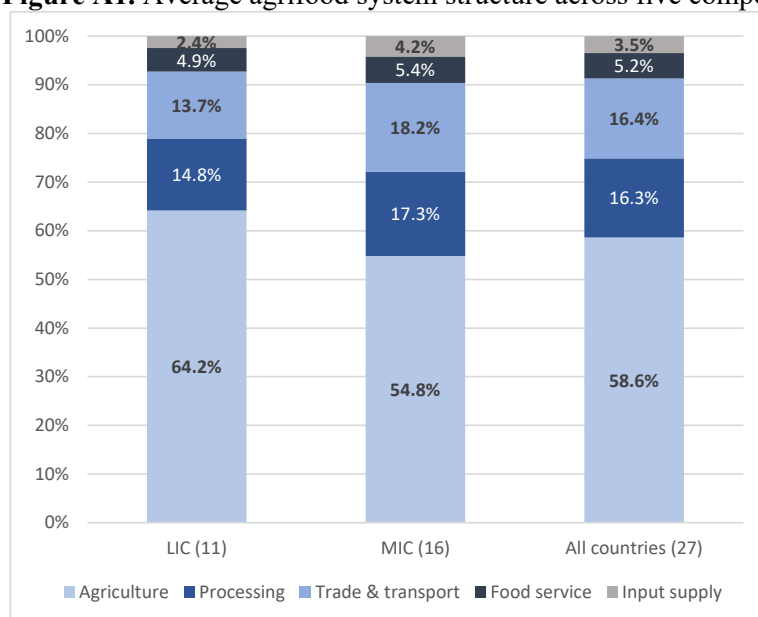
Source: Authors.

Table A2. Population, GDP and GNI per capita in 2022

	Population	GDP	GNI pc
	Million	\$Billion	\$US
Bangladesh	169.4	460.1	103.7
Burkina Faso	21.0	18.8	5.2
Cambodia	17.2	40.0	12.0
Democratic Republic of Congo	92.9	65.8	16.9
Egypt, Arab Rep.	114.5	476.7	78.3
Ethiopia	125.4	126.8	69.8
Ghana	33.1	73.9	23.5
Kenya	54.3	114.4	34.6
Indonesia	281.2	1,319.1	384.1
Madagascar	28.2	15.3	6.0
Malawi	20.6	12.4	5.6
Mali	21.1	22.4	8.1
Mozambique	29.9	18.9	5.4
Myanmar	52.6	62.3	32.2
Nepal	29.7	41.2	14.8
Niger	22.9	15.4	6.2
Nigeria	223.2	477.4	163.4
Pakistan	247.5	374.9	119.8
Philippines	114.9	404.4	117.6
Rwanda	13.7	13.3	4.7
Senegal	16.4	27.8	7.4
Sudan	45.5	51.7	11.1
Tajikistan	10.2	10.7	3.4
Tanzania	64.7	75.8	25.1
Uganda	47.3	45.6	16.8
Vietnam	100.4	413.4	87.9
Zambia	18.5	29.2	2.0

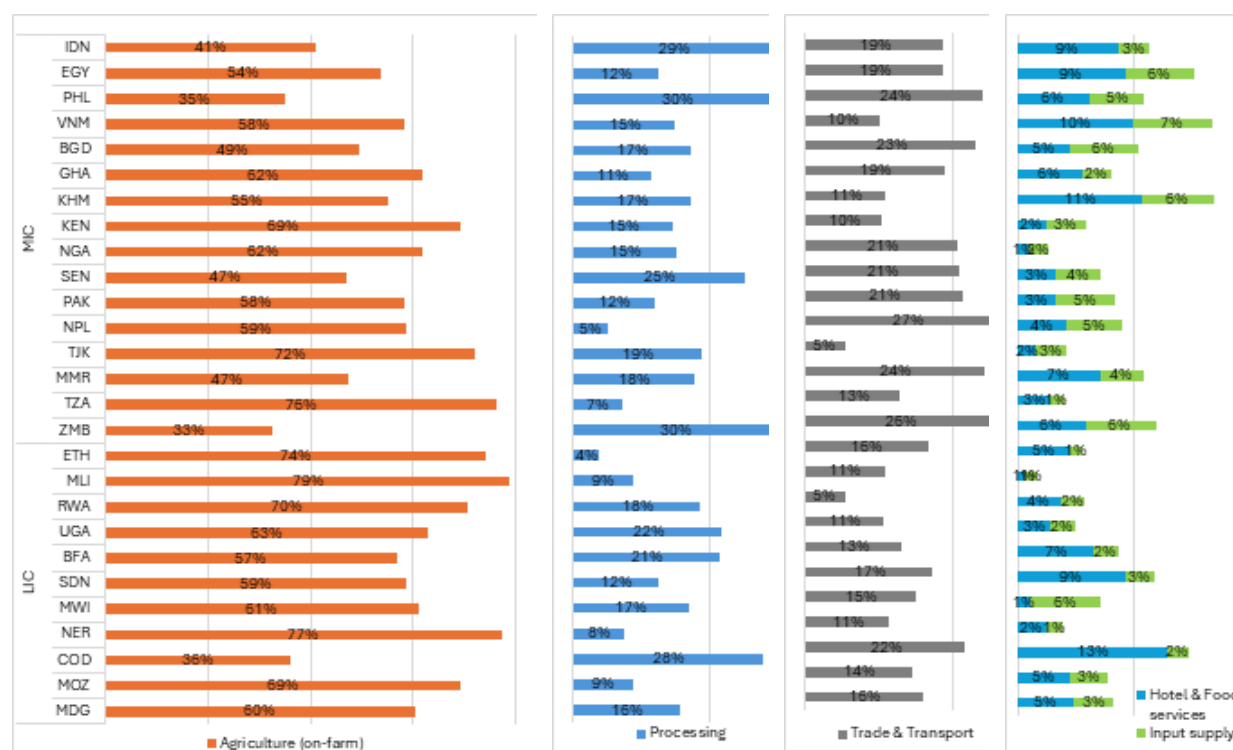
Source: World Development Indicators.

Figure A1. Average agrifood system structure across five components by income group



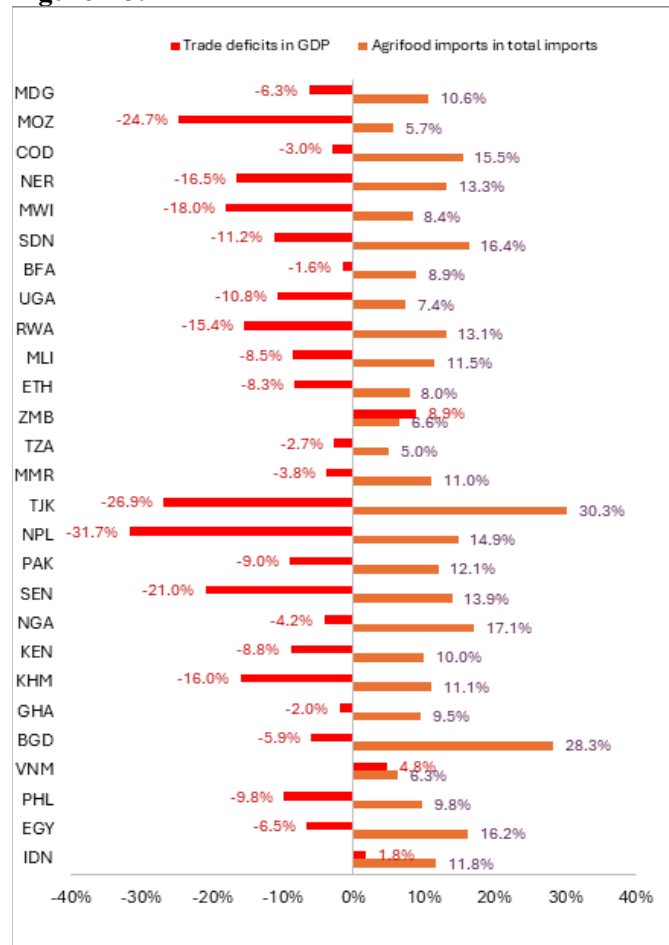
Source: Authors' calculation using country SAMs.

Figure A2. Agrifood system structure by country, sorted by per capita income



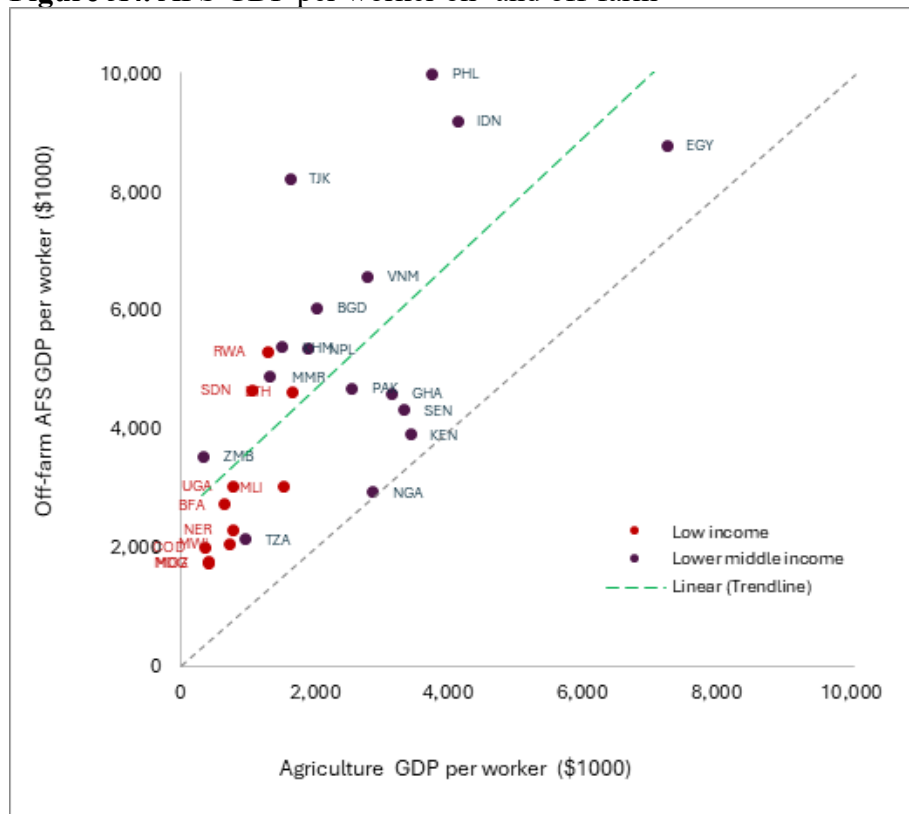
Source: Authors' calculation using country SAMs.

Figure A3. Shares of total trade deficits in GDP vs. shares of agrifood imports in total imports



Source: Authors' calculation using country SAMs.

Figure A4. AFS GDP per worker on- and off-farm



Note: The trendline (the green line) is the 27 countries.

Source: Authors' calculation using country SAMs.

Table A3. AFS performance metrics by country

Rank	Income group	Country	AFS GDP growth (%)	Change in share of AFS GDP in total GDP (%-point)	Difference between off-farm and on-farm job growth (%-point)	Growth in AFS per worker (%)
			Growth	Structural change	Jobs	Productivity
1	LIC	ETH	6.9	-0.87	3.3	5.7
2	LIC	RWA	5.1	-0.57	8.8	4.4
3	LIC	BFA	3.7	-1.02	6.9	2.8
4	LMIC	VNM	3.9	-0.69	2.5	5.0
5	LMIC	MMR	4.3	-0.57	3.4	4.0
6	LIC	COD	3.2	-1.12	4.6	1.3
7	LMIC	SEN	4.1	-0.29	6.6	2.7
8	LMIC	KHM	1.9	-1.35	4.0	2.0
9	LMIC	TJK	4.1	-1.19	-1.0	4.1
10	LMIC	BGD	4.5	-0.49	2.6	4.1
11	LMIC	GHA	4.2	-0.75	0.7	4.0
12	LMIC	EGY	3.7	0.20	6.3	4.0
13	LMIC	PHL	3.2	-0.65	3.4	2.6
14	LIC	NER	6.2	0.06	2.0	3.4
15	UMIC	IDN	3.9	-0.15	4.0	3.4
16	LMIC	TZA	4.6	-0.46	2.1	1.9
17	LMIC	KEN	3.3	-0.46	2.4	2.2
18	LIC	MLI	4.1	-0.43	1.7	1.9
19	LMIC	NPL	3.2	-0.29	2.6	2.2
20	LIC	MOZ	3.8	-0.33	1.8	1.7
21	LIC	MWI	3.3	-0.25	1.6	1.4
22	LIC	UGA	3.1	-0.45	3.6	-1.0
23	LMIC	PAK	2.8	-0.23	2.0	1.2
24	LMIC	NGA	3.3	0.00	2.3	1.2
25	LIC	MDG	1.0	-0.32	5.6	-1.2
26	LMIC	ZMB	0.3	-0.32	2.3	-2.0
27	LIC	SDN	0.0	0.26	4.7	-1.6

Note: The country rank in the first column is by a simple average (equally weighted) of the normalized four indicators. Normalization entails assigning a score of 1 to the country with highest growth rate in AFS GDP, jobs, or productivity (and lowest value in structural change) and a score of 0 to the country with lowest value in the corresponding indicators. Ethiopia, Rwanda, Burkina Faso, and Vietnam are among the strongest performers in recent years whereas agrifood system performance has stagnated in Sudan, Zambia, Madagascar, and Nigeria.

Source: Authors' calculation using country SAMs.

ANNEX B. DECOMPOSITION OF AGRIFOOD SYSTEMS BY VALUE CHAINS

With diverse agricultural systems, consumption patterns, and development levels, the presence of specific value chains is somewhat variable across countries. Therefore, we allocate specific value chains covered in country SAMs into eight aggregate value chain groups:

1. The **cereal** value chain group includes barley, maize, millet, rice, sorghum, wheat, related processing (milling), and off-farm components. Maize is a large component of this group in many African countries as is rice in Asian countries. Wheat is important in Egypt, Ethiopia, Pakistan, and Tajikistan, and sorghum and/or millet are important in Burkina Faso, Mali, Niger, and Sudan.
2. The **root crop** value chain group includes cassava, Irish potatoes, sweet potatoes, other root crops, and plantains.
3. The **pulses and oilseeds** value chain group includes beans, other pulses, soybeans, groundnuts, sesame, and other oilseeds.
4. The **horticulture** value chain group includes fruits and vegetables.
5. The **cash crop** value chain group is very diverse given the range of traditional export crops in studied countries. These include cocoa, coffee, cotton, tobacco, tea in African countries, and rubber in some Asian countries. This group also includes cash crops with relatively large processing components that are primarily grown for domestic markets, like sugar.
6. The **livestock and fish** group includes cattle, goats and sheep, poultry, and pigs. This group also includes both farmed and wild caught fish, value chains which are small in most African countries but important in some Asian countries.
7. The **forestry** value chain group covers the planting, managing and harvesting of trees, the collection of non-timber forest products, an agricultural subsector, and the wood products value chain, a manufacturing sector.

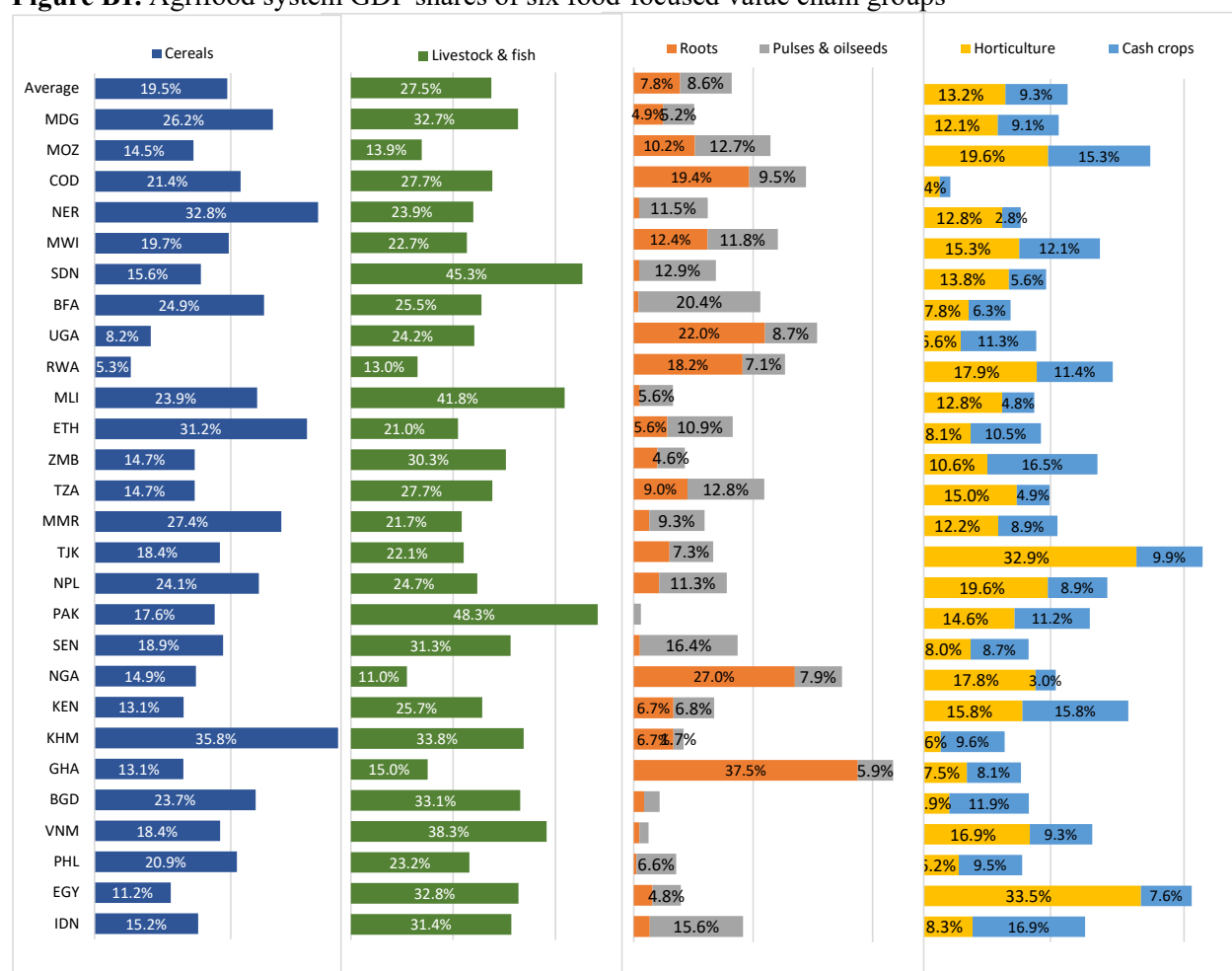
8. The **others** group includes food processing and other off-farm components that cannot be attributed to one of the other seven groups by their association with primary agricultural products (e.g., beverages that use few agricultural raw materials, highly processed foods, and food services).

The six food-focused value chain groups as shares of national agrifood system GDP are presented in Figure B1. Given the large size of cereal and livestock groups in most countries, the figure displays these two groups separately from the other four food-focused value chains groups. The livestock and fish group is the largest, accounting for 28 percent of AFS GDP across these 27 countries. It is the largest contributor to AFS GDP in 17 countries and the second largest in 8 countries. The cereal value chain group is also large, averaging 20 percent of AFS GDP. Cereals are the largest value chain group in Cambodia, Myanmar, Ethiopia, and Niger and the second largest value chain group in twelve additional countries. Together, cereals and livestock/fish account for roughly half of AFS GDP, reflecting their central role in food consumption.

Horticulture (12 percent) and root crops (7 percent) are smaller contributors to agrifood system GDP on average but highly significant in some countries. For example, the horticulture value chain group represents the largest share of AFS GDP in Egypt (33.5 percent), Tajikistan (32.9 percent) and Mozambique (19.6 percent) and the roots value chain group is the largest in Ghana (37.5 percent) and Nigeria (27 percent), because of cassava and yam, and the second largest in Uganda (22 percent, plantain) and Rwanda (18.2 percent, potatoes and plantain).

Cash crops (10 percent) and pulses/oil seeds (8 percent) are also relatively smaller components of the analyzed agrifood systems. Pulses and oil seeds are more important in Burkina Faso (cowpeas), Senegal (peanuts), and Indonesia (oil palm) and cash crops make their largest contribution in Zambia (tobacco), Mozambique (sugar and tobacco), Indonesia (rubber, coffee, cocoa, and others), and Kenya (tea, cut flower and coffee). However, unlike horticulture and root crops, neither cash crops nor pulses/oil seeds exceed 20 percent of AFS GDP or are the largest value chain in any country.

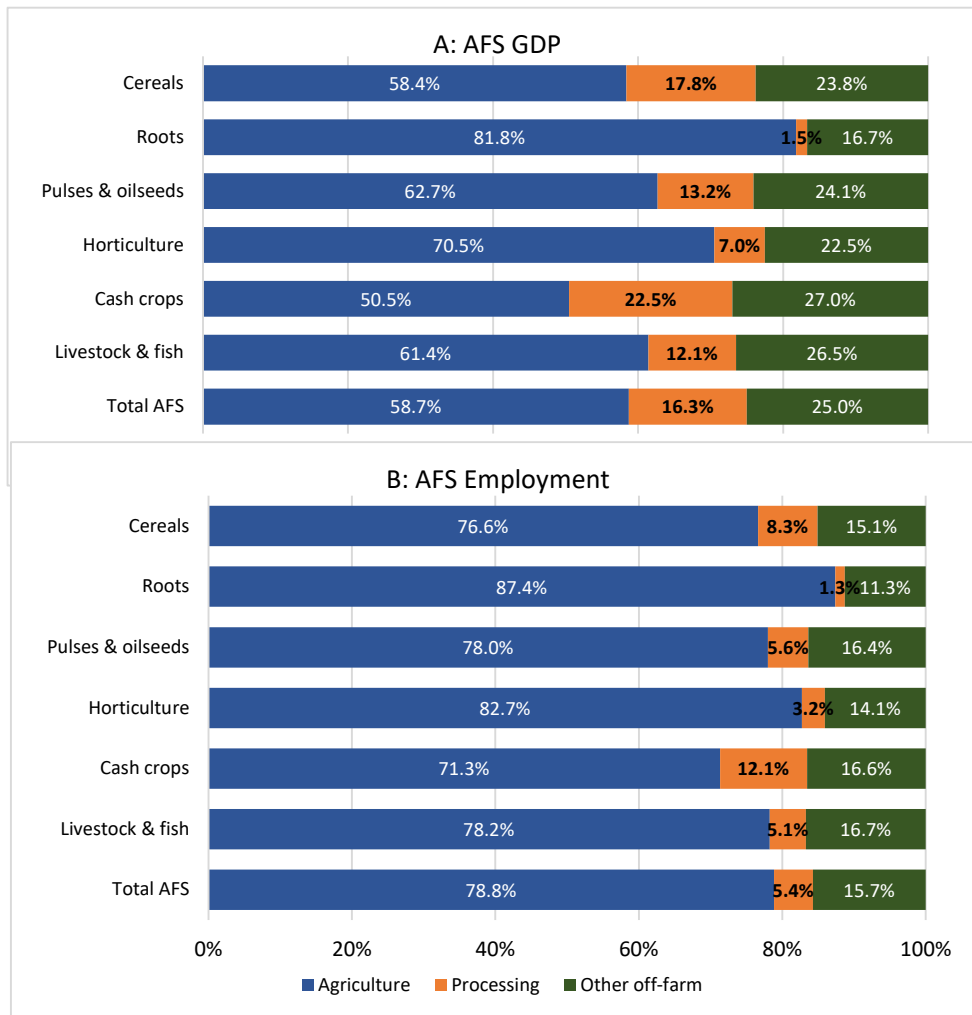
Figure B1. Agrifood system GDP shares of six food-focused value chain groups



Note: In most countries, these six food-focused value chain groups account for nearly or more than 80% of AFS GDP, with two countries as exceptions where the size of “Forestry” or “Others” groups is large in the AFS GDP. In the Philippines, the unattributed agro-processing and food services are about 30% of AFS GDP, while in Rwanda, the unprocessed primary forestry accounts for 15% of AFS GDP.

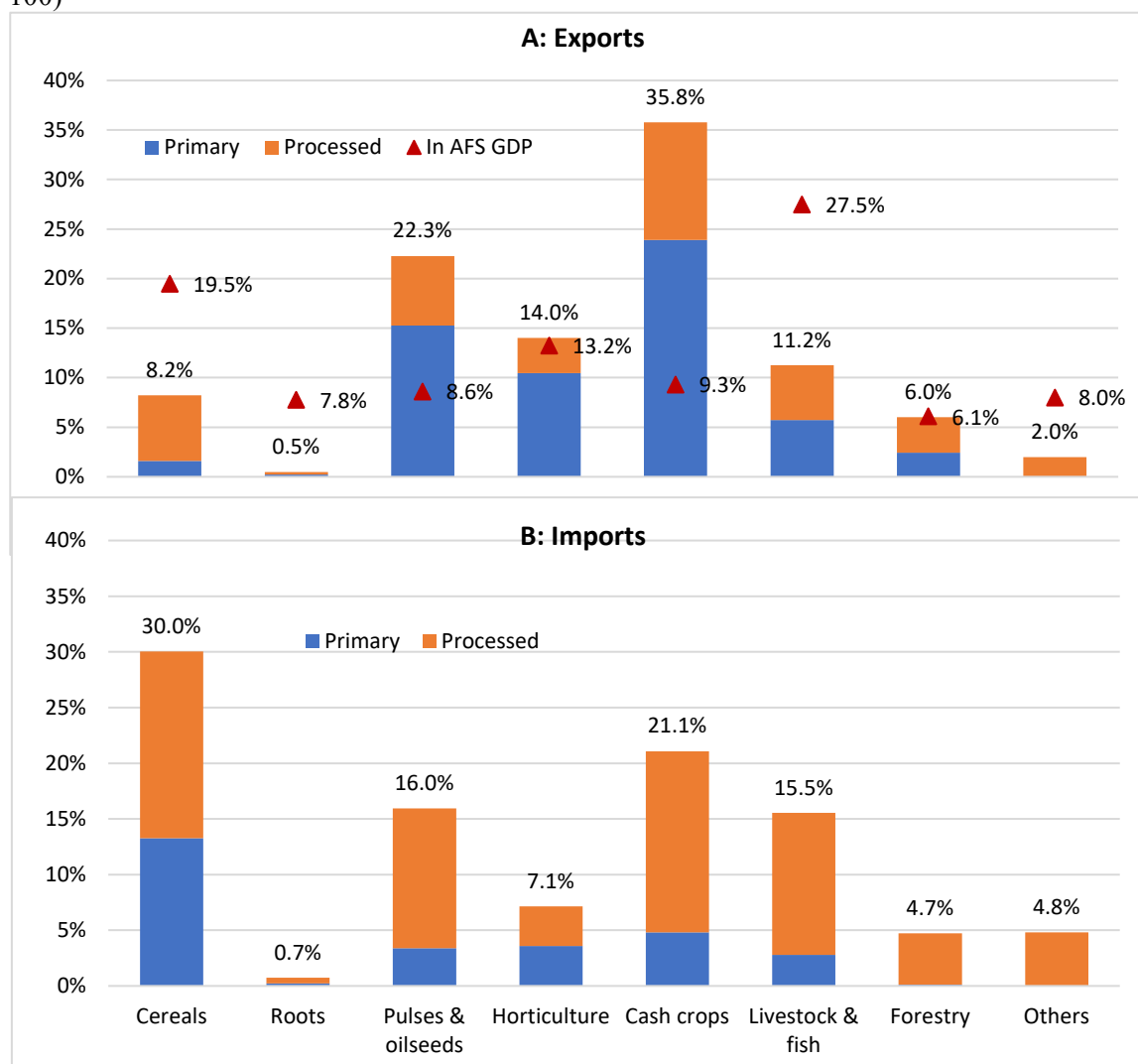
Source: Authors’ calculation using country SAMs.

Figure B2. Agriculture, processing, and other off-farm components in the AFS



Source: Authors' calculation using country SAMs.

Figure B3. Value chain shares of agrifood exports and imports (Total agrifood exports and imports = 100)



Note: Panel A of Figure B3 includes 1) the average share of agrifood exports represented by each value chain group, 2) the primary and processed components of the exports across value chain groups, and 3) the average shares of value chains group's AFS GDP as a reference for comparison to their export shares. For example, horticulture accounts for 14% of exports, on average, and it contributes 13.2% to agrifood system GDP. Roughly three quarters of these exports are unprocessed fruits and vegetables. Panel B of Figure B3 provides similar information for imports.

Source: Authors' calculation using country SAMs.

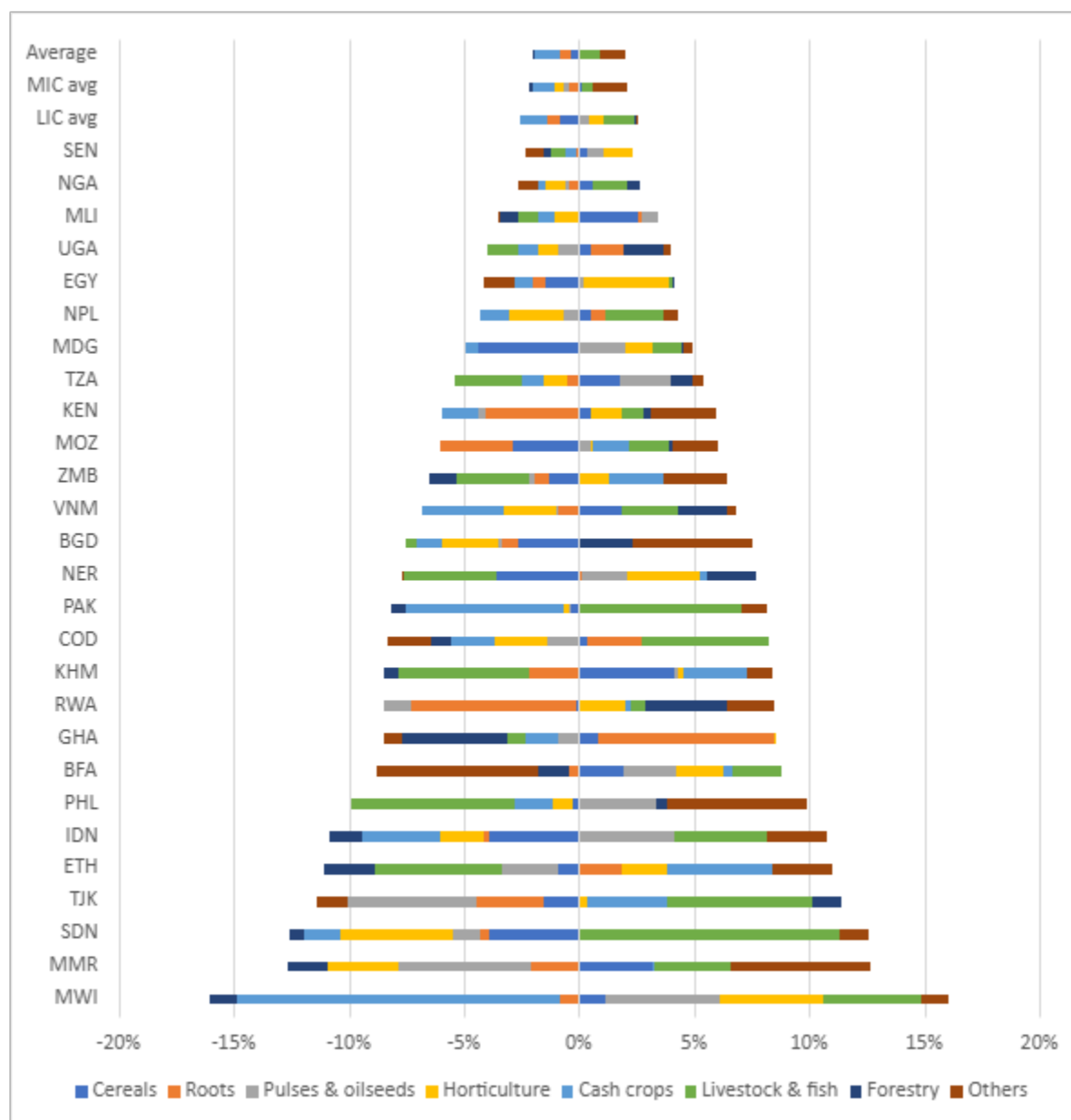
Table B1. Large export value chain groups' shares of agrifood exports by country

	Cereals	Pulses & oilseeds	Horticulture	Cash crops	Livestock & fish	Forestry	Large VCs total
IDN	<10.0	49.0	<10.0	20.8	13.5	<10.0	83.3
EGY	<10.0	<10.0	90.4	<10.0	<10.0	<10.0	90.4
PHL	<10.0	14.9	40.6	<10.0	14.1	15.1	84.7
VNM	15.6	<10.0	26.0	16.0	28.0	<10.0	85.6
BGD	<10.0	<10.0	<10.0	72.3	20.4	<10.0	92.7
GHA	<10.0	<10.0	<10.0	84.0	<10.0	<10.0	84.0
KHM	56.5	<10.0	<10.0	11.9	10.1	<10.0	78.5
KEN	<10.0	<10.0	<10.0	85.7	<10.0	<10.0	85.7
NGA	<10.0	32.0	<10.0	41.1	<10.0	<10.0	73.1
SEN	<10.0	58.6	20.1	14.8	<10.0	<10.0	93.4
PAK	47.1	<10.0	13.6	<10.0	20.8	<10.0	81.5
NPL	<10.0	63.8	<10.0	13.0	<10.0	<10.0	76.8
TJK	<10.0	<10.0	41.6	56.7	<10.0	<10.0	98.4
MMR	39.5	15.6	10.0	<10.0	22.4	<10.0	87.6
TZA	12.5	17.6	15.5	33.1	16.7	<10.0	95.4
ZMB	23.6	<10.0	<10.0	40.5	10.9	<10.0	74.9
ETH	<10.0	38.7	<10.0	56.6	<10.0	<10.0	95.3
MLI	<10.0	12.0	<10.0	47.9	28.5	<10.0	88.4
RWA	<10.0	13.1	<10.0	51.6	11.0	<10.0	75.7
UGA	<10.0	<10.0	<10.0	65.3	17.0	<10.0	82.3
BFA	<10.0	63.6	13.6	22.3	<10.0	<10.0	99.5
SDN	<10.0	63.5	<10.0	<10.0	15.6	<10.0	79.1
MWI	<10.0	<10.0	<10.0	77.9	<10.0	<10.0	77.9
NER	<10.0	76.2	<10.0	<10.0	<10.0	<10.0	76.2
COD	<10.0	<10.0	<10.0	58.3	<10.0	36.3	94.6
MOZ	<10.0	23.6	15.3	35.6	<10.0	21.8	96.2
MDG	<10.0	<10.0	17.4	17.5	39.6	<10.0	74.4

Note: Value chain groups with the largest shares are highlighted.

Source: Authors' calculation using country SAMs.

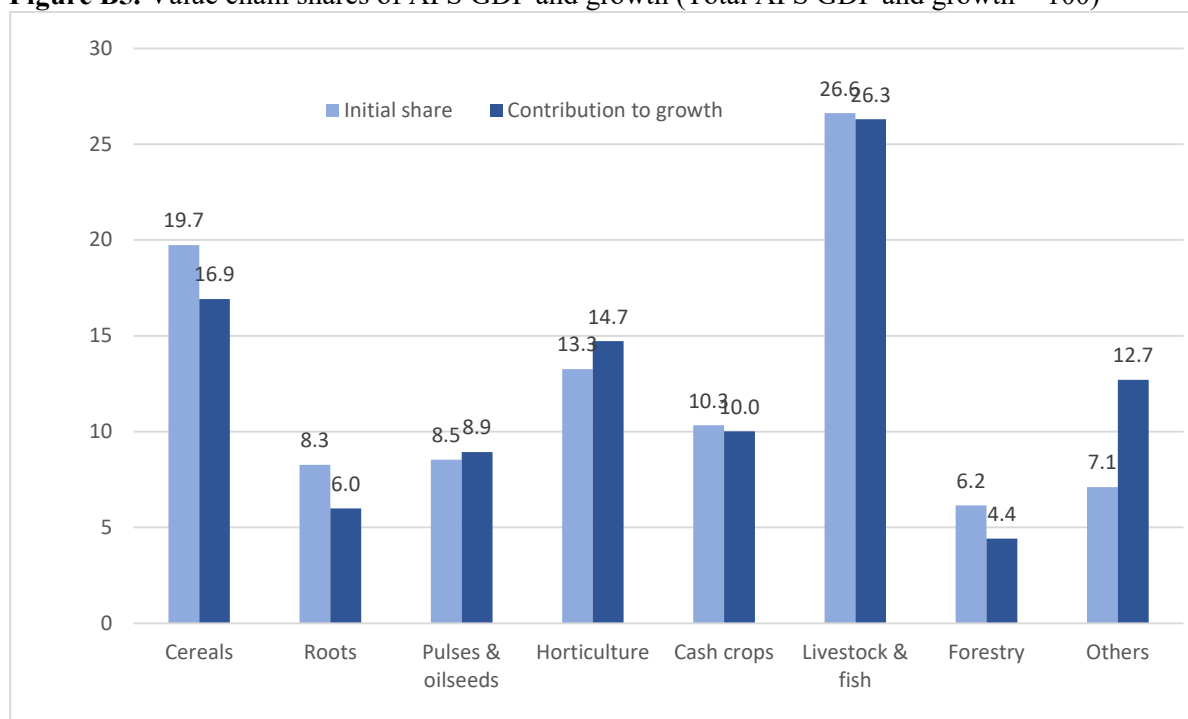
Figure B4. Changes in the shares of value chains in AFS GDP between the end and initial years (the total change in AFS GDP shares = 0 for each country)



Note: This figure shows changes in the relative importance of value chain groups to AFS GDP between the first and last years of each country's SAM time series. Value chains with declining shares appear on the left-hand side of the figure, while those with rising shares are on the right. For example, in Tanzania, the contribution of livestock, pulses/oilseeds, forestry and other value chains to AFS GDP grew between 2009 and 2022 while the relative contributions of cereals, cash crops, horticulture, and root crops fell. In some countries, such as Senegal, there were small changes in the relative importance of value chain groups, indicating modest structural change over time. In others, the structural shifts were more pronounced: in Malawi, the tobacco value chain contracted by about 7 percent annually between 2009 and 2022, driving a 9 percent decline in the cash crop group's share of AFS GDP. Note that the average changes in value chains across countries are relatively small because they include both positive and negative changes.

Source: Authors' calculation using country SAMs.

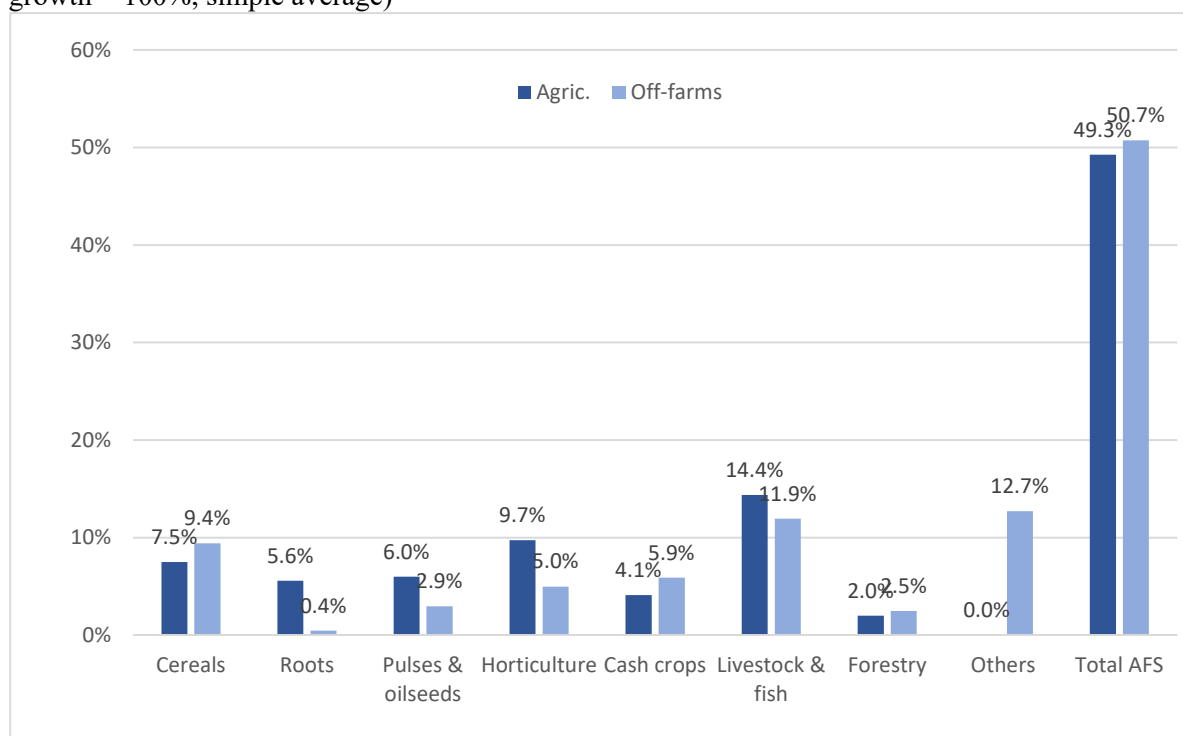
Figure B5. Value chain shares of AFS GDP and growth (Total AFS GDP and growth = 100)



Note: This figure shows the average share of AFS GDP represented by each value chain group in the initial year of the SAM time series and the average contribution of each value chain group to AFS GDP growth.

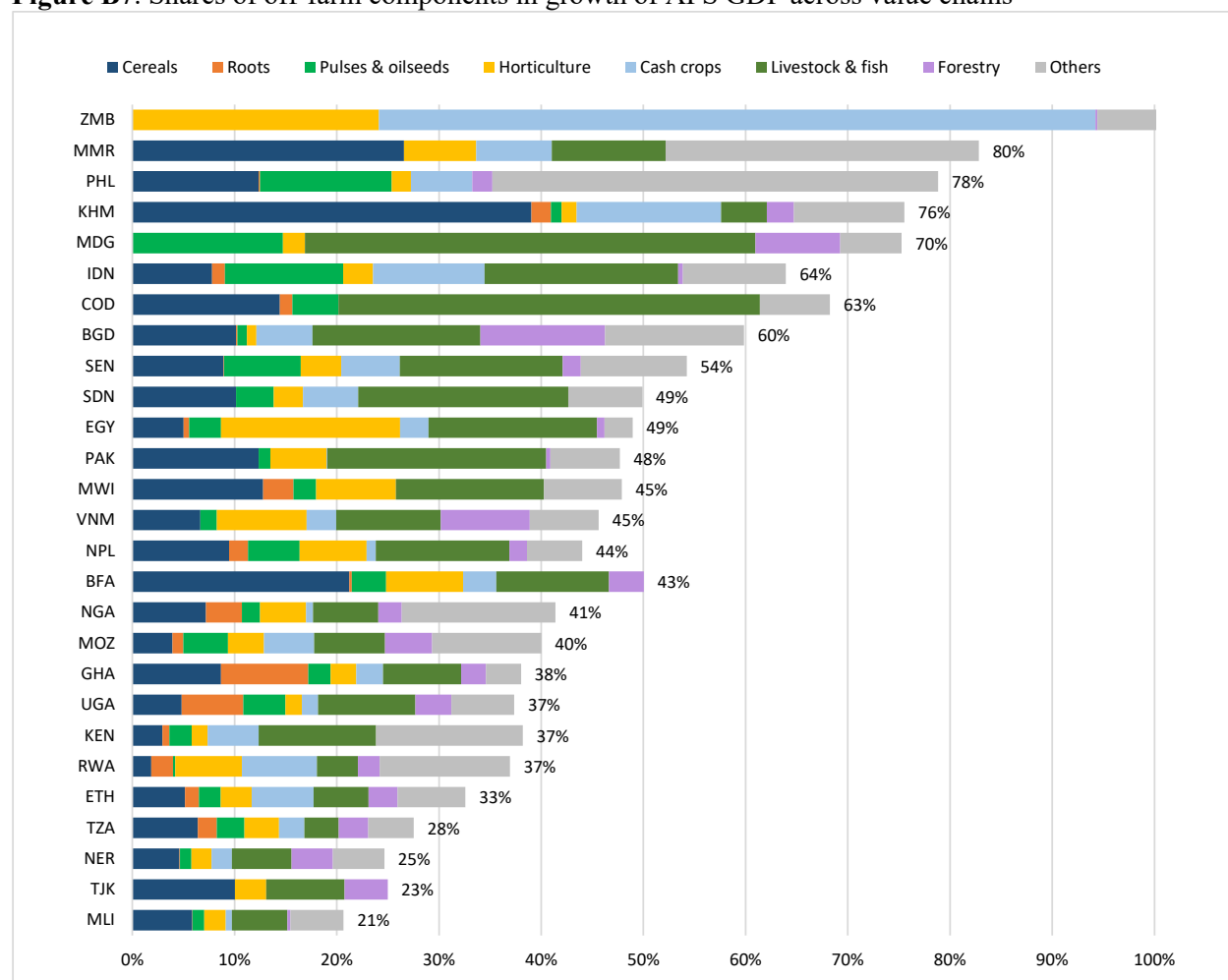
Source: Authors' calculation using country SAMs.

Figure B6. Contribution of on- and off-farm components to AFS growth across value chains (total AFS growth = 100%, simple average)



Source: Authors' calculation using country SAMs.

Figure B7. Shares of off-farm components in growth of AFS GDP across value chains



Note: This figure does not display value chains with negative contribution. In Zambia, agricultural GDP fell, and total increased off-farm GDP from the three value chain groups in the figure is more than the AFS growth.

Source: Authors' calculation using country SAMs.

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