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Estimating global and country level employment in agrifood systems¹

Executive summary

In 2023, the Food and Agriculture Organization (FAO) developed a methodology to estimate the number of individuals employed within agrifood systems (AFS), addressing a prior lack of formal statistics. This paper introduces a new approach using an operational definition based on the International Standard Industrial Classification of All Economic Activities (ISIC). The methodology requires ISIC 2-digit codes to accurately identify non-agricultural AFS employment. Starting with official labour statistics from the International Labour Organization (ILO), an econometric model is used to estimate missing data, and compute total employment in agrifood systems.

Suggested actions by LACCAS

The Commission is invited to provide its views and recommendations to FAO on the following points:

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I. Introduction

Agri-food systems (AFS) include the primary agricultural production of both food and non-food products (such as crops, livestock, fisheries, forestry, and aquaculture), the creation of non-agricultural food products (e.g., synthetic meat), the entire food supply chain from production to consumption, and the final disposal of food waste. Identifying and quantifying AFS workers is essential, particularly in lower-income countries where the majority of these workers are concentrated. A clearer understanding of this workforce could help identify opportunities for programs and policies aimed at promoting upskilling, entrepreneurship, and inclusive transformation. Additionally, such data would support monitoring and evaluation efforts to determine policy effectiveness and swiftly address any unforeseen challenges requiring intervention.

II. Methodology and data

To identify individuals employed in agrifood systems (AFS), an operational definition is established based on the International Standard Industrial Classification of All Economic Activities (ISIC) (United Nations, 2008). This classification provides the minimum level needed to recognize AFS workers, though it excludes those involved in trade and transport (see Box 1). While using more detailed ISIC codes would enhance accuracy, data availability

¹ This document is prepared using the existing FAO Statistics Working Paper of Davis et al. on estimating global and country level employment in agrifood systems and FAOSTAT Employment Domain brief developed by Gurbuzer Y.

diminishes with each additional digit. At the ISIC 2-digit level, AFS can be identified through the specific codes and divisions outlined in Table 1.

Table 1. ISIC codes identifying agrifood systems

Categories	ISIC divisions	ISIC codes – Rev.4	ISIC codes – Rev.3
Agriculture, forestry and fishing	Agriculture	01	01
	Forestry and logging	02	02
	Fishing	03	05
Food processing and services	Manufacture of food products	10	15
	Manufacture of beverages	11	
	Food and beverage service activities	56	
	Undifferentiated goods- and services-producing activities of private households for own use	98	96
Manufacture of non-food agricultural products	Manufacture of tobacco products	12	16
	Manufacture of textiles	13	17
	Manufacture of leather and related products	15	19
	Manufacture of wood and of products from wood and cork, except furniture	16	20
	Manufacture of paper and paper products	17	21

Further, to be able to capture the share of trade and transportation (ISIC Rev. 4 Codes 46,47, 49, 50, 51, 52, 53) in AFS, a proxy measure is used by multiplying overall employment in trade and transportation by the share of AFS in total employment not including trade and transportation—in essence assuming that the share of trade and transportation in AFS mirrors the overall share of AFS in total employment.

A. Data

Starting with official labour statistics from the International Labour Organization (ILO), an econometric model is used to estimate missing data. and compute total employment in agrifood systems. Key indicators from ILOSTAT used include:

- Employment by sex and economic activity (ISIC level 2, thousands) | Annual, from household surveys and Labour Force surveys, covering 155 countries (2000-2023).
- Employment by sex and economic activity (ILO modelled estimates, Nov. 2023, thousands) | Annual, disaggregated by broad sectors (agriculture, industry, services).

The ILO processes household and labour force surveys, from which it estimates employment by sex and economic activity. Depending on the survey year, some of the data are classified using the most recent ISIC Rev.4, however older data are classified by ISIC Rev.3.1. The ILO modelled estimates are used to fill in gaps in reported data. These modelled estimates, however, are insufficient to measure AFS employment as they are only disaggregated by broad sectors (e.g. agriculture, manufacturing and services) rather than at the ISIC 2-digit level.

For missing data, a linear trend was applied to interpolate values between two known points, assuming a consistent trend over time. In cases of missing information for specific country-year pairs, this interpolation method was used to estimate values between available data points. When data remained unavailable, we estimated non-agricultural AFS employment using regression models that incorporated additional indicators from the World Development Indicators, USDA, and FAOSTAT.

Two separate models were developed to predict non-agricultural AFS employment in countries with missing data. The first model, for countries with at least one data point on non-agricultural AFS employment, included country fixed

effects. The second model, for countries without any data on non-agricultural AFS employment, was run without the country fixed effects².

III. Results

According to this new FAO model developed, approximately 1.3 billion people were employed in agrifood systems (AFS) in 2021, making up 39.2 percent of the global workforce³. Asia had the highest number of AFS workers, with 830 million people, and India and China⁴ alone accounted for nearly 60 percent of AFS employment in the region. Africa followed with an estimated 300 million AFS workers, while in the Americas, slightly more than 100 million people were employed in AFS. Europe and Oceania had much lower figures, with 50 million and around 4 million people, respectively. Together, Asia and Africa represent 87.9 percent of global AFS employment.

The data reveal significant regional differences in AFS employment. In Africa and Asia, a large majority (70–75 percent) of AFS employment is in agriculture, while in the Americas, Europe, and Oceania, a higher proportion (55–65 percent) works in off-farm activities within the agrifood system.

The share of AFS employment in total global employment has decreased from 52.2 percent in 2000 to 39.2 percent in 2021, reflecting a shift away from agrifood systems towards other sectors. At the same time, the proportion of non-agricultural employment within agrifood systems has risen globally and across regions, likely due to economic diversification and industrialization. The global share of agricultural employment within total employment fell from 39.8 percent in 2000 to 26.4 percent in 2021. In contrast, the share of non-agricultural AFS employment in total employment has remained steady at about 13 percent, with regional variations over time. Since 2000, the share of non-agricultural AFS employment has only increased in Africa, while it has remained stable or declined in other regions.

IV. Conclusions and recommendations

This paper provides an estimate of the global population engaged in agrifood systems (AFS), using economic activity classifications identified through ISIC 2-digit codes. These classifications cover subsectors such as primary production (agriculture, livestock, forestry, fishing, aquaculture, hunting), food processing and services, and the manufacturing of non-food agricultural products. Based on this approach, we estimate that approximately 1.3 billion people were employed in AFS in 2021, representing a lower-bound estimate according to the employment definitions set by the International Conference of Labour Statisticians (ICLS).

This analysis highlights the significant role of AFS in global economies and the interconnections across different parts of agrifood systems. Establishing a permanent statistical series that tracks and identifies these individuals is crucial for understanding the evolution of rural and food system transformations. Improved data will enhance existing models and estimates, helping to characterize sector dynamics more accurately. Additionally, AFS statistics play a key role in policymaking, program design, and monitoring and evaluation.

Further research is needed to explore the quality of jobs within AFS, as well as the relationship between such employment, various livelihood strategies involving AFS, and broader welfare outcomes such as equity, inclusion, health, education, and poverty. As AFS continue to evolve, job creation can provide significant benefits to people involved in this sector.

² For the countries without data, out-of-sample tests were conducted on three different versions of the model: (1) without regional fixed effects, (2) with regional fixed effects, (3) with sub-regional fixed-effects. The inclusion of the fixed effects in the model is found to decrease out-of-sample R-squared of the model compared to the model without the fixed-effects. Therefore, we opted for the model without regional or sub-regional fixed effects.

³ The global and regional aggregates do not include Burkina Faso, Equatorial Guinea, Gabon, the Republic of Moldova and Rwanda due to unreliable data.

⁴ The FAO model incorporates data from specific sources, such as the Chinese Academy for Agricultural Sciences (CAAS) for China and official statistics, such as NAICS four-digit level statistics from Statistics Canada for Canada. Additionally, when non-modelled data with ISIC codes at the two-digit level are available in ILOSTAT, the share of AFS employment in total employment is calculated and applied to the total employment in the ILO modelled estimates. Therefore, slight discrepancies between the totals reported by the ILO and FAO models may arise due to these methodological differences and data sources used by each organization.