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Ethiopia's Agrifood System

Structure and Drivers of Transformation

Xinshen Diao, Mia Ellis, Karl Pauw, and James Thurlow

Introduction

Ethiopia stands out as one of the fastest growing African countries between 2009 and 2019, with an average annual GDP growth rate close to 10 percent (ESS 2020). The global COVID-19 pandemic coupled with an armed civil conflict that started in November 2020 and continued for two years caused a significant slowdown in economic growth during the 2020–2022 period. Ethiopia's GDP growth is now projected to recover to 5.3 percent in 2023 and 6.1 percent in 2024 (World Bank 2023), remaining well below the growth rates achieved in the pre-pandemic era. Agriculture remains an important sector in Ethiopia, accounting for one-third of GDP and two-thirds of jobs. The agriculture sector, like the broader economy, performed well prior to the pandemic and civil conflict, averaging 5.5 percent growth from 2009 to 2019 (ESS 2020), and played an important role in weathering the global commodity market shocks during 2022–2023 (Diao and Thurlow 2023). In this brief, we look beyond primary agriculture to understand how Ethiopia's broader agrifood system (AFS) is contributing to growth and transformation in the country.

The AFS is a complex network of actors who are connected by their roles in supplying, consuming, and governing agrifood products and jobs. Just as an economy undergoes transformations as a country develops, agrifood systems are also expected to evolve (Diao, Hazell, and Thurlow 2010; Timmer 1988). Subsistence farming typically dominates agriculture during the earliest stages of development; as agricultural productivity rises, however, farmers start to supply surplus production to markets, thus creating job opportunities for workers in the nonfarm economy both within and outside the agrifood sectors (Haggblade, Hazell, and Dorosh 2007). Rising rural incomes generate demand for more diverse products; this leads to more nonfarm activities such as processing, packaging, transporting, and trading. In the early stages of transformation, the agriculture sector serves as an engine of rural—and even national—economic growth. Eventually, urbanization, the nonfarm economy, and nonagricultural incomes play more dominant roles in propelling agrifood system development, with urban and rural nonfarm consumers creating most of the demand for agricultural outputs via value chains that connect rural areas to towns and cities (Dorosh and Thurlow 2013). The exact nature of this transformation

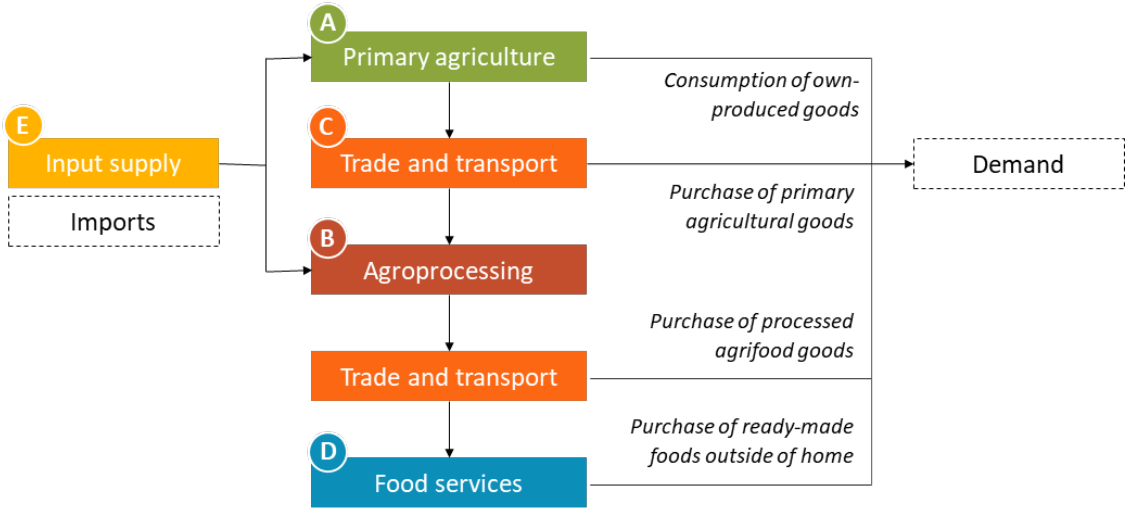
process varies across countries because of the diverse structure of their economies and the unique growth trajectories of their various agrifood and nonfood subsectors.

This brief describes the current and changing structure of Ethiopia's AFS and evaluates the potential contribution of different value chains to the acceleration of agricultural transformation and inclusiveness. We start by offering a simple conceptual framework of the AFS and then compare Ethiopia's AFS with that of other countries at different stages of development. We go on to disaggregate Ethiopia's AFS across agricultural value chains, taking into consideration their different market structures and historical contribution to economic growth and transformation. Finally, we use a forward-looking economy-wide model to assess the diverse contributions that specific value chains can make to each of a set of broad development outcomes. We conclude by summarizing our main findings.

A Simple Conceptual Framework of the Agrifood System

A country's AFS is a complex network of actors, connected by their differing roles in supplying, using, and governing agrifood products (a detailed conceptual description of the AFS is offered by Fanzo et al. 2020). In this brief, rather than examining all components of Ethiopia's AFS, we employ a narrower focus. We first measure its size, structure, and historical contribution to economic growth and transformation through a data-driven exercise; and second, we use IFPRI's Rural Investment and Policy Analysis (RIAPA) model (IFPRI 2023a) to assess the effectiveness of AFS growth, led by productivity gains in different agricultural value chains, in promoting multiple development outcomes in Ethiopia. Our measurement of the AFS is done from a supply-side perspective, that is, we use national accounts and employment statistics to either track or simulate growth and employment changes over time. By disaggregating the AFS into several value chain groups, this analysis offers a unique and useful perspective on the drivers of AFS growth and transformation.

Figure 1. A simple conceptual framework of the agrifood system



Source: Thurlow et al. (2023).

Figure 1 provides a simple conceptual framework of the AFS made up of five components, A to E (see Thurlow et al. 2023). *Primary agriculture* (A) comprises the supply and demand of all agricultural

products including crops, livestock, fisheries, and forestry products. *Agroprocessing* (B) is part of the manufacturing sector and includes those subsectors that process agriculture-related food or nonfood products. *Trade and transport services* (C) includes those services associated with the transporting, wholesaling, and retailing of agrifood products between farms, firms, and final points of sale. *Food services* (D) includes services such as meals prepared at restaurants, food stalls, or hotels. Finally, *input supply* (E) is the portion of domestically produced intermediate inputs that is used directly in agricultural and agroprocessing production, such as fertilizers and financial services.

Using this conceptual framework, it is possible to measure the size and structure of Ethiopia's AFS from a supply-side perspective. Following the definitions of Thurlow et al. (2023), AFS GDP (or AgGDP+) is the sum of the GDP contributions of the five components (A to E), while AFS employment (or AgEMP+) is the total number of jobs across those components. As the economy grows and transforms over time, there will be changes in the relative contributions of the various on-farm and off-farm components of the AFS to total AgGDP+ and AgEMP+. A transforming economy, for example, will typically be characterized by more rapid growth in the off-farm components of the AFS; there will thus be an increased contribution by off-farm components to AgGDP+ and AgEMP+ and a relative decline in the contribution of primary agriculture. By disaggregating AgGDP+ and AgEMP+ by specific agricultural value chains, we can further assess the contribution of each of those value chains to AFS growth and transformation.

Current Structure of Ethiopia's Agrifood System

Table 1 presents the structure of Ethiopia's AFS in 2019 based on official national accounts data and sectoral employment statistics (ESS 2020; ILO 2020), as compiled in a 2019 Social Accounting Matrix (SAM) for Ethiopia (IFPRI 2023b). National estimates are broken down into estimates for the AFS (that is, AgGDP+ and AgEMP+) and the rest of the economy. The AFS is further broken down into its on-farm (primary agriculture) and off-farm components. The estimates for manufacturing and services (including the trade and transport services subsector) at the bottom of the table include activities in both the AFS and non-AFS sectors, thus providing a perspective on the relative size of the off-farm AFS components within the overall manufacturing and services sectors.

As shown in Table 1, in 2019 the AFS accounted for 48.0 percent of Ethiopia's national GDP and 77.2 percent of employment. Primary agriculture alone contributed more than one-third of GDP and two-thirds of employment, while the four off-farm components of the AFS contributed 12.8 percent to GDP and 9.4 percent to employment. Off-farm components of the AFS therefore accounted for roughly one-quarter of AgGDP+ and 12 percent of AgEMP+. The comparison of on- and off-farm GDP and employment shares shows that labor productivity in the off-farm components of the AFS is significantly higher than on-farm. Hence, the movement of farm workers into these off-farm components—a natural process of agricultural transformation—may thus be beneficial to household incomes.

Table 1. Current structure of Ethiopia's agrifood system and economy (2019)

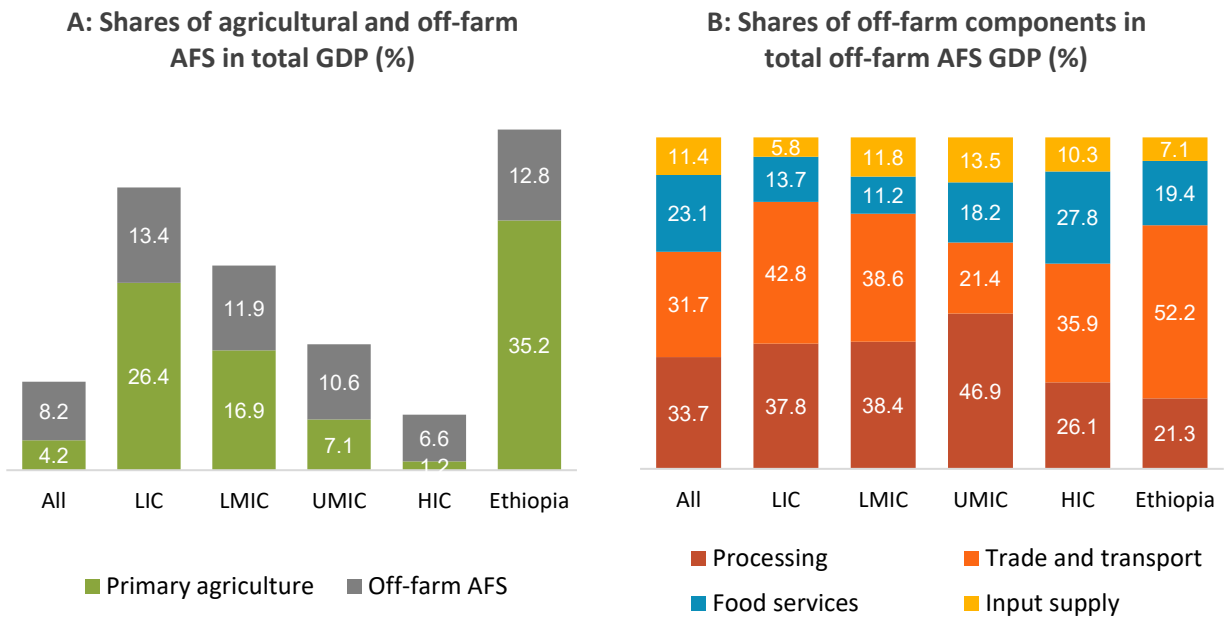
	GDP		Employment	
	Value (US$ billion)	Share (%)	Workers (million)	Share (%)
Total economy	**98.5**	**100.0**	**52.2**	**100.0**
Agrifood system	**47.2**	**48.0**	**40.3**	**77.2**
Primary agriculture (A)	**34.6**	**35.2**	**35.4**	**67.9**
Off-farm AFS	**12.6**	**12.8**	**4.9**	**9.4**
Processing (B)	2.7	2.7	1.1	2.1
Trade and transport (C)	6.6	6.7	2.9	5.5
Food services (D)	2.4	2.5	0.6	1.2
Input supply (E)	0.9	0.9	0.3	0.6
Rest of economy	**51.3**	**52.0**	**11.9**	**22.8**
Total manufacturing	5.8	5.9	2.2	4.2
Total services	36.1	36.6	12.7	24.4
Total trade and transport	16.6	16.8	6.5	12.5

Source: Authors' calculation based on the 2019 Social Accounting Matrix for Ethiopia (IFPRI 2023b).
Notes: A to E correspond to the five agrifood system (AFS) components from Figure 1.

Comparing Ethiopia's Agrifood System to Other Countries

The structure and economic contribution of a country's AFS varies at different stages of its development. Evidence of this is provided in Figure 2, which compares the 2019 AFS structures of low-income (LIC), lower-middle-income (LMIC), upper-middle-income (UMIC), and high-income countries (HIC). Ethiopia is an LIC, while the on-farm component of Ethiopia's AFS and its contribution to national GDP are much higher than t the LIC average, and off-farm component is similar to the LIC average (Panel A). Within the four off-farm components of the AFS, Ethiopia's agroprocessing is relatively smaller than what is seen in other LICs, while the agrifood trade and transport component is relatively large (Panel B).

Figure 2. Comparing Ethiopia's agrifood system to other countries (2019)

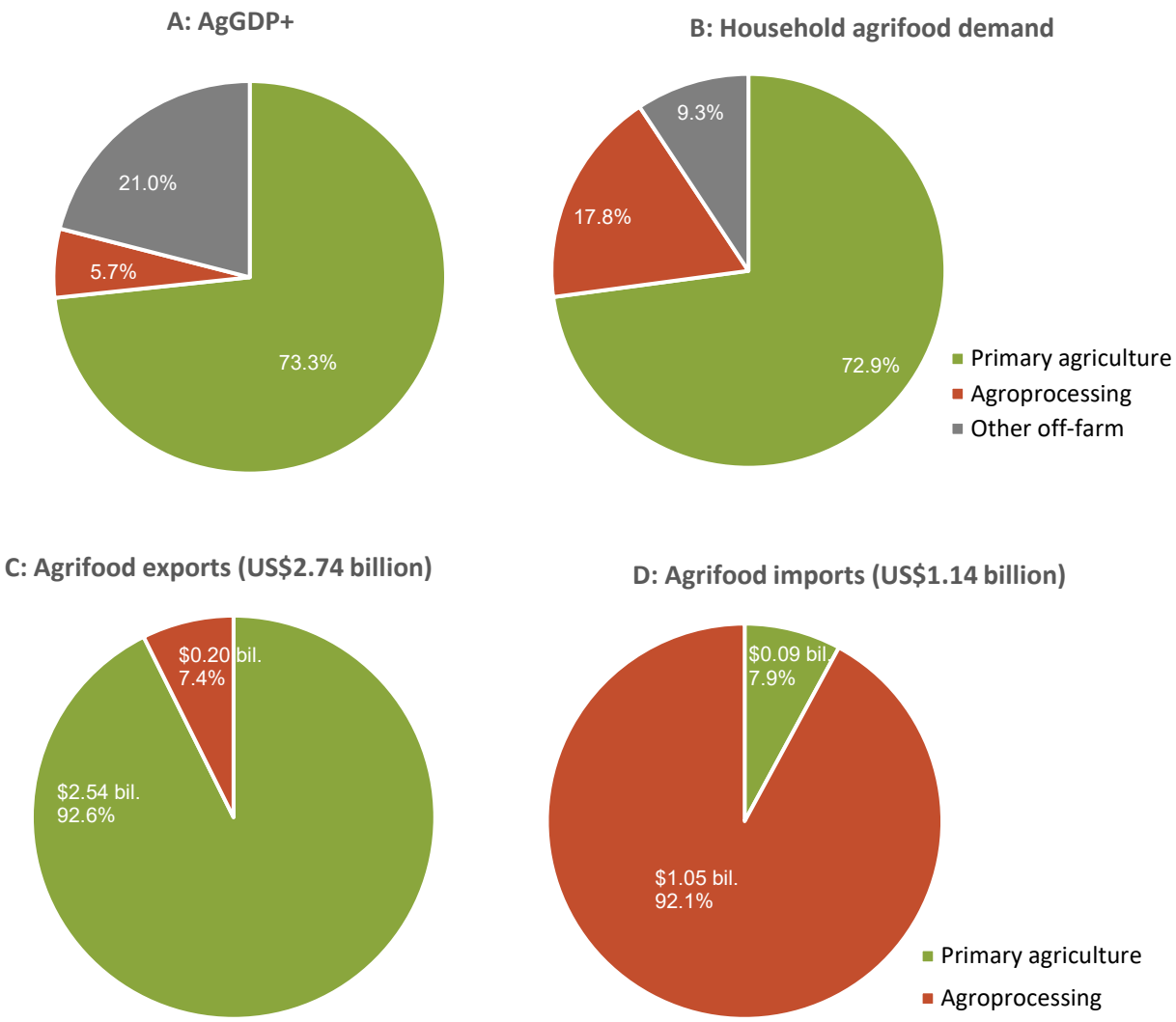


Source: IFPRI's Agrifood System Database (Thurlow et al. 2023) and the 2019 Social Accounting Matrix for Ethiopia (IFPRI 2023b).
Note: LIC = low-income country; LMIC = lower-middle-income country; UMIC = upper-middle-income country; and HIC = high-income country.

Unpacking the Demand Side of Ethiopia's Agrifood System

In Figure 3, the structure of Ethiopia's AFS from the supply side, as measured by AgGDP+ (Panel A), is compared to the structure of the AFS from the demand side, as measured by household consumption of agrifood products (Panel B). Primary agriculture accounts for a similar large component of AgGDP+ and household total agrifood demand, about 70 percent, while processed agrifood products account for a higher share of household agrifood demand (17.8 percent) than the share of the associated sector in AgGDP+ (5.7 percent). The bias toward processed agrifood products is mirrored in the high share of agrifood imports accounted for by processed products; that is, 92.6 percent of agrifood commodity exports are primary agricultural commodities (Panel C), but 92.1 percent of imports are processed goods (Panel D). While Ethiopia maintains a surplus on its total agrifood commodity trade balance, imports of processed agrifood commodities far exceed their exports—the value of Ethiopia's processed agrifood commodity imports is five times the value of its processed agrifood exports.

Figure 3. Composition of agrifood system GDP, household demand, and trade (2019)



Source: Authors' calculation based on the 2019 Social Accounting Matrix for Ethiopia (IFPRI 2023b).

Disaggregating the Agrifood System across Value Chains

For a more detailed assessment of structural and historical growth patterns within the AFS, we group Ethiopia's agrifood system into 16 value chain groups (see Table A1 in the Appendix for details on how individual value chains or subsectors are mapped to value chain groups). The 16 value chain groups are further categorized into three subgroups on the basis of their trade orientation. Exportable and importable value chains are defined, respectively, as those value chains with export–output and import–consumption ratios above the national average. Trade in both primary and processed agrifood products is considered in the calculation of these trade ratios. The remaining value chains are classified as less-traded value chains.

Table 2 shows the 16 value chain groups, categorized into exportable, importable, and less-traded value chains. The table also reports the contribution of each value chain group to AgGDP+, primary agricultural GDP, and GDP in the off-farm components of the AFS. Consistent with Figure 3, Table 2

shows that Ethiopia has some comparative advantage in exports, with an export–output ratio of 4.0 percent, which is higher than the import–consumption ratio of 1.7 percent. Only 2 of the 16 value chains are classified as exportable value chains because their export–output ratios exceed the national average for AFS value chains. The "export crops" value chain group Ethiopia's two most important agricultural export commodities—coffee and cut flowers. Exportable agrifood products typically require additional processing and more trade and transport services; the two exportable sectors thus have a relatively large off-farm AFS GDP share of 10.3 percent, which is almost double their primary agricultural GDP share of 5.8 percent. Interestingly, oilseeds as an exportable value chain also have a high import–consumption ratio. This reflects urbanization and growing nonfarm income-generating opportunities in rural areas, which lead to an increase in demand for processed oilseed products, which are mainly imported. In this case, exports from the oilseed value chain are predominantly in the form of primary agricultural products (sesame seeds), while imports into that value chain are in the form of processed products, like cooking oils.

Table 2. Ethiopia's agrifood system composition by trade orientation of value chains (2019)

	Share of GDP (%)			Exports / output (%)	Imports / demand (%)
	AFS (AgGDP+)	Primary agriculture	Off-farm AFS		
Total	**100.0**	**100.0**	**100.0**	**4.0**	**1.7**
Exportable	**7.0**	**5.8**	**10.3**	**47.5**	**11.6**
Oilseeds	3.0	2.7	3.7	41.9	22.6
Export crops	4.0	3.0	6.5	51.3	0.2
Importable	**11.0**	**8.6**	**17.5**	**0.7**	**7.3**
Other cereals	0.4	0.4	0.2		33.8
Horticulture	5.8	5.6	6.3	1.3	2.5
Other crops	4.8	2.5	11.0	0.1	8.9
Less traded	**78.8**	**85.7**	**60.0**	**0.3**	**0.2**
Maize	7.3	8.2	5.0		
Teff	6.9	8.3	3.1		0.6
Sorghum	7.0	8.2	3.8		
Wheat & barley	10.7	11.6	8.1	0.0	0.4
Pulses	7.3	8.9	3.1	1.5	
Roots	4.0	4.6	2.2		
Cattle	8.5	7.9	10.1	1.2	0.0
Milk	12.1	13.4	8.5		0.1
Other livestock	4.9	6.0	1.7	3.2	1.2
Fish	0.5	0.3	0.8		1.2
Forestry	9.6	8.2	13.6	0.0	1.1

Source: Authors' calculation based on the 2019 Social Accounting Matrix for Ethiopia (IFPRI 2023b).

Eleven of the 16 value chains fall in the less-traded group of value chains, together accounting for 78.8 percent of AgGDP+. Many of these less-traded value chains have relatively small off-farm components,

and thus contribute a disproportionately smaller share to off-farm AFS GDP (60.0 percent) compared to their primary agricultural GDP contribution (85.7 percent). The cattle value chain is a clear exception; it is associated with significant value-addition such as meat processing. Expansion of this sector could thus effectively drive agricultural transformation by boosting value addition and off-farm employment in the value chain.

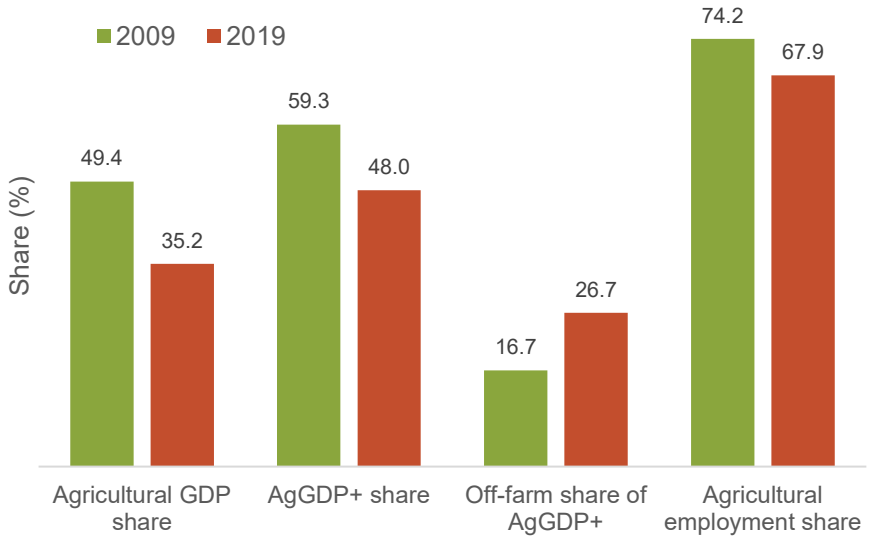
Structural Change and Drivers of Agrifood System GDP Growth

The previous sections have provided a snapshot of the current structure of Ethiopia's AFS, the disaggregation of the AFS across the 16 value chain groups, and the trade orientation of those value chains. We have demonstrated that Ethiopia has some comparative advantage in agrifood exports, while less-traded value chains are dominant in terms of their contribution to AgGDP+ and primary agriculture. However, except for cattle, these value chains also are generally less oriented toward value addition in the off-farm components of the AFS (that is to say, their contribution to off-farm AFS components is small relative to their contribution to primary agriculture, especially when compared to tradable value chains). Prioritizing growth in tradable value chains and cattle value chain could therefore be an effective strategy for expanding off-farm value addition and jobs, which would contribute positively to AFS transformation.

In this section, we assess the performance and structural transformation of Ethiopia's AFS in recent years. Labor productivity is typically lowest in primary agriculture and higher in off-farm activities, such as agrifood processing and food services, and in sectors outside of the AFS. Economic growth and urbanization are associated with relatively faster growth in these nonagricultural sectors, which can help create higher-paying jobs for both rural and urban households. As such, even smallholder farm households with family members who obtain off-farm employment may benefit from structural transformation.

Figure 4 compares the shares of agricultural GDP and AgGDP+ in Ethiopia's national GDP, and agricultural employment as a share of total employment between 2009 and 2019. The figure also includes an estimate of the share of the off-farm components in AgGDP+. Agricultural GDP and AgGDP+ shares as well as the agricultural employment share fell significantly between 2009 and 2019, while the off-farm component of AgGDP+ increased substantially. This indicates that Ethiopia's rapid growth has been accompanied by significant economic structural change and that Ethiopia's AFS has been transforming. Still, primary agriculture dominates AgGDP+, with agricultural GDP triple GDP in the off-farm components, and employment in primary agriculture almost 10 times larger than employment in the off-farm components.

Figure 4. Agricultural GDP, agrifood system GDP, and employment shares (2009–2019)



Source: Authors' estimates using the 2009 and 2019 Social Accounting Matrixes for Ethiopia (IFPRI 2023b).

Table 3 evaluates the growth performance across AFS value chains over the 2009 to 2019 period. As before, value chains are grouped according to their trade status, that is, exportable, importable, and less traded. Overall, Ethiopia's AFS grew rapidly, with an average annual AgGDP+ growth rate of 6.9 percent. The off-farm component of the AFS grew much faster (12.0 percent) than primary agriculture (5.5 percent), with agrifood processing, a subcomponent of the off-farm component of the AFS, growing particularly fast, at 14.3 percent per year.

Among the 16 value chains, 5 achieved above-average growth during the 2009 to 2019 period, that is, more than 6.9 percent per year (these are marked with an asterisk in Table 3). All of the three importable value chains—other cereals (mainly rice), horticultural products, and other crops (including many small crops such as sugarcane, tobacco, cotton and fibers, tea, and others)—grew faster than the AFS average. Two of the 11 less-traded value chains (teff and fish) also achieved above-average growth, while both exportable value chains had growth rates below the average. In all of the five rapidly growing value chains, growth in the off-farm components of the AFS was much faster than growth in the primary agricultural component. Moreover, in all these value chains that achieved above-average growth—and in many of the other value chains with growth rates below 6.9 percent—the processing components of the value chains grew rapidly. This is consistent with the broader patterns of growth and structural change in Ethiopia's AFS; these also show that growth in the off-farm component of the AFS was much faster than the growth of on-farm, and that processing agricultural GDP grew even more rapidly.

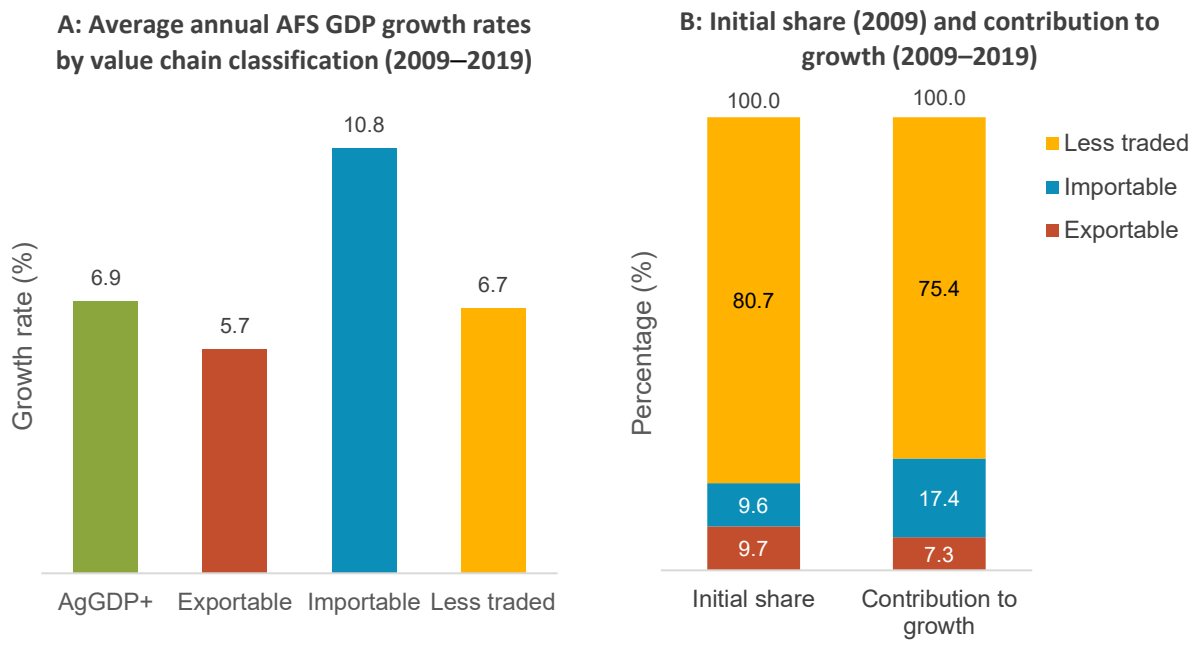
Table 3. Agrifood system GDP growth rates by value chain (2009–2019)

	Average annual GDP growth rate (%)			
	Total AFS	Primary agriculture	Off-farm AFS	Agro-processing
Total AFS	**6.9**	**5.5**	**12.0**	**14.3**
Exportable	**5.7**	**3.6**	**10.0**	**11.9**
Oilseeds	4.8	3.2	9.3	12.6
Export crops	6.4	4.1	10.4	11.4
Importable	**10.8**	**8.8**	**14.2**	**15.5**
Other cereals*	9.9	9.4	13.2	19.6
Horticulture*	9.4	8.4	12.5	14.6
Other crops*	12.8	9.7	15.3	15.7
Less traded	**6.7**	**5.8**	**12.2**	**15.2**
Maize	6.0	5.0	12.3	14.9
Teff*	12.1	11.9	13.8	14.9
Sorghum	7.0	6.4	11.6	14.3
Wheat & barley	6.8	5.8	11.8	15.8
Pulses	6.7	6.3	10.4	
Roots	7.5	7.2	10.0	
Cattle	6.0	3.9	13.5	15.2
Milk	5.0	3.9	12.2	15.3
Other livestock	4.3	3.7	12.6	11.4
Fish	15.3*	11.8	21.6	12.6
Forestry	4.9	3.3	8.3	13.3

Source: Authors' analysis using the 2009 and 2019 Social Accounting Matrixes for Ethiopia (IFPRI 2023b).
Note: Value chains that experienced above-average AgGDP+ growth over the 2009–2019 period (that is, higher than 6.9 percent) are marked with an asterisk (*).

Figure 5 summarizes the key growth trends from Table 3. On average, importable value chains grew faster than the national AgGDP+ (10.8 percent), and less-traded value chains have an average growth rate close to the AFS average (6.7 percent) (Panel A). Since importable value chains only make up a small share of the AFS (9.6 percent), however, the larger less-traded group of value chains contributed the most to the AFS growth, at 75.4 percent (Panel B).

Figure 5. Drivers of Ethiopia's AFS GDP growth (2009–2019)



Source: Authors' analysis using the 2009 and 2019 Social Accounting Matrixes for Ethiopia (IFPRI 2023b).

Assessing Growth Outcomes Using IFPRI's RIAPA Model

IFPRI's Rural Investment and Policy Analysis (RIAPA) model is a tool for conducting forward-looking, economywide country-level analysis (IFPRI 2023a). RIAPA has been used in a wide variety of contexts to simulate the impacts of policies, investments, and economic shocks. Here we employ RIAPA to assess the effectiveness of productivity-led growth in Ethiopia's agricultural value chain groups for promoting multiple development outcomes. The analysis was carried out for 11 value chain groups, which were selected from the original list of 16: sorghum, other cereals, fish, and forestry were excluded, while cattle and milk are combined. We considered five development outcomes:

- A poverty–growth elasticity that measures the percentage point change in the poverty headcount rate per unit of agricultural GDP growth generated within the targeted value chain;
- A growth multiplier that measures the change in GDP per unit of increase in agricultural GDP in the targeted value chain;
- An employment multiplier that measures the change in the number of jobs created per unit of increase in agricultural GDP in the targeted value chain;
- A diet-quality indicator that measures the percentage change in a diet quality index per unit of agricultural GDP growth generated within the targeted value chain; and
- A hunger–growth elasticity that measures the percentage-point change in the rate of undernourishment per unit of agricultural GDP growth generated within the targeted value chain.

The simulations entail increasing on-farm productivity separately in each targeted value chain and comparing development outcomes across the value chains. While this exogenous productivity shock is imposed only in the primary agriculture component of each value chain, there are spillover effects into that value chain's off-farm components as well as into other agricultural value chains or sectors outside the

AFS. These spillovers are captured by the economywide model and provide an indication of the transformation effect that agricultural productivity growth in the value chain has within the AFS and in the broader economy. There are also structural differences across value chains; for example, value chains have unique links to other sectors as suppliers or users of intermediate inputs, or they have unique links to rural or urban households in different income groups because of the types of workers they employ or the consumption preferences of households for the agrifood products produced by those value chains.

As such, each value chain growth scenario is expected to have a unique impact on development outcomes; moreover, not all value chains will be equally effective at improving outcomes. In some cases, there may even be trade-offs due to competition for resources across value chains. With the aid of the RIAPA model, these complex effects can be unpacked, thus providing information to governments or development partners that can be used to prioritize across different value chains; this is subject, of course, to the development outcomes they value most highly.

Figure 6 shows the scores each value chain achieves across the five development outcome indicators. We arbitrarily rank the value chains by their poverty score. Value chains clearly differ significantly in terms of their effectiveness in improving different development outcomes. The horticultural product value chain, for example, has strong poverty effects and is the most effective in improving diet quality, but it is much less effective in increasing jobs. Indeed, productivity growth in horticultural production releases labor and land to other value chains, ultimately causing no change in total employment, that is, the number of job creation is zero.

The two livestock value chains, in contrast, have job creation multipliers of 0.83 and 0.80 respectively, the two highest among all the value chains. This means that for every US$1 million increase in GDP in the two livestock value chains driven by rising productivity, an additional 830 and 800 jobs, respectively, are created to the total economy, mainly in the off-farm components of their own value chains or in other value chains or other sectors of the economy. The two livestock value chains also score high on the growth outcome but rank much lower on the poverty outcome. They even have negative hunger effects, with growth in both livestock value chains causing a slight increase in the national hunger rate. This is because the relative prices for other staple foods rise with growth of the two livestock sectors, hurting the households whose food consumption disproportionally relies on low-price staple foods.

Figure 6. Impact of value chain growth on development outcomes

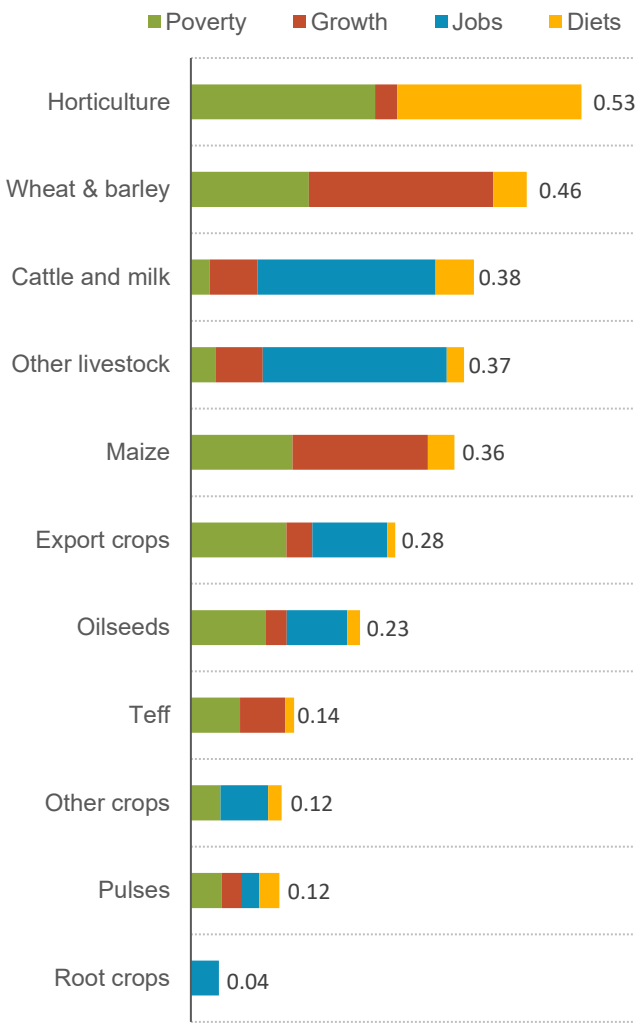
Source: RIAPA Model Results.
Note: Panel A shows the percentage point changes in the poverty rate that are associated with a 1 percent increase in agricultural GDP; Panel B shows the percentage point changes in the hunger rate that are associated with a 1 percent increase in agricultural GDP; Panel C shows the changes in total GDP (in US$ millions) that are associated with a US$1.0 million increase in agricultural GDP from the targeted value chain; Panel D is the change in economywide employment (in thousand persons) that is associated with a US$1.0 million increase in agricultural GDP from the targeted value chain; and Panel E is the percentage improvement in diet quality that is associated with a 1 percent increase in agricultural GDP. The figure is ordered by the poverty rate outcome.

These results highlight the possible trade-offs that may emerge when prioritizing individual value chains, as there is no single value chain that is the most effective at achieving every development objective. Promoting a few value chains jointly will not only diversify agricultural growth; it can also help to simultaneously achieve multiple development objectives.

A composite score across different outcome indicators is created to narrow down the number of value chains that might be prioritized. Because of a high correlation between poverty and hunger impacts across value chains, the hunger score is omitted from the composite score. Also, since the different outcome indicators have different underlying units, the individual outcomes are normalized so that they are comparable while still retaining their ranking within the outcome category. Normalization entails assigning a score of 1 to the value chain that is most effective within an outcome category and a score of 0 to the least-effective value chain. All value chains with adverse effects on an outcome are also assigned a score of 0. This includes value chains with a growth multiplier of less than one (pulses and root crops) or those with negative employment effects (horticulture, wheat and barley, maize, and teff). The remaining value chains receive a score between 1 and 0 that is proportionate to their original score relative to the highest-ranked value chain. The individual normalized scores for the outcomes are then combined into a composite score for each value chain. The default approach assumes that each of the four outcome indicators is equally important, so an equal weight is assigned to each score; however, if policymakers consider a particular development outcome to be more or less important than the other outcomes, the weights assigned to each particular outcome score can be adjusted accordingly.

Figure 7 presents the composite scores using equal weights across the four development outcome indicators (that is, excluding hunger). Each component in the bars shows the relative contribution of a particular outcome indicator in the final score. Horticultural products, wheat and barley, the two livestock value chains, and maize are ranked highest. For horticulture (the highest-ranked value chain), only three of the four outcome components make important contributions to the composite score, and there is no contribution from the job creation component. This is also the case for the second-ranked wheat and barley and fourth-ranked maize value chains; that is, there is no contribution from the growth led by wheat and barley or by maize on the job creation outcome. While the two livestock value chains rank after the horticulture and the wheat and barley value chains, all four outcome components make some contribution to their composite scores, and the contribution from job creation is especially large. While a ranking of their impacts on multiple development outcomes on the basis of composite scores allows us to identify and prioritize value chains, trade-offs clearly exist as to which outcomes are most significantly affected by productivity-led growth in each value chain.

Figure 7. Composite score of development outcomes: Equal weights



Source: RIAPA model results.
Note: The composite score is a simple average (equally weighted) of the scores for each of the four outcome categories; the figure is ordered according to the highest composite score.

Summary

In the decade prior to the COVID-19 pandemic, Ethiopia's economy grew rapidly at about 10 percent per year and the agrifood system (AFS) also grew impressively, achieving an annual growth rate of 6.9 percent. Since more than three-quarters of the labor force in Ethiopia is engaged in the AFS, this growth was important for household income growth and poverty reduction. The rapid growth led to a significant structural change within Ethiopia's AFS. The growth rate for the off-farm component of the AFS was more than double the on-farm growth rate—12.0 and 5.5 percent, respectively—and the increase in the off-farm share of the AFS was thus significant, from 16.7 to 26.7 percent in that 10-year period. In these years, the shares of both agricultural GDP and agricultural employment also declined significantly, and the AFS has been transforming along with broader economic structural change. However, agriculture remains a relatively large sector in Ethiopia and still dominates AgGDP+. Agricultural

GDP is triple GDP in the off-farm components, and employment in primary agriculture almost 10 times larger than employment in the off-farm components..

Almost all the growth in Ethiopia's AFS that occurred between 2009 and 2019 was contributed by less-traded value chains (75.4 percent) and importable value chains (17.4 percent), an indication that domestic market demand has been a dominant force driving AFS growth.

The RIAPA model-based comparison of future sources of growth shows that there is no single value chain group that is the most effective in achieving all desired development outcomes, that is, declining poverty, declining hunger, economic growth, job growth, and improved diets. The horticultural products, wheat and barley, and maize value chains as well as the two livestock value chains rank high in their composite outcome scores. All these value chains are less traded or import substitutable, and promoting these value chains together offers an effective and broad-based way to achieve these development outcomes.

About the Authors

Xinshen Diao and **Karl Pauw** are Senior Research Fellows, **James Thurlow** is the Director, and **Mia Ellis** is a Research Analyst in IFPRI's Foresight and Policy Modeling Unit, based in Washington, DC.

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Appendix

Table A1. Value chain groups and their corresponding agricultural subsectors

Value chain groups and their share of AgGDP+	Individual value chains (or agricultural subsectors) in the group and their share of the group's agricultural GDP
Maize (7.3%)	Maize 0%
Teff (6.9%)	Teff 100%
Sorghum (7.0%)	Sorghum and millet 100%
Wheat and barley (10.7%)	Wheat 64.5% | Barley 35.5%
Other cereals (0.4%)	Rice 73.8% | Other cereals 26.2%
Pulses (7.3%)	Pulses 100%
Oilseeds (3.0%)	Groundnuts 11.5% | Other oilseeds 88.5%
Roots (4.0%)	Enset 65.1% | Irish potatoes 18.7% | Sweet potatoes 8.8% | Other roots 7.4%
Horticulture (5.8%)	Leafy green vegetables 23.3% | Other vegetables 59.5% | Nuts 1.5% | Bananas 4.8% | Other fruits 10.9%
Export crops (4.0%)	Coffee 76.6% | Cut flowers 23.4%
Other crops (4.8%)	Sugarcane 11.7% | Tobacco 0.2% | Cotton & fibers 4.6% | Leaf tea 0.7% | Other crops 82.8%
Cattle (5.8%)	Cattle meat 100%
Dairy (12.1%)	Raw milk 100%
Other livestock (4.9%)	Poultry meat 28.3% | Eggs 9.3% | Small ruminants 50.5% | Other livestock 11.8%
Fish (0.5%)	Capture fisheries 100%
Forestry (9.6%)	Forestry 100%

Source: Authors' calculation based on the 2019 Social Accounting Matrix for Ethiopia (IFPRI 2023b).

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1201 Eye Street, NW, Washington, DC 20005 USA | T. +1-202-862-5600 | F. +1-202-862-5606 | Email: ifpri@cgiar.org | www.ifpri.org | www.ifpri.info