



ANNEX 2

Data and methodology

1 Introduction

This data annex accompanies the *Rural Development Report 2021: Food Systems for Rural Prosperity*. It aims to document data sources and methods of estimation for the data and visualizations used in the Report and highlights messages for each of the following areas:

- Poverty
- Food security and nutrition
- Gender
- Agrifood economy and employment
- Rural households economic diversification
- Digital
- Social protection
- Small-scale agriculture
- Ease of doing business and enabling the business of agriculture

Throughout the annex we disaggregate the data by geographic region and by income level – as defined by the World Bank. Whenever possible, we also show rural/urban disaggregation.

We use the following icons for ease of presentation:



Sources, references, links to data



Highlight messages



Caveats and considerations

KEY MESSAGES

Poverty

- Seven out of 10 people who live in extreme poverty live in rural areas.
- 1.5 billion people who are moderately poor live in rural areas.

Food security and nutrition

- An increasing number of countries are suffering from a double burden of malnutrition: hunger and child undernutrition with adult overweight and obesity.
- As countries increase their income levels, they decrease child undernutrition and increase adult overweight and obesity.
- Middle-income countries suffer more than others from a double burden of malnutrition.
- Throughout the world, pulses and fruits and vegetables are available at a much lower level than that required for a healthy diet.
- In low-income countries, the availability of cereals roots, tubers and plantains is almost three times what is needed for a healthy and sustainable diet. In contrast, the availability of fruits and vegetables is two and a half times less than the recommended intake.
- In high-income countries, the availability of sugars and fats is almost double the recommended intake. The availability of pulses, seeds and nuts, on the other hand, is one fifth that required for a healthy diet.

Gender

- Structural inequalities make plots managed by women significantly less productive than those managed by men.
- In low-income countries, women can earn as little as 15 cents for each dollar earned by men working in the agricultural sector.

Agrifood economy and employment

- The lower the income level, the larger the proportion of employment in agricultural activities and the larger the share of employment in food systems. Non-farm employment (manufacturing plus food and beverage service activities) does not seem to vary with different levels of income.

- In every region, the labour force in the hinterlands dedicates between 70 per cent and 87 per cent of its time to farming and agrifood-related activities.
- In low- and middle-income countries, food systems provide important employment opportunities beyond the farm gate.

Rural households' economic diversification

- Own-farm activities are an important source of income for most rural households in our sample of low- and middle-income countries.
- The greater part of the income of small-scale farms in sub-Saharan Africa comes from farm and agriculture labour, whereas in Latin America, small-scale farms derive most of their income from non-farm and non-agricultural activities.

Digital

- The rural-urban gap in mobile internet adoption is reducing but remains substantial. The reduction was driven by South Asia, where the gap fell from 47 per cent to 30 per cent between 2017 and 2019.
- Despite an overall reduction in the gender gap of mobile internet use in low- and middle-income countries from 27 per cent to 20 per cent, there are still more than 300 million fewer adult women than men using mobile internet.

Social protection

- Worldwide, less than half of the population is covered by at least one social protection benefit. This figure reduces to less than one fifth for Africa and less than two fifths for Asia and the Pacific.
- Low-income countries tend not to reach the median coverage (of at least one social protection benefit) of upper-middle-income countries.

KEY MESSAGES (CONT.)

Small-scale agriculture

- Very small holdings (<1 ha) constitute the majority of farms in all income groups. Still, they account for less than one fourth of the land in low-income countries and around 1 per cent in upper-middle-income countries.
- Very small holdings (<1 ha) constitute the majority of farms yet they hold 7 per cent of the land and produce over one tenth of the food. Large holdings (>20 ha), on the other hand,

constitute 6 per cent of the total holdings, yet they account for 80 per cent of the land area and produce almost half (47 per cent) of the total food.

Ease of doing business and enabling the business of agriculture

- Low-income countries face far more challenges when doing business, including in the agricultural sector.

2 Country characterization

IFAD's *Rural Development Report 2019* used macro data from 85 countries to analyse structural and rural transformation processes and derive a country transformation typology. The data were from circa 2016. The sample included all low- and middle-income countries, except island nations, resource-dependent nations and countries for which there was no available information. The typology used two variables to define the level (low or high) of structural and rural transformation for each country, as follows:

- For structural transformation (ST):
 - Variable: non-agricultural value added (as a percentage of GDP)
 - Measure: relative value to the sample average (80 per cent)
- For rural transformation (RT):
 - Variable: agricultural value added per worker (constant 2010 US\$)
 - Measure: relative value to the sample median (US\$1,592)

We initially used these measures to categorize countries into four different types of economies:

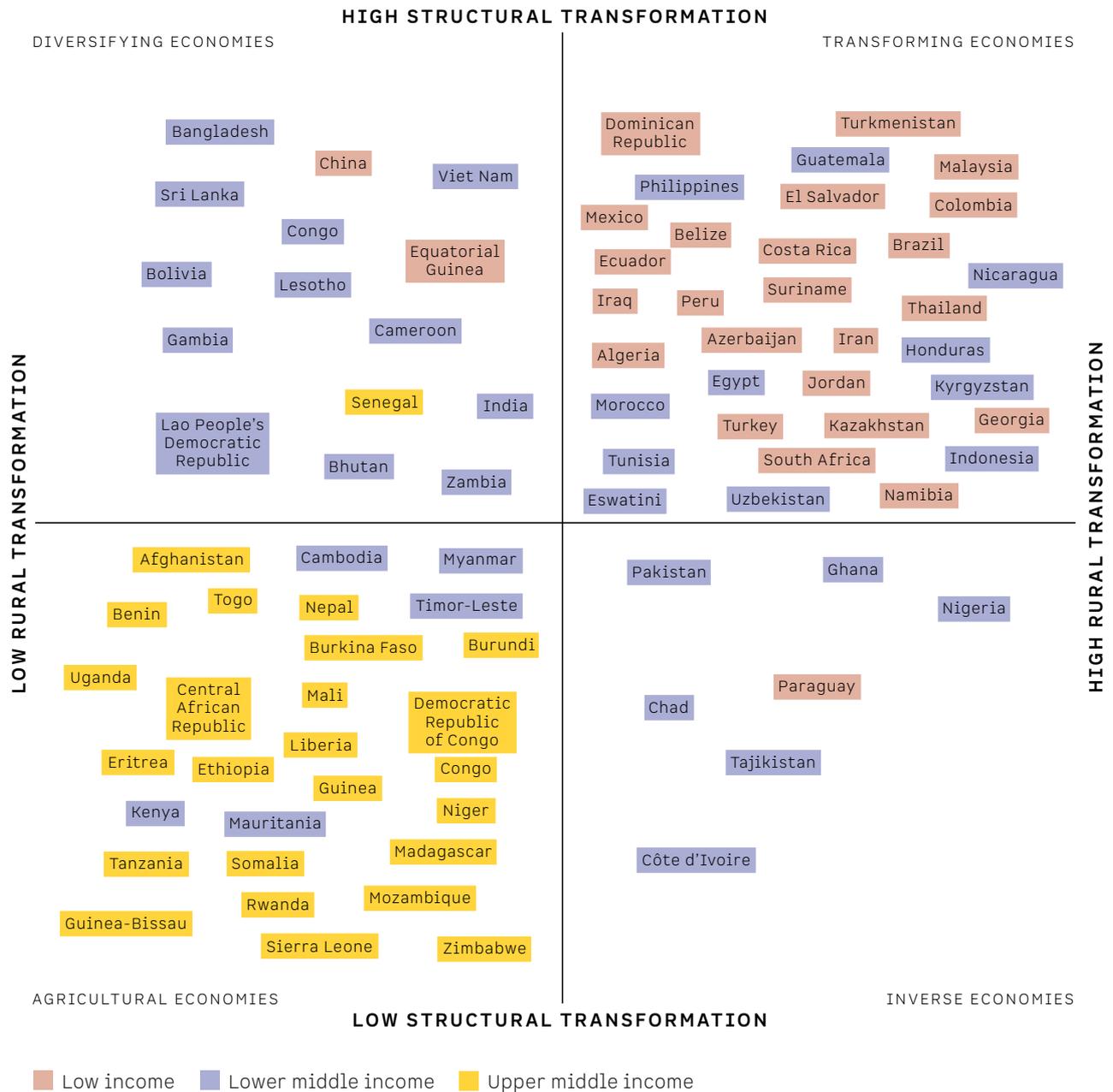
- Transformed economies: countries with high ST and high RT
- Diversifying economies: countries with high ST and low RT
- Inverse economies: countries with low ST and high RT
- Agricultural economies: countries with low ST and low RT

FIGURE A2.1 shows the categorization of countries using the *Rural Development Report 2019* data.

FIGURE A2.1 shows a high correlation between levels of transformation—especially at the extremes—where transformed economies (high-high) are primarily those of upper-middle- and lower-middle-income countries, and agricultural economies (low-low) are mostly those of low-income countries.

However, recent global changes have meant a transition of big economies such as China and India to the transforming economies group and some other smaller ones moving out of the inverse economies group, making it almost inexistent. Using up-to-date data for the typology measures also shows no clear correlation between the country categorization and relevant variables such as agricultural value added, level of agricultural employment or even poverty rates.

FIGURE A2.1 COUNTRY CATEGORIZATION AND LEVEL OF INCOME

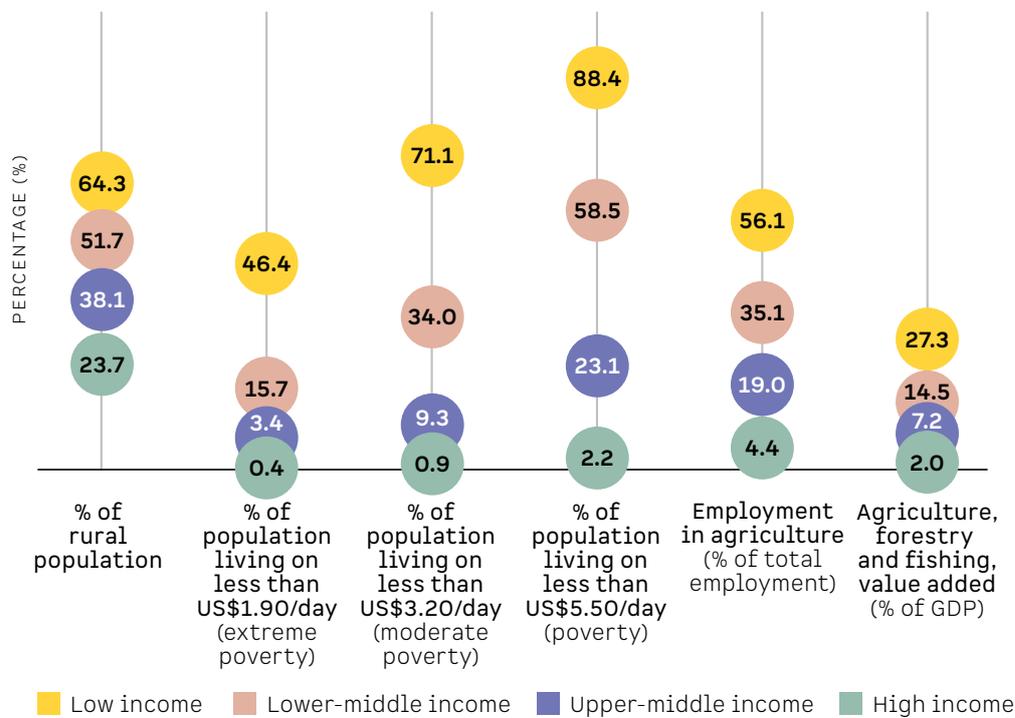


Note: The position of the countries does not reflect the actual distances from the relevant variables mean and median.

A country's level of income, however, seemed to be correlated with the different aspects examined in the report. Therefore, we use income level groups – as defined by the World Bank: high, upper-middle, lower-middle and low – to disaggregate the information. **FIGURE A2.2** shows key characteristics of the income groups.

There are further substantial differences across and within these income groups in terms of the nature of their food systems, levels of malnutrition, differential access to technology by geography and gender, among others. We explore these in detail in the following sections.

FIGURE A2.2 FOOD SYSTEMS VARY SUBSTANTIALLY BY COUNTRY INCOME, SHAPING THE OPPORTUNITIES AND CONSTRAINTS FOR DIVERSIFIED RURAL LIVELIHOODS



Note: Covers 152 countries with 7.3 billion people.

Source: World Bank 2020b and Povcal (<http://iresearch.worldbank.org/PovcalNet/povDuplicateWB.aspx>).

3 Poverty

In this section we portray the level of urban and rural poverty using different international poverty lines. We focus on extreme and moderate poverty and show the proportions of people living in poverty disaggregated by region and by income level. Information comes from different sources:



For extreme poverty disaggregated by rural and urban – World Data Lab – World Poverty Clock

<https://worldpoverty.io/> (data accessed upon request)



For poverty headcounts at the international poverty lines of US\$3.20 and US\$5.50 per day – World Bank – PovCal

<http://iresearch.worldbank.org/PovcalNet/povDuplicateWB.aspx>



For moderate poverty disaggregated by rural and urban locations – FAO (2017), The State of Food and Agriculture. Leveraging Food Systems for Inclusive Rural Transformation, Statistical Annex

https://reliefweb.int/sites/reliefweb.int/files/resources/a-I7658e_0.pdf

We use the following definitions of poverty:

Extreme poverty – The current international extreme poverty line is set at US\$1.90 a day in 2011 PPP (purchasing power parity) terms, which represents the mean of 15 national poverty lines for the poorest countries. These are the same 15 countries that defined the poverty line of US\$1.25 a day in 2005 PPP terms.

Moderate poverty – Moderate poverty is defined as the population living below the international poverty line of US\$3.20 a day in 2011 PPP terms. The US\$3.20 line is typical of low- and middle-income countries. This poverty line is an update from the previous one set at US\$3.10 a day based on new information on costs of living. In this annex, we use both these lines because the current estimates of moderate poverty have not been disaggregated by rural and urban locations.

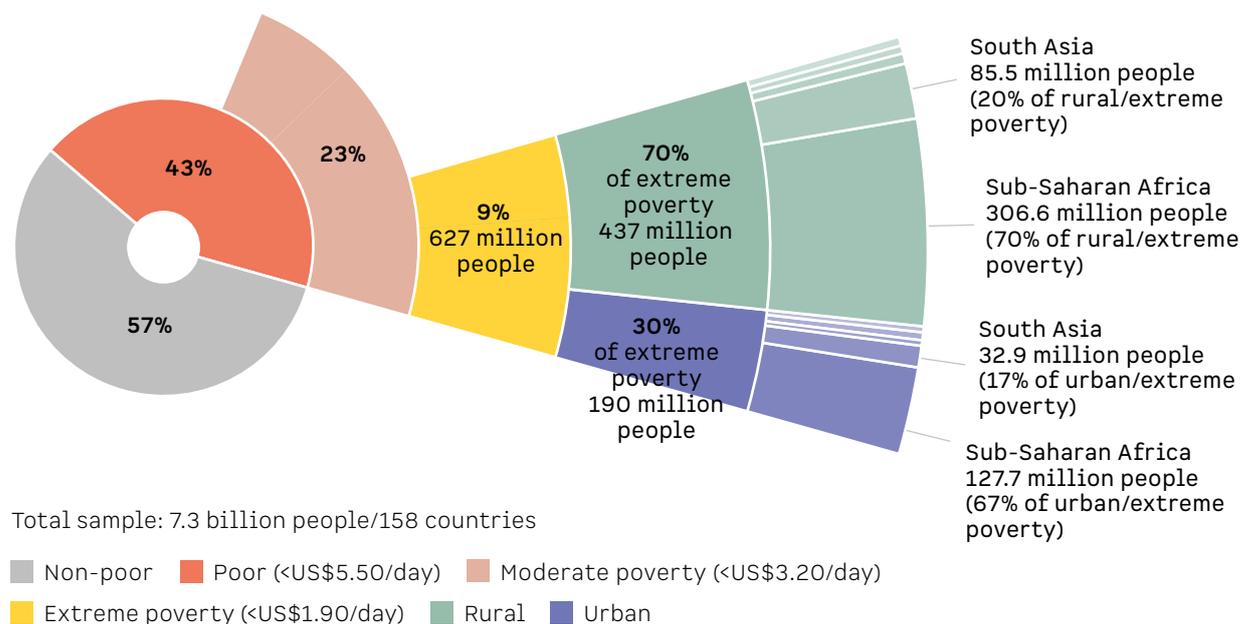
Poverty – This is broadly defined as the population living below the international poverty line of US\$5.50 a day in 2011 PPP terms. This line is typical of upper-middle-income countries.

Extreme poverty in rural and urban areas by geographic regions

We have complete data on poverty estimates at the different international poverty lines, including for extreme poverty disaggregated by urban and rural locations, for 158 countries, with a total population of 7.3 billion people (about 96 per cent of the global population) in 2018.

TABLE A2.1 EXTREME POVERTY ESTIMATES COVERAGE BY REGION

	NUMBER OF COUNTRIES	TOTAL POPULATION
East Asia and the Pacific	20	2 282 269 984
Europe and Central Asia	48	904 785 417
Latin America and the Caribbean	23	556 070 437
Middle East and North Africa	14	377 659 243
North America	2	361 184 720
South Asia	7	1 772 312 556
Sub-Saharan Africa	44	1 059 470 860
Total	158	7 313 753 217

FIGURE A2.3 EXTREME POVERTY IS BECOMING CONCENTRATED IN RURAL AREAS, PARTICULARLY IN SUB-SAHARAN AFRICA


Source: Authors' elaboration using information from the World Poverty Clock and Povcal.
<http://iresearch.worldbank.org/PovcaINet/povDuplicateWB.aspx>.

Based on this sample, 43 per cent of the global population are poor at the broadly defined poverty line, 23 per cent moderately poor and 9 per cent extremely poor.¹ Of the extremely poor group, 70 per cent live in rural areas and the other 30 per cent in urban areas. The extremely poor in rural areas are highly concentrated in the sub-Saharan region (70 per cent) and in South Asia (20 per cent).



Extreme poverty is largely concentrated in rural areas and in sub-Saharan Africa.

Seven out of 10 people living in extreme poverty reside in rural areas.

Moderate poverty

Moderate poverty estimates for urban and rural areas are not readily available from public official sources. They were commissioned from the World Bank for the IFAD *Rural Development Report 2016*. The figures were reproduced in the statistical annex of the FAO 2017 report, *Leveraging Food Systems for Inclusive Rural Transformation*.

Moderate poverty was defined then as the population living on less than US\$3.10 per capita per day (see poverty definitions above). Using these data and complementing them with the upper-middle-income countries poverty line of US\$5.50 left us with complete information for 90 countries, representing 5.8 billion people (or 76 per cent of the world's population), using 2018 population estimates.

TABLE A2.2 MODERATE POVERTY ESTIMATES COVERAGE BY REGION

	NUMBER OF COUNTRIES	TOTAL POPULATION
East Asia and the Pacific	10	1 998 570 545
Europe and Central Asia	6	126 450 021
Latin America and the Caribbean	19	553 223 890
Middle East and North Africa	7	305 239 499
South Asia	7	1 772 312 556
Sub-Saharan Africa	41	1 028 301 670
Total	90	5 784 098 181

¹ These figures are in line with those reported in the World Bank Poverty and Shared Prosperity Report (2020), which states: "About a quarter of the global population is living below the US\$3.20 poverty line, and almost half is living below the US\$5.50 line, compared with less than a 10th living below US\$1.90." This means that adding urban/rural disaggregated figures and limiting our sample to the information available does not seem to have affected or biased our sample.

With this reduced sample, poverty at the US\$5.50 a day line increases to 52 per cent. This is explained by the fact that the new sample (of 90 countries) excludes high-income countries. Moderate poverty, in turn, is 39 per cent. While this is again explained by the sample, the increase also has to do with the time of the surveys on which the figures are based: the surveys were conducted between 1992 to 2013, with 73 per cent carried out between 2009 and 2012. According to the World Bank, the global moderate headcount ratio in 2011, when most of the surveys were conducted, was 32.9 per cent. While we acknowledge that these figures are not directly comparable, it is a good reference point to deduce how great or small the bias in our sample is.

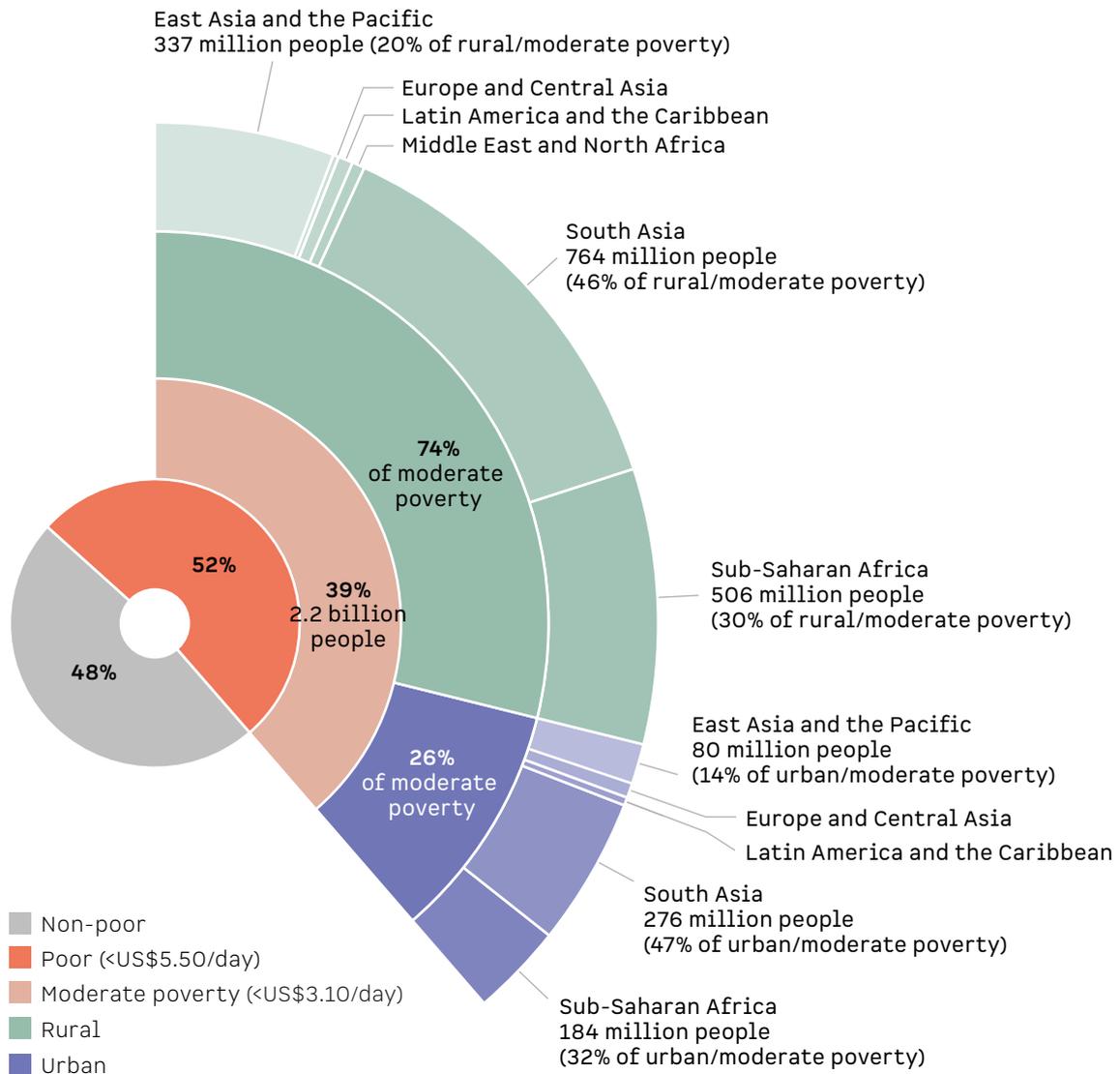
In this sample, 74 per cent of those living in moderate poverty live in rural areas and 26 per cent in urban areas. The former are concentrated largely in South Asia (46 per cent), sub-Saharan Africa (30 per cent) and East Asia and the Pacific (20 per cent).



Moderate poverty is largely concentrated in rural areas and in South Asia, sub-Saharan Africa and East Asia and the Pacific.

1.5 billion people who are moderately poor live in rural areas.

FIGURE A2.4 MODERATE RURAL POVERTY AND INEQUALITY REMAIN HIGH ACROSS EAST ASIA AND THE PACIFIC, SOUTH ASIA AND SUB-SAHARAN AFRICA, PREDOMINANTLY IN RURAL AREAS



Source: FAO (2017) for moderate poverty and Povcal <http://iresearch.worldbank.org/PovcalNet/povDuplicateWB.aspx> for poverty at \$5.50 a day.

4 Food security and nutrition

A global double burden of malnutrition

Even though food security and nutrition have greatly improved in the 25 years between 1990 and 2015, the world is far from achieving zero hunger and undernutrition for children. At the same time, adult moderate and high overweight has become an accompanying concern. In this section we explore these issues using the food security and nutrition (FSN) typology developed by FAO and the International Food Policy Research Institute (IFPRI).



For FSN typology - FAO and IFPRI (2020) Progress towards ending hunger and malnutrition. A cross-country cluster analysis

<https://doi.org/10.4060/ca8593en>



For data and tables - IFPRI Progress towards ending hunger and malnutrition. A cross-country cluster analysis., Food Security Portal

<https://www.foodsecurityportal.org/node/62>

According to FAO and IFPRI (2020), countries can be classified into six categories of food security and nutrition situations:²

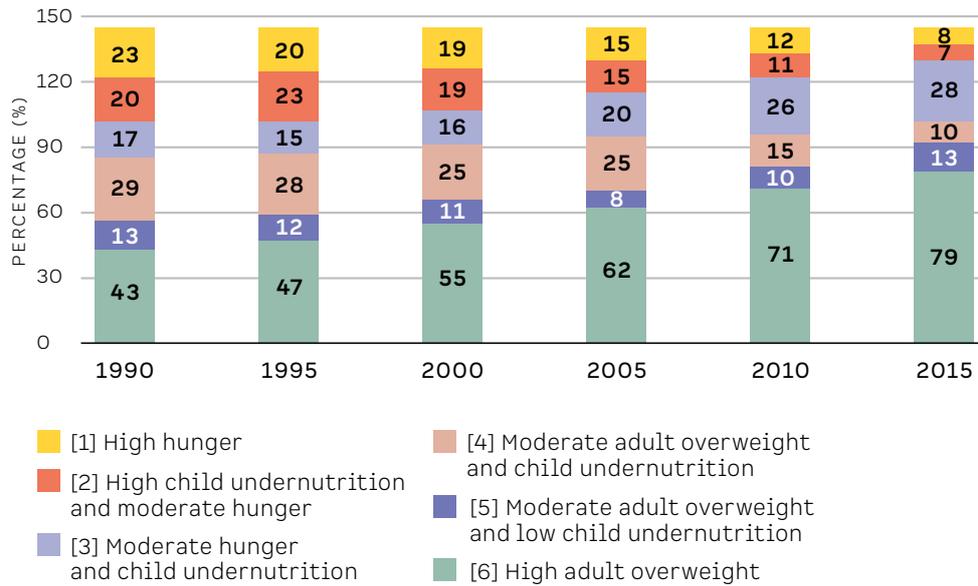
1. High hunger and high child undernutrition
2. Moderate hunger but high child undernutrition
3. Moderate hunger and moderate child undernutrition
4. Moderate child undernutrition and moderate adult overweight
5. Low child undernutrition and moderate adult overweight
6. No hunger, but high adult overweight

FIGURE A2.5 uses five-year intervals between 1990 and 2015 to show the change in the size of the six different FSN categories over this 25-year period. This analysis is based on a total of 145 countries.



While there are still a number of countries that have not yet solved the problem of hunger and child undernutrition, an increasing number are now facing the problem of high prevalence of adult overweight and obesity, resulting in a global double burden of malnutrition.

² Only two countries, the Republic of Korea and Japan, have managed to eradicate hunger and child undernutrition, while keeping adult overweight and obesity to a minimum (FAO and IFPRI, 2020, p.ix).

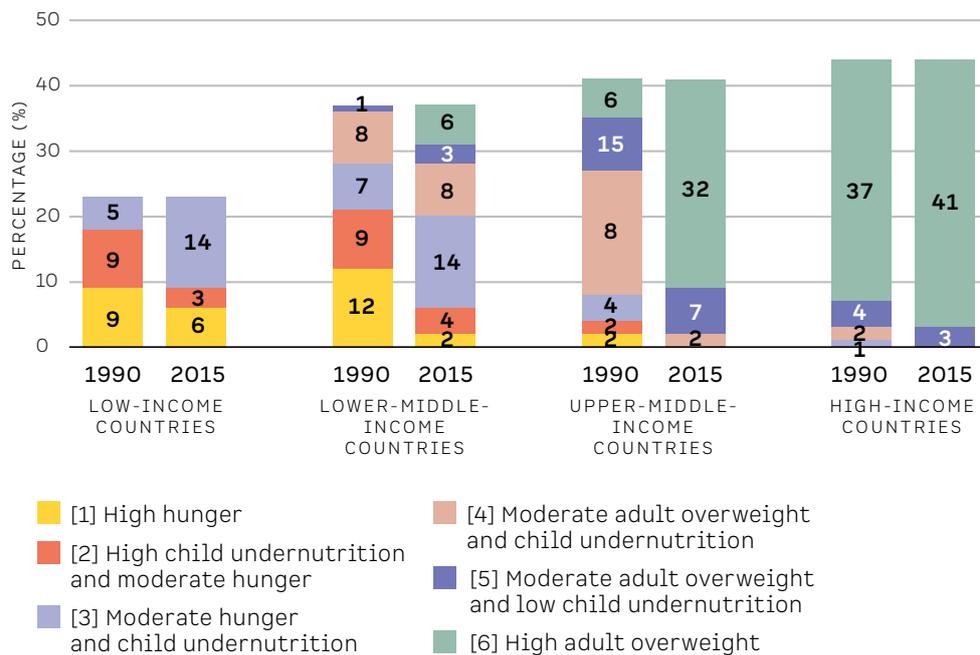
FIGURE A2.5 UNDERNUTRITION UP – OVERNUTRITION ALSO UP

Source: <https://www.foodsecurityportal.org/node/62>.

During the 25-year period, the global progress made in reducing undernutrition has been accompanied by increasing overnutrition and obesity. Although 36 countries out of 145 have moved from categories that had higher levels of child undernutrition and hunger between 1990 and 2015 into categories 5 and 6, which have low or no child undernutrition, 53 were still dealing with child undernutrition in 2015. During this same period, the number of countries with a high prevalence of adult overweight and obesity increased from 43 to 79.

Using income-level groups, we are able to show in **FIGURE A2.6** how our different economies fare in these six different food security and nutrition situations.

FIGURE A2.6 NUMBER OF COUNTRIES IN FOOD SECURITY AND NUTRITION CLUSTERS BY INCOME LEVEL, 1990-2015



Source: Authors' elaboration based on <https://www.foodsecurityportal.org/node/62>.



Low-income countries are still battling with high levels of hunger and child undernutrition in 2015. High-income countries, on the other hand, have drastically shifted to high levels of adult overweight and obesity.

FIGURE A2.6 compares the number of countries in the six FSN types in 1990 and 2015 using the four income-level groups. The figure shows that as income increases, adult overweight becomes more prevalent. Hunger and child undernutrition is a problem in low-income countries and adult overweight is a problem in high-income countries. This means that middle-income countries – especially those in the lower-middle income group – carry the double burden of malnutrition.

Food availability and healthy diets

The previous section highlights the need to be producing and consuming more diverse and nutrient dense diets. In this section we focus on this aspect by showing the mismatch between a healthy diet and food that is available for consumption.

Information comes from the following sources:



EAT-Lancet Commission (2019). Food Planet Health: Healthy Diets From Sustainable Food Systems. *Summary Report of the EAT-Lancet Commission*. <https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/>



FAO (2020). The State of Food Security and Nutrition in the World (SOFI). FAO. <http://www.fao.org/publications/sofi/2020/en/>

The targets for a planetary health diet have been adapted from EAT-Lancet Commission (2019, p. 10).³ It is worth noting that the healthy diet targets do not aim to prescribe an exact diet. Instead, they outline the food groups and food intakes that, when combined in a diet, have empirically been shown to optimize human health. A more detailed analysis would require an adaptation to reflect the culture, geography and demography of the population and individuals. Therefore, the targets used here should be considered a benchmark for analysis.



The EAT-Lancet Commission (2019) planetary health diet has a slightly lower intake of macronutrients from animal sources than other diets as it takes into account the environmental cost of protein sources. Conversely, the recommended amount of protein from non-animal sources (such as legumes and nuts) is slightly higher.

Data on food availability for human consumption globally and across different income groups have been adapted from FAO (2020), where estimations are based on the Supply Utilization Accounts (SUAs) database of the FAO Statistics Division (currently not in the public domain). Data from 184 countries and territories for the years 2000 to 2017 were used to estimate the contribution of all food groups (combined into seven groupings) to total food supply in grams per capita per day in 2017.⁴



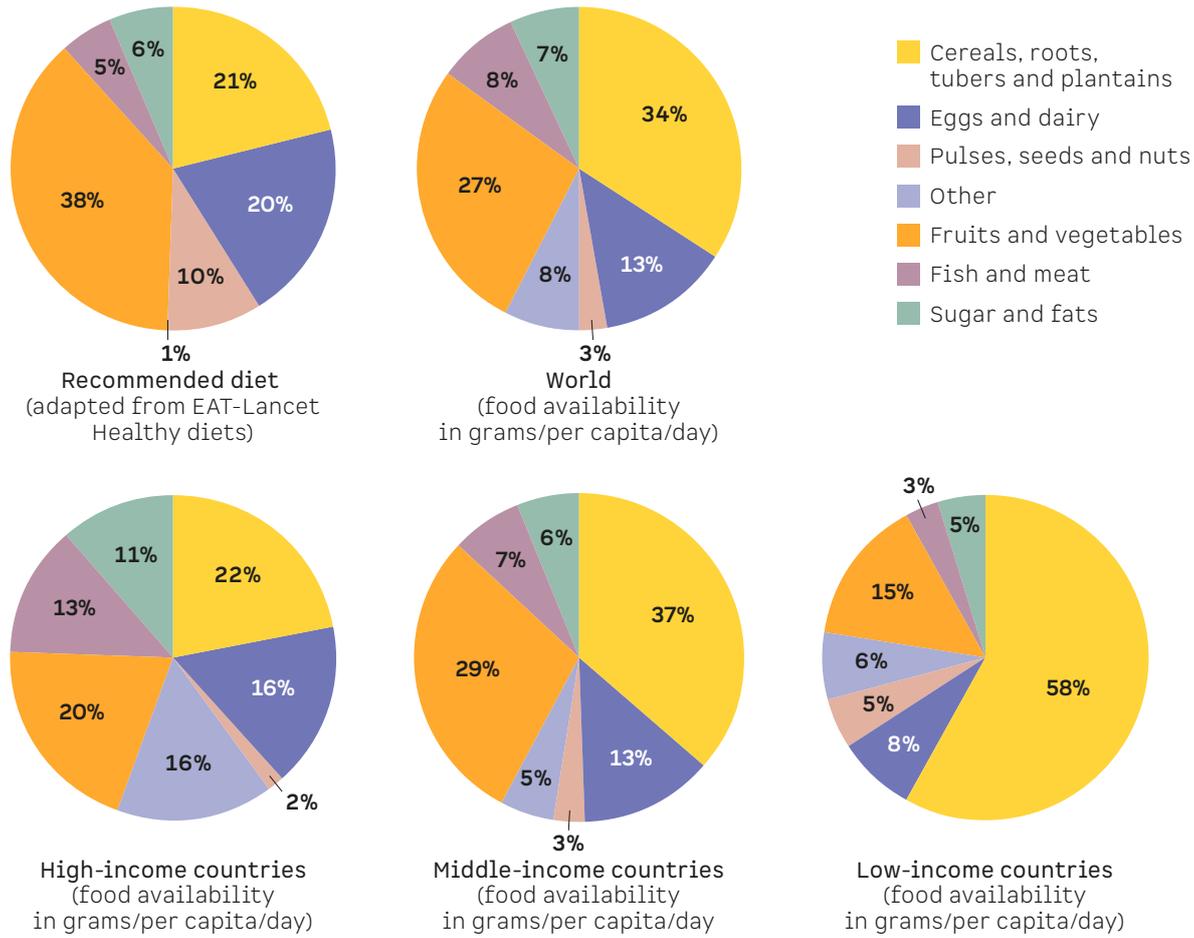
In some cases, national SUAs may not reflect production from some small farms or private households. This caveat should be considered when using and interpreting SUA data.

We use these different sources to compare the targets of food consumption by food group for a planetary health diet with the availability of food (globally, and by income level). Data for middle-income countries have been estimated as an average of data for upper-middle-income and lower-middle-income countries. The results are presented in **FIGURE A2.7**.

³ Scientific targets set here are based on an extensive review of foods, dietary patterns and health outcomes.

⁴ For more information on the methodology and food categorization, see Annex 2 of FAO (2020).

FIGURE A2.7 COMPARING RECOMMENDED DIETS WITH FOOD AVAILABILITY GLOBALLY AND BY INCOME LEVEL



Sources: [1] EAT-Lancet Commission (2019). Food Planet Health: Healthy Diets From Sustainable Food Systems. Summary Report of the EAT-Lancet Commission.

<https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/>.

[2] FAO (2020). The State of Food Security and Nutrition in the World (SOFI).

FAO. <http://www.fao.org/publications/sofi/2020/en/>.



Food availability worldwide does not match the recommended levels of food intake. This is especially true for cereals, roots, tubers and plantains, for which food availability is significantly greater than the recommended intake and for eggs and dairy, where there is a significant shortfall of availability to meet the recommended intake.



In low-income countries, the availability of cereals, roots, tubers and plantains is almost three times what is needed for a healthy and sustainable diet. In contrast, the availability of fruits and vegetables is two and a half times less than that required by the recommended diet.



In high-income countries, the availability of sugars and fats is almost double the recommended intake. The availability of pulses, seeds and nuts, on the other hand, is one fifth that of a healthy diet.

Globally, the availability of food for human consumption by different categories does not reflect the necessities for a healthy, sustainable diet. To achieve healthy and sustainable diets, global efforts should be directed not only to realign global production to effective needs, but particularly to ensure equal access to the diverse food groups to all. In 2017, cereals, roots, tubers and plantains represent the highest contribution to global total food availability (34 per cent), approximately 10 per cent more than actually required by healthy, sustainable diets. Fruits and vegetables, on the contrary, represent a smaller contribution (27 per cent), which is approximately 10 per cent less than needed to sustain healthy diets. Food availability is also deficient in pulses, seeds and nuts, and eggs and dairy.

Food availability versus food needs for a healthy diet is very different when looking at income levels. In low-income countries, cereals, roots, tubers and plantains represent nearly 60 per cent of all food available by weight in 2017, which is almost three times the actual needs for a healthy, sustainable diet. Fruits and vegetables, on the other hand, amount to only 15 per cent, which is about two and a half times less than the recommended intake.

The availability of food from animal sources (fish, meat, eggs and dairy) is higher in high-income countries, at 29 per cent, where only 25 per cent is needed for a healthy diet that requires other protein sources; and lower in low-income countries (11 per cent), where the availability of food from animal sources does not meet the requirements of a healthy, sustainable diet.

High-income countries have the highest availability of sugars and fats in proportion to other food groups (11 per cent) and 16 per cent of their food availability consists of sweetened and alcoholic beverages, juices, stimulants, spices and condiments, and sugar-preserved fruit. However, FAO (2020) states that high-income countries had the smallest increase in percentage change in the availability of sugars and fats in previous years, while the highest increase was seen in upper-middle-income countries.

5 Gender

Gender productivity gaps

In 2014, the World Bank and the ONE Campaign produced a report that looked into the causes of gender gaps in farming productivity in six sub-Saharan African countries that comprise more than 40 per cent of the region's population. Data come from household surveys conducted in the late 2000s and early 2010s.

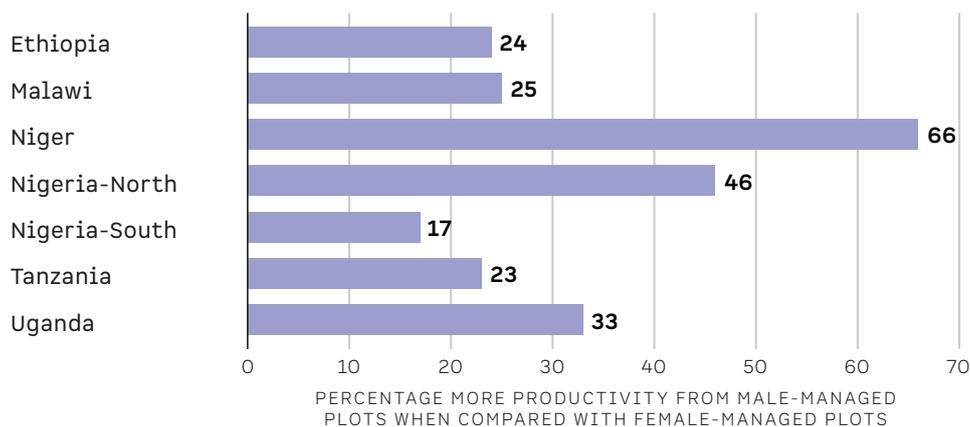


Integrated Surveys on Agriculture (LSMS-ISA). Analysis presented in World Bank and the ONE Campaign (2014) *Levelling the Field. Improving Opportunities for Women Farmers in Africa*.

<https://www.worldbank.org/en/region/afr/publication/levelling-the-field-improving-opportunities-for-women-farmers-in-africa>

The analysis shows that, when comparing simple averages, gender gaps in agriculture range from 13 per cent in Uganda to 25 per cent in Malawi. However, if the comparisons take into account plot size and geographic factors, gender gaps range from 23 per cent in Tanzania to 66 per cent in Niger. This suggests that, in Niger, plots managed by men of a similar size and in a similar geographic context to plots managed by women produce on average 66 per cent more per hectare. The results are presented in **FIGURE A2.8**.

FIGURE A2.8 GENDER GAPS IN AGRICULTURAL PRODUCTIVITY, CONTROLLING FOR PLOT SIZE AND SUBNATIONAL REGION



Note: The gap in southern Nigeria is not statistically significant, probably because of a relatively small sample size.

Source: Taken from World Bank, ONE Campaign (2014), p.9.



In similar contexts and similar sized-plots, men-managed plots produced between 24 per cent and 66 per cent more than women-managed plots.

The key factors correlated with gender productivity gaps were:

- Labour poses the main barrier to achieving equality in productivity across all the countries profiled
 - On average, female farmers tend to live in smaller households with fewer men. Consequently, they have fewer household members to provide labour on the farm.
 - Female farmers also face challenges in hiring effective outside labour.
 - Women typically assume a larger role than men in childcare and household responsibilities, which is likely to restrict their ability to work on their own farms or manage their labourers.
- There are significant differences in the use of and returns on inputs such as fertilizers.
- Women have less access and control over land, both of which are critical to agricultural investment.
- Women have less access to knowledge and information on farming methods.



Structural inequalities explain why plots managed by women cannot reach the same productivity levels as plots managed by men.

Agricultural wage gap

In this section we use data from the International Labour Organization (2019) to look at the agricultural wage gap (pennies on the dollar) for women's monthly earnings in agricultural employment compared with men's monthly earnings for our four-country categorization.



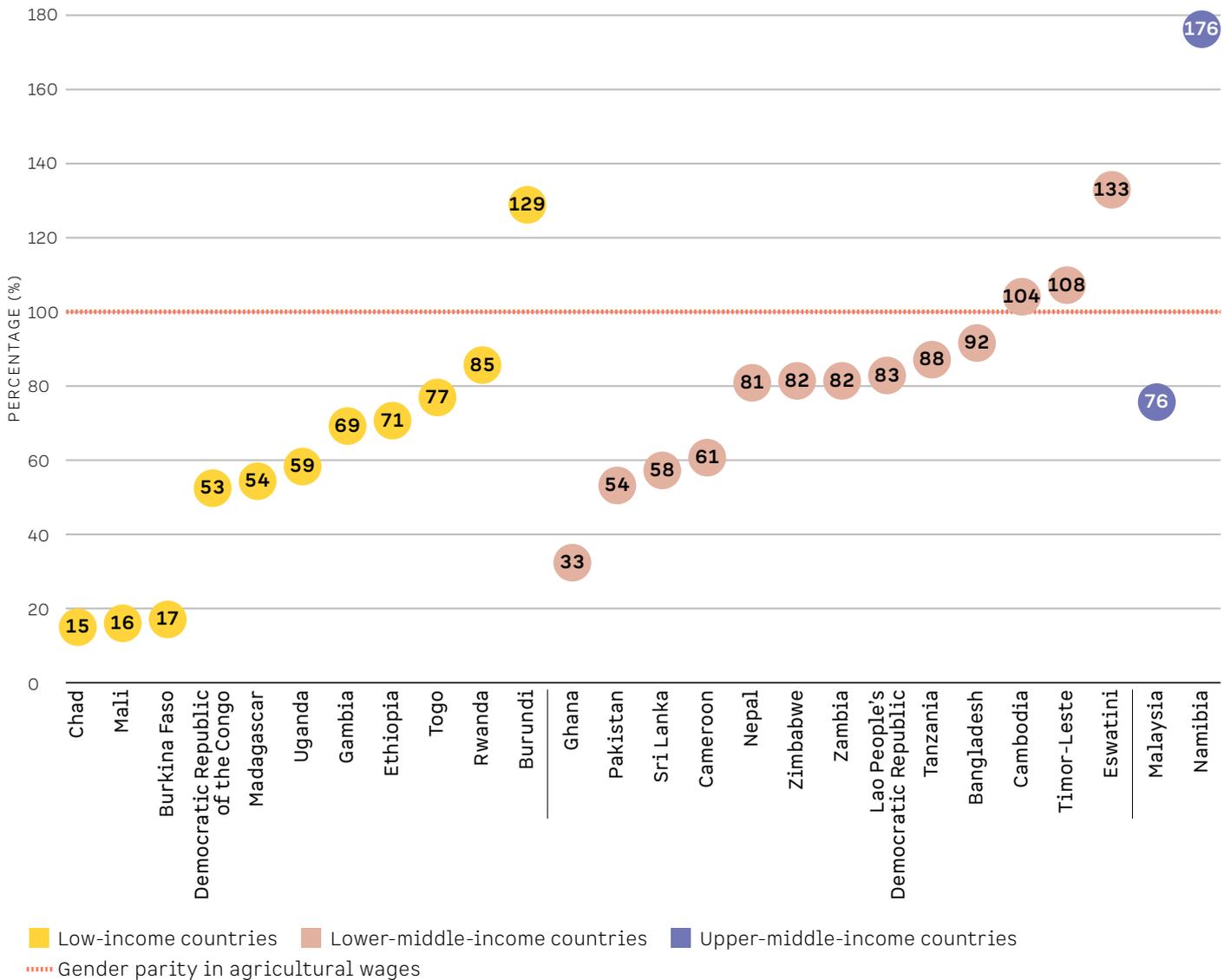
International Labour Organization (ILO) (2019). *Wages and working time statistics database*.

Available at: <https://ilostat.ilo.org/data/>. Calculations done by authors comparing average earnings for agriculture as an economic activity for men and women.



In all but a few countries, women earn less than men for work in the agricultural sector, though the gaps vary in size by country and by income level. On average, wage gaps are largest in low-income countries, with women earning as little as 15 cents for each dollar earned by men.

FIGURE A2.9 AGRICULTURAL WAGE GAP FOR WOMEN - SUBSTANTIAL AND PERSISTENT



Source: ILO, 2019.

6 Agrifood economy and employment

Agrifood systems employment: agriculture, food manufacture and food services

This section examines employment in the agrifood system (AFS). For this, we distinguish between employment in agriculture and non-farm AFS employment.



ILOSTAT (2021) Employment by sex and economic activity - ISIC level 2 (thousands). Downloaded from ILOSTAT. Last update on 7 March 2021.
<https://ilostat.ilo.org/data/>



As the ISIC differentiation does not allow for an easy extrapolation of retail employment in the food system (e.g. food markets) from other retail employment, the non-farm employment only includes workers in food, beverage and tobacco manufacturing and in food and beverage service activities, underestimating the food-related employment outside the farm gate.

FIGURE A2.10 uses the latest data available from the ISIC level 2 ILO database for the year range 2012-2020. The Y axis shows the share of agricultural employment in total employment – blue dots – and the share of non-farm employment in total employment – orange dots. The X axis shows employment in food systems as a percentage of total employment.⁵

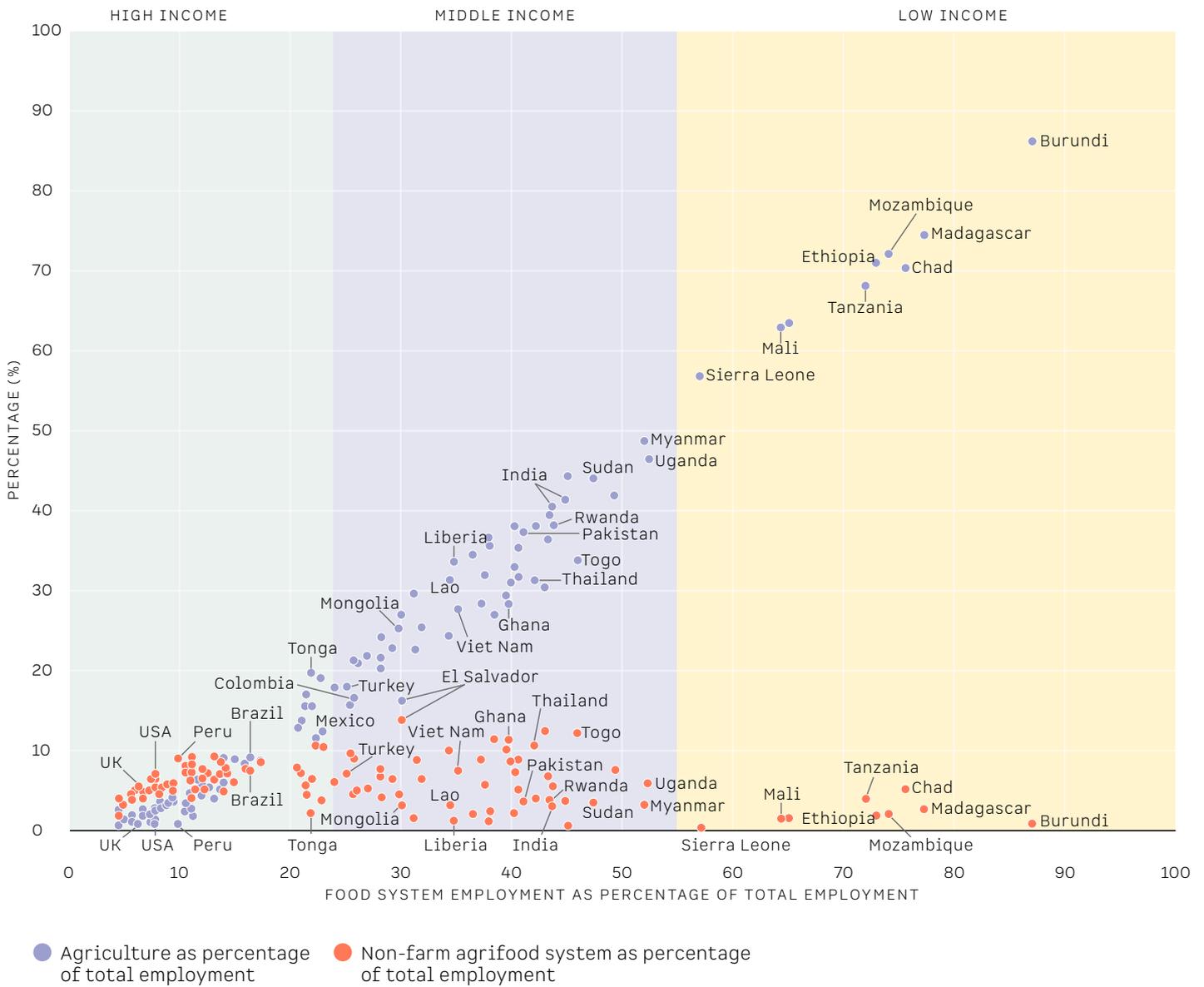
Countries with lower agricultural employment tend to have a lower share of employees in the general agrifood system. The lower the income, the higher the reliance on agriculture for employment. Non-farm employment slightly increases with income but does not seem to make a great difference in substituting the loss in agricultural employment. It is worth noting that data availability means that the non-AFS employment does not consider employment in food retail and, hence, employment in non-farm food-related activities may be underestimated.



Countries with a higher percentage of the population employed in food systems have higher agricultural employment. Generally, the lower the income level, the larger the proportion of employment in agricultural activities and the share of employment in food systems. Non-farm employment (manufacturing plus food and beverage service activities) does not seem to vary with income.

⁵ The share of employment in food systems is calculated as the sum of agricultural and non-farm AFS employment.

FIGURE A2.10 AGRICULTURAL AND NON-FARM EMPLOYMENT IN FOOD SYSTEMS AS PERCENTAGE OF TOTAL EMPLOYMENT (Y AXIS) WITH FOOD SYSTEMS EMPLOYMENT AS PERCENTAGE OF TOTAL EMPLOYMENT (X AXIS) (LATEST DATA, 2012-2020)



Agrifood system employment: comparing East and Southern Africa, India, Brazil, and the United States of America

This section examines employment in the agrifood system in four geographic areas: East and Southern Africa, India, Brazil, and the United States of America. Shares of employment in agriculture, food manufacture, food services and retail and other sectors are presented both as a percentage of food system employment and as a percentage of total employment. This section takes a more comprehensive look at food systems by including employment in food markets and retail.



For Brazil: Moreira et al. (2016) Assessment of the Economic Structure of Brazilian Agribusiness (table 4).

<https://www.hindawi.com/journals/tswj/2016/7517806/>



For East and Southern Africa: Tschirley et al. (2015) Africa's unfolding diet transformation: implications for agrifood system employment (p.108)

<https://www.emerald.com/insight/content/doi/10.1108/JADEE-01-2015-0003/full/html> (based on LSMS surveys in Ethiopia, Malawi, Mozambique, Tanzania, Uganda and Zambia).



For India: Data on agriculture, food manufacture, and total employment from LOSTAT (2021) Employment by sex and economic activity - ISIC level 2 (thousands). Downloaded from ILOSTAT. Last update on 7 March 2021.

<https://ilostat.ilo.org/data/>; and total amount of non-farm employment from Can India's 21 million food enterprises withstand the impact of COVID-19?, Working paper.



For United States of America: USDA (2012). Agriculture and its related industries provide 9.2 per cent of U.S. employment.

<https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail?chartId=77216>

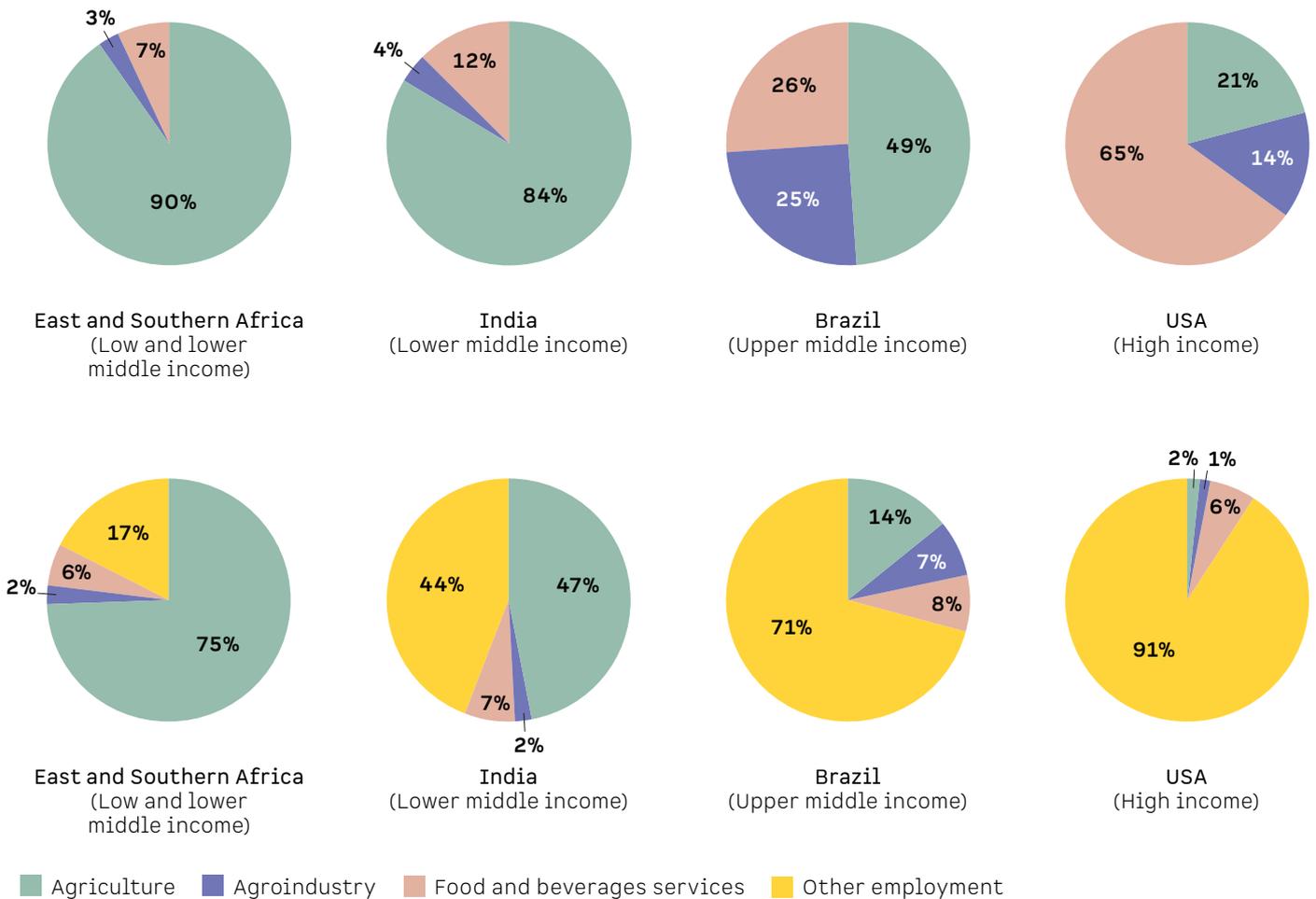
Non-farm employment (in manufacturing and food services and retail) as a share in the food system becomes increasingly prevalent when the level of income increases. However, as a share of total employment, non-farm employment remains significant in low- and middle-income countries (in India with 56 per cent and Brazil with 29 per cent). This suggests that food systems provide significant employment opportunities outside the farm gate.



In low- and lower-middle-income countries, food systems provide important employment opportunities outside the farm gate.

FIGURE A2.11 INDICATIVE DISTRIBUTION OF EMPLOYMENT IN THE FOOD SYSTEM IN SELECTED AREAS AT DIFFERENT INCOMES COMPARED WITH DISTRIBUTION AS PART OF TOTAL EMPLOYMENT

AS A SHARE OF FOOD SYSTEM EMPLOYMENT



Note: Data are from 2010 for East and Southern Africa, from 2011 for Brazil, and from 2012 for India and USA.

Time allocation in agrifood employment by geographic region

This section examines employment in the agrifood economy in 13 countries in Asia, sub-Saharan Africa and Latin America by measuring the time spent in any economic activity or job. It uses the concept of full-time equivalent (FTE). Data come from household surveys (Living Standards Measurement Studies [LSMS] and national surveys) and are presented in Dolislager et al. (2019).



For data: Dolislager et al. (2019) Youth agrifood system employment in developing countries: a gender differentiated spatial approach, Research Series 43, IFAD
<https://bit.ly/3bhK5aW>

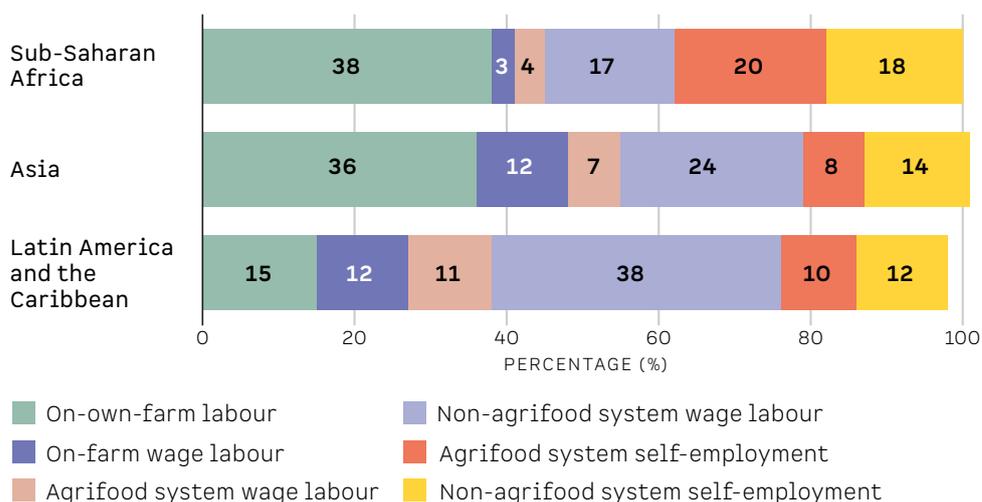
LSMS data have been collected in Ethiopia, Malawi, Niger, Nigeria, Tanzania and Uganda for sub-Saharan Africa; Bangladesh, Cambodia, Indonesia and Nepal for Asia; and Mexico, Nicaragua and Peru for Latin America.

The analysis considers time spent in economic activities or jobs in farms, non-farm in the AFS; and other non-agrifood-related activities. AFS employment is employment in agricultural and food product processing, logistics, wholesale, retail, and food service (such as food stalls), other than on-farm production.

The main categories are further divided into “own” economic activities in self-employment or family activities; and “wage” jobs carried out in economic activities owned by others.

Dolislager et al. (2019) divided the population densities of the 13 study countries into quartiles that represent rural-urban gradients (four zones). The densest quartile represents urban areas. The rural areas are split into the second densest zone (peri-urban), the third densest (intermediate), and the least dense (hinterland). We combined the three least dense quartiles (peri-urban, intermediate and hinterland) in an average to estimate the time allocation in different work activities in rural areas. The results are presented in **FIGURE A2.12** and **FIGURE A2.13**.

FIGURE A2.12 ESTIMATED TIME ALLOCATION BY LABOUR CATEGORY IN RURAL AREAS, BY GEOGRAPHIC REGION SYSTEM



Notes: [1] Agrifood system employment is all other food system activities other than on-farm production.

[2] The figures are population weighted estimates from household surveys in 13 countries detailed above.

Source: Authors' elaboration based on Dolislager et al. (2019).



Latin America and the Caribbean is the region where the rural labour force spends comparatively less time in agrifood-related activities (48 per cent); in Asia and sub-Saharan Africa time spent by the labour force on agrifood-related activities amounts to 63 per cent and 65 per cent, respectively.



The amount of time spent on own-farm labour is similar in rural areas in sub-Saharan Africa and Asia - but more than double than time spent by the labour force on own farms in countries of Latin America and the Caribbean.



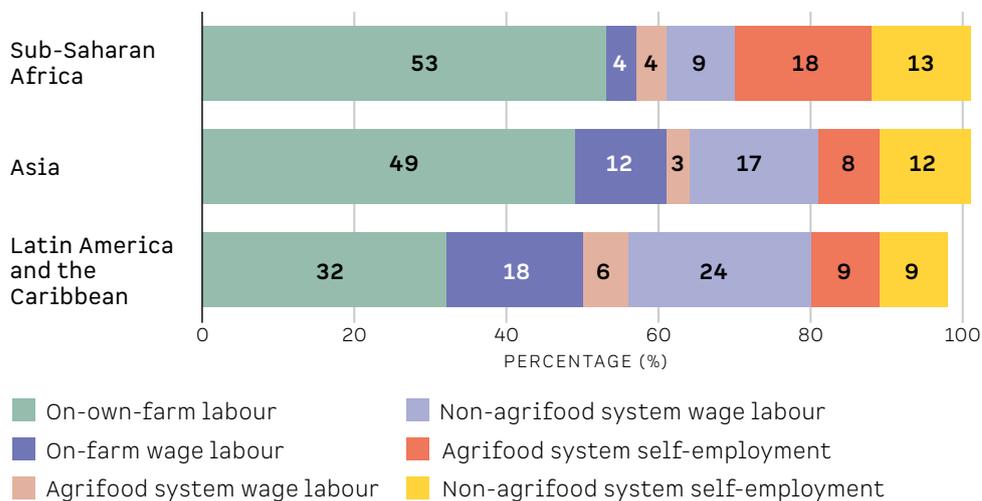
Although the percentage of time spent on farm work is much lower in rural areas of Latin America and the Caribbean (27 per cent compared with 41 per cent in sub-Saharan Africa and 48 per cent in Asia), time spent on non-farm AFS activities is comparable to, or higher than, that of the other regions (21 per cent, compared with 24 per cent in sub-Saharan Africa and 15 per cent in Asia). According to Dolislager et al. (2019), “this suggests that even as rising agricultural productivity in richer countries sends labour off the farm, and non-AFS sectors begin to dominate employment opportunities, increased value in off-farm AFS subsectors can continue to provide employment opportunities.”

FIGURE A2.13 shows the breakdown of labour time allocation in the hinterlands defined by the authors as the least densely populated quartile in each survey. In the hinterlands, individuals spend more of their time in agrifood system-related activities. Work in the agrifood system accounts for 79 per cent of labour time in sub-Saharan Africa, 72 per cent in Asia and 65 per cent in Latin America and the Caribbean.



The labour force in the hinterland of all three regions spends a significant amount of time in farming and agrifood-related activities, the highest being in sub-Saharan Africa (87 per cent) and the lowest in Asia (70 per cent).

FIGURE A2.13 TIME ALLOCATION BY LABOUR CATEGORY WITHIN AND OUTSIDE THE FOOD SYSTEM IN THE HINTERLANDS



Source: Authors' elaboration based on Dolislager et al. (2019).

7 Rural household economic and employment diversification

Rural household income diversification

Rural household diversification data come from the Rural Household Multiple Indicator Survey (RHoMIS), a dataset containing information on 13,310 farm households in 21 countries gathered through a standardized questionnaire.



Rural Household Multiple Indicator Survey (RHoMIS)

<https://doi.org/10.7910/DVN/9M6EHS>

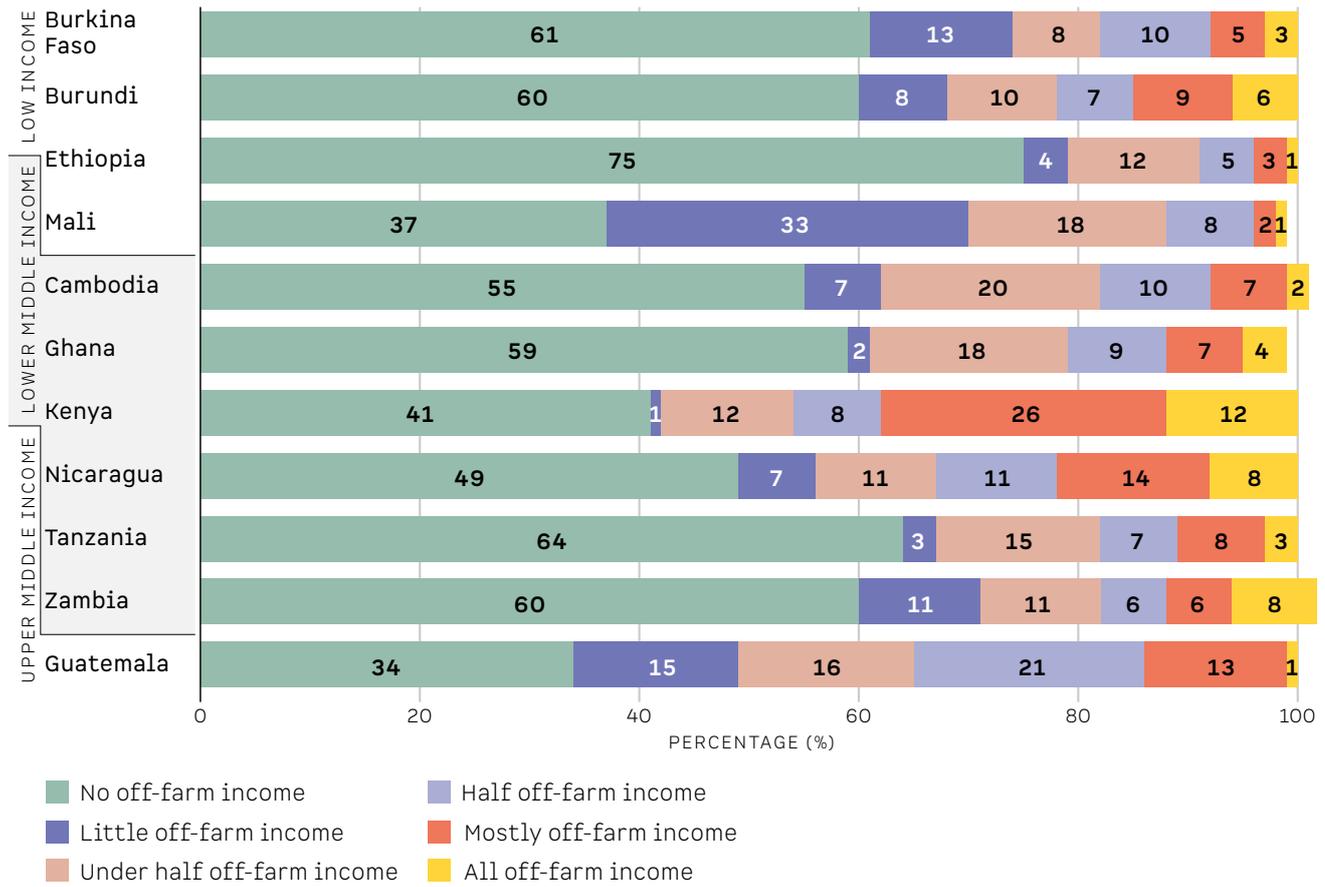
We analysed the raw data, specifically looking at the variables related to off-farm income. The survey asks respondents about the proportion of their total household income that comes from off-farm sources, and gives respondents five categories from which to choose: all (90 per cent or more), most (70-89 per cent), half (50-69 per cent), under half (11-49 per cent) and little (10 per cent or less). Further variables derived by the RHoMIS team operationalize these numerically into the following values: all (90), most (70), half (50), under half (20), little (10).

Except for Guatemala, all the countries in **FIGURE A2.14** are either low-income or lower-middle-income countries. Rural households in this sample report that at least one third of their income comes from no off-farm activities, the highest being in Ethiopia, with 75 per cent of rural households' income. The figure also shows that a minority of rural households, in low- and lower-middle-income countries alike, derive all of their income from off-farm sources, the highest being Kenya, with 12 per cent of households' incomes.



The figure highlights the importance of own-farm income for most rural households in the sample.

FIGURE A2.14 INCOME FROM OFF-FARM SOURCES IN RURAL HOUSEHOLDS IN SELECTED COUNTRIES (%)



Source: Authors' elaboration based on Rural Household Multiple Indicator Surveys.

Income sources for smallholders

Data come from FAO's data portrait of small family farms, which uses household surveys for 19 countries across the world to generate an image of how family farmers in developing and emerging countries live their lives. With the exception of Ethiopia, which uses the Ethiopian Rural Household Survey, all the surveys are nationally representative and cover urban and rural areas. Data are reported for smallholders, other (larger-scale) holders and all farmers.



Family Farming Knowledge Platform: Smallholders Data Portrait

<http://www.fao.org/family-farming/data-sources/dataportrait/income/en/>

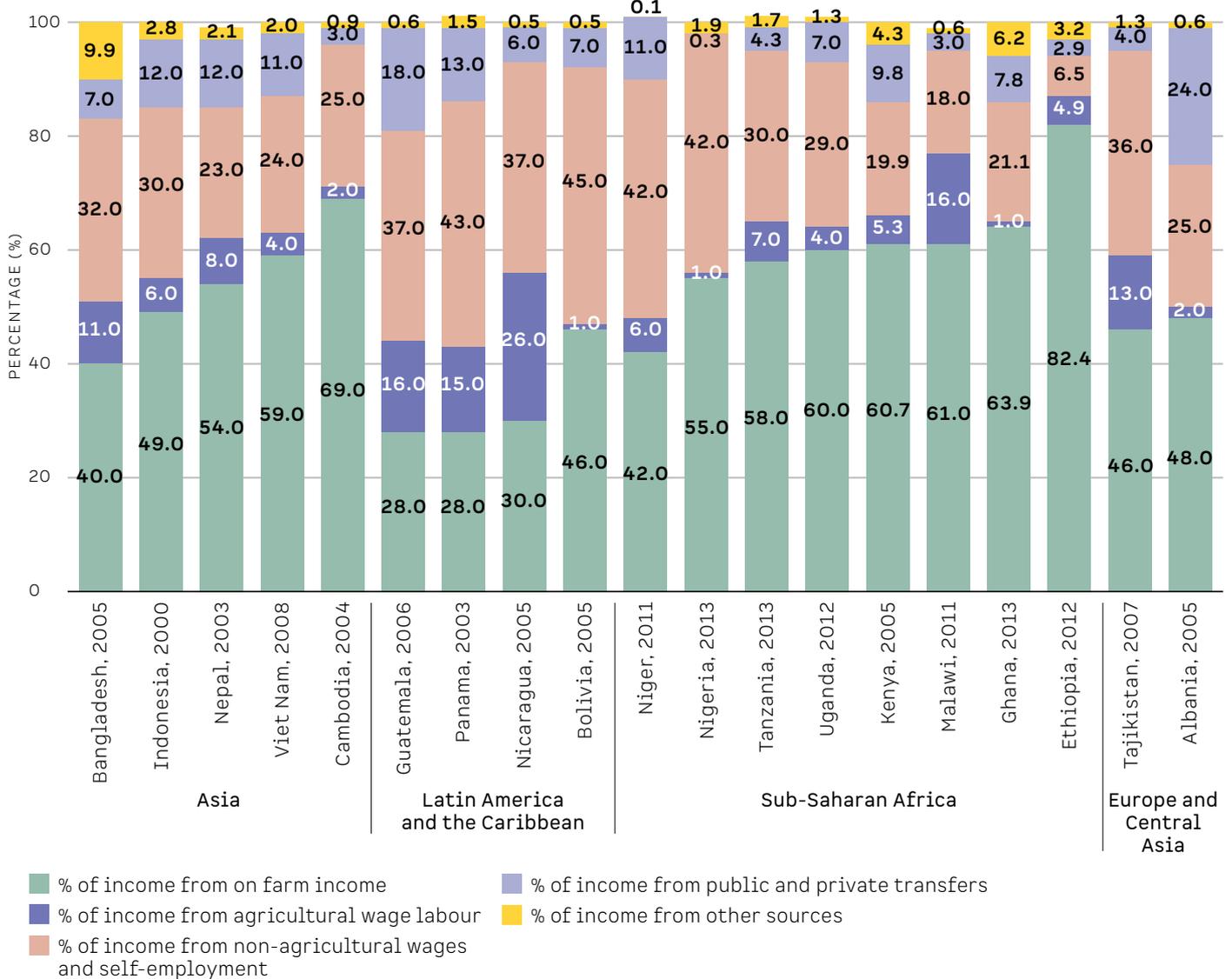
In **FIGURE A2.15** we show income sources for all farmers (not only small-scale farmers) using the following categories:

- Percentage of income from on farm income: this is the share of income from farm activities, which are crop production, crop by-products (only when it is possible to distinguish these from crop production), livestock and livestock by-products production.
- Percentage of income from agricultural wage labour: this is the share of income from paid dependent work in agriculture, both skilled and unskilled.
- Percentage of income from non-agricultural wages and self-employment: this is the share of income from non-farm sector, including both wages from non-agricultural employment and non-farm self-employed business income.
- Percentage of income from transfers, remittances: this is the share of income from private and public transfers, including pensions and social assistance.
- Percentage of income from other sources: this is the share of income from other miscellaneous sources including, for example, farm and non-farm rental income, real estate income, savings, interest or other investment income.



Most of the income of small-scale farms in sub-Saharan Africa comes from farm and agriculture labour, whereas in Latin America and the Caribbean, small-scale farms derive most of their income from non-farm and non-agricultural activities.

FIGURE A2.15 FAMILY FARMERS' INCOME SOURCES IN SELECTED COUNTRIES



Source: Authors' elaboration using data from Data Portrait of Small Family Farms.

8 Digital

In this section we focus on the digital divide and differences in rates of technological development.



GSMA Intelligence 2020. *The State of Mobile Internet Connectivity 2020*

<https://www.gsma.com/wp-content/uploads/2020/09/GSMA-State-of-Mobile-Internet-Connectivity-Report-2020.pdf>

Multiple factors need to be considered when assessing the digital divide and differences in rates of technological development. With the increasing extension of infrastructure, and the number of people living in an area without coverage of a mobile broadband network amounting to only 7 per cent (or half a billion people) in 2019, the coverage gap is not the main determinant in the access and use of digital services.

Geographical location, rural-urban areas and gender play a key role in the digital usage gap. Globally, rural populations are still 37 per cent less likely than urban populations, and women are still 20 per cent less likely than men to use mobile internet access. The gap is more accentuated in countries with lower levels of income.

Affordability, awareness and digital literacy play a key role in internet use. In low- and middle- income countries, handset affordability remains the main barrier to mobile ownership, while nearly 25 per cent of adults are not aware of mobile internet. Digital literacy and skills are more likely to be perceived as the most important barrier to adoption in rural populations when compared with urban, and among women when compared with men. Similarly, women are more likely than men to perceive skills as the most important barrier to mobile internet adoption, especially in Africa.

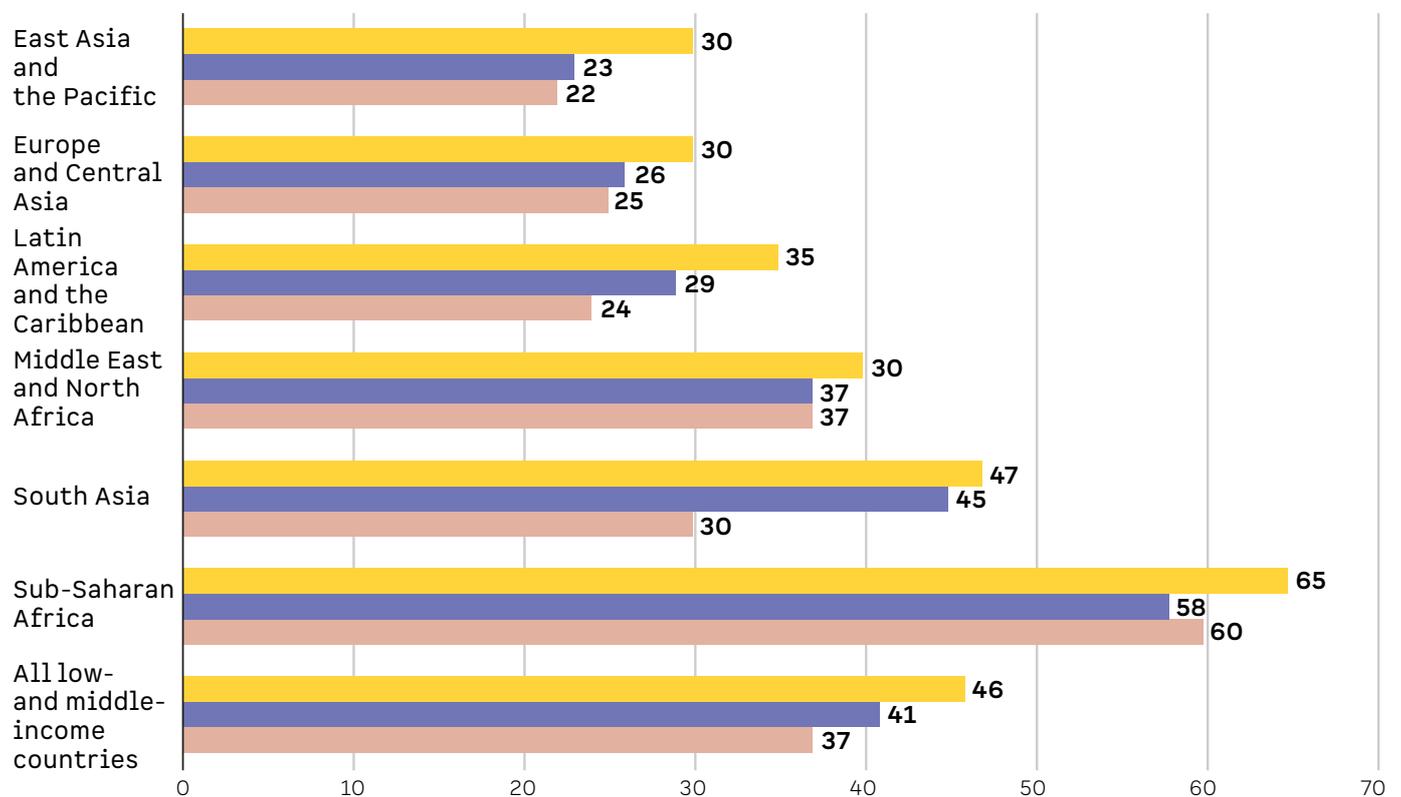
By geographic region in low- and middle-income countries

FIGURE A2.16 shows the rural-urban gap in mobile internet use. The gap refers to how much less likely a person living in a rural area is to use mobile internet than a person in an urban area.



The rural-urban gap in mobile internet adoption is reducing but remains substantial. The reduction was driven primarily by an improvement in South Asia, where the gap fell from 47 per cent to 30 per cent between 2017 and 2019.

FIGURE A2.16 RURAL-URBAN GAP IN MOBILE INTERNET USE IN LOW- AND MIDDLE-INCOME COUNTRIES, BY REGION, 2017-2019 (%)



Source: Reproduced from The State of Mobile Internet Connectivity 2020, (p. 19).

By gender in low- and middle-income countries

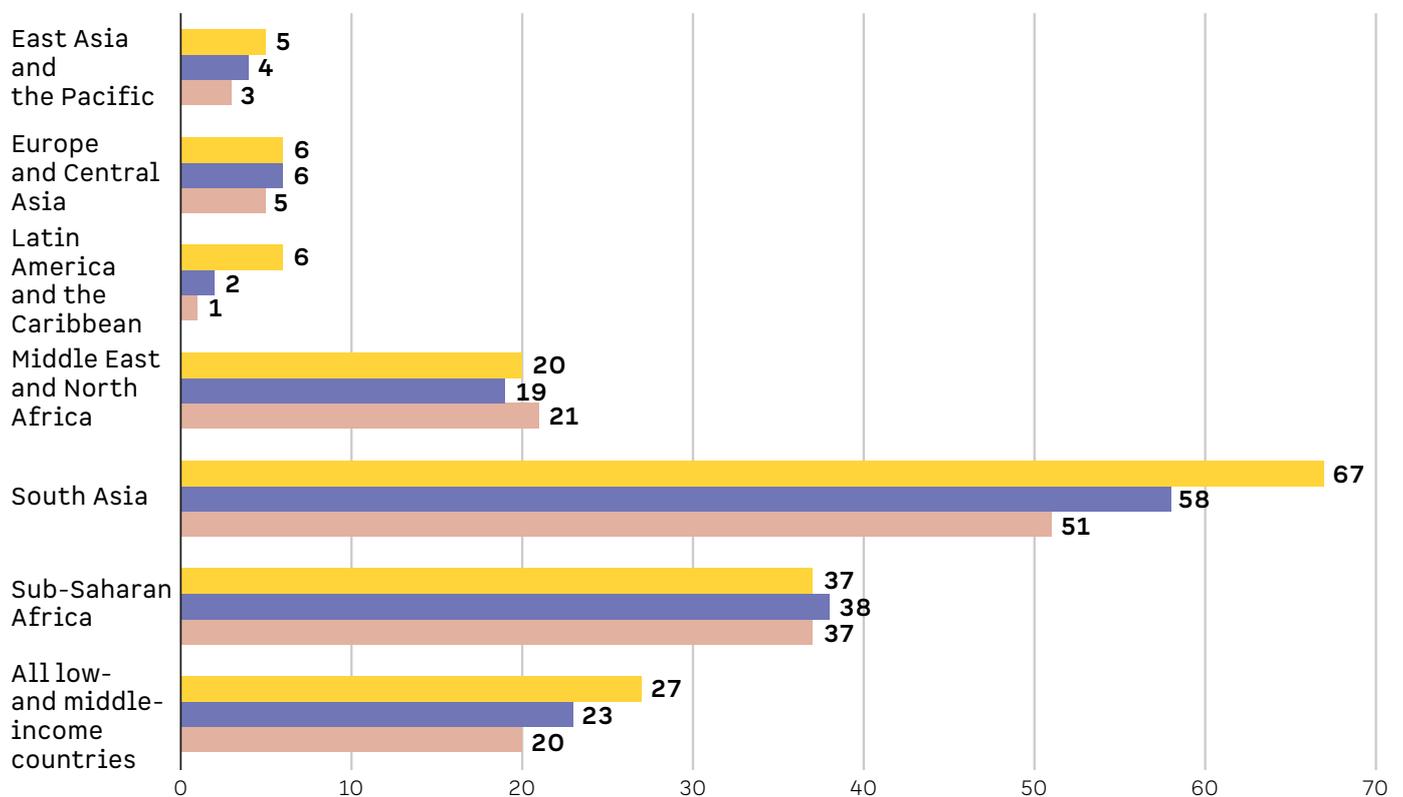


The gender gap in mobile internet use is largest in South Asia, but this is also the region with the greatest improvement between 2017 and 2019. On the other hand, the gap in sub-Saharan Africa and in the Middle East and North Africa shows no change in the same period.



Despite an overall reduction in the gender gap of mobile internet use in low- and middle-income countries from 27 per cent to 20 per cent, there are still more than 300 million fewer adult women than men using mobile internet.

FIGURE A2.17 GENDER GAP IN MOBILE USE IN LOW- AND MIDDLE-INCOME COUNTRIES, BY REGION, 2017-2019 (%)



Source: Reproduced from The State of Mobile Internet Connectivity 2020, (p. 20).

9 Social protection

By geographic regions

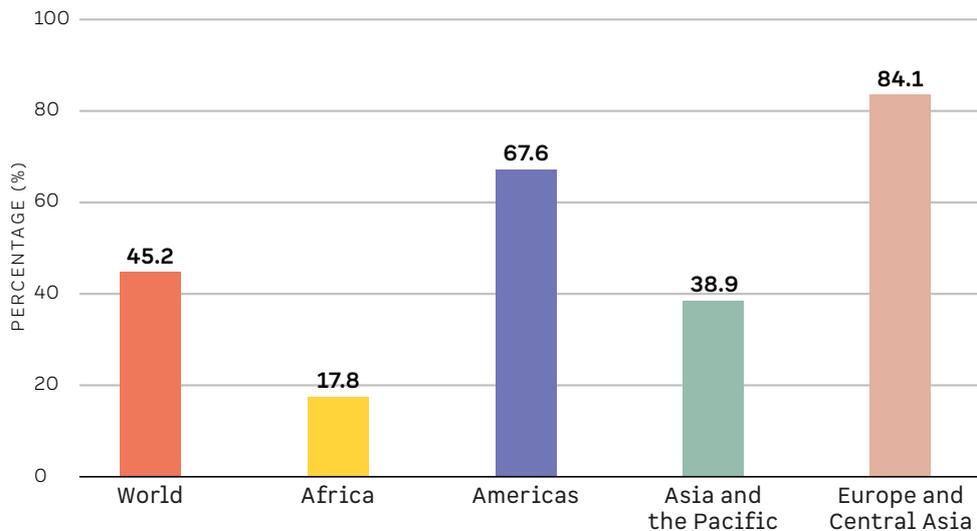
The data in **FIGURE A2.18** come from the ILO World Social Protection Database. Social protection benefits (SDG indicator 1.3.1) include benefits for children, mothers with newborns, persons with severe disabilities, unemployed people, older people, and vulnerable people covered by social assistance. Coverage means either receiving a cash benefit or contributing to a social security scheme.



World Social Protection Report 2017-2019: Universal social protection to achieve the Sustainable Development Goals.

https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_604882.pdf

FIGURE A2.18 PROPORTION OF POPULATION COVERED BY AT LEAST ONE SOCIAL PROTECTION BENEFIT



Source: ILO, 2017.s.



In sub-Saharan Africa and Asia and the Pacific, well under half of the population have coverage from even one social protection benefit.

Only two out of 10 people in Africa are covered by at least one social protection benefit.

By income level

Using the same information, in **FIGURE A2.19** we show levels of social protection coverage disaggregated by country and by income level. For each of the income groups, we show the median of the proportion of population covered by at least one social protection benefit.

FIGURE A2.19 PROPORTION OF POPULATION COVERED BY AT LEAST ONE SOCIAL PROTECTION BENEFIT, BY TYPE OF ECONOMY

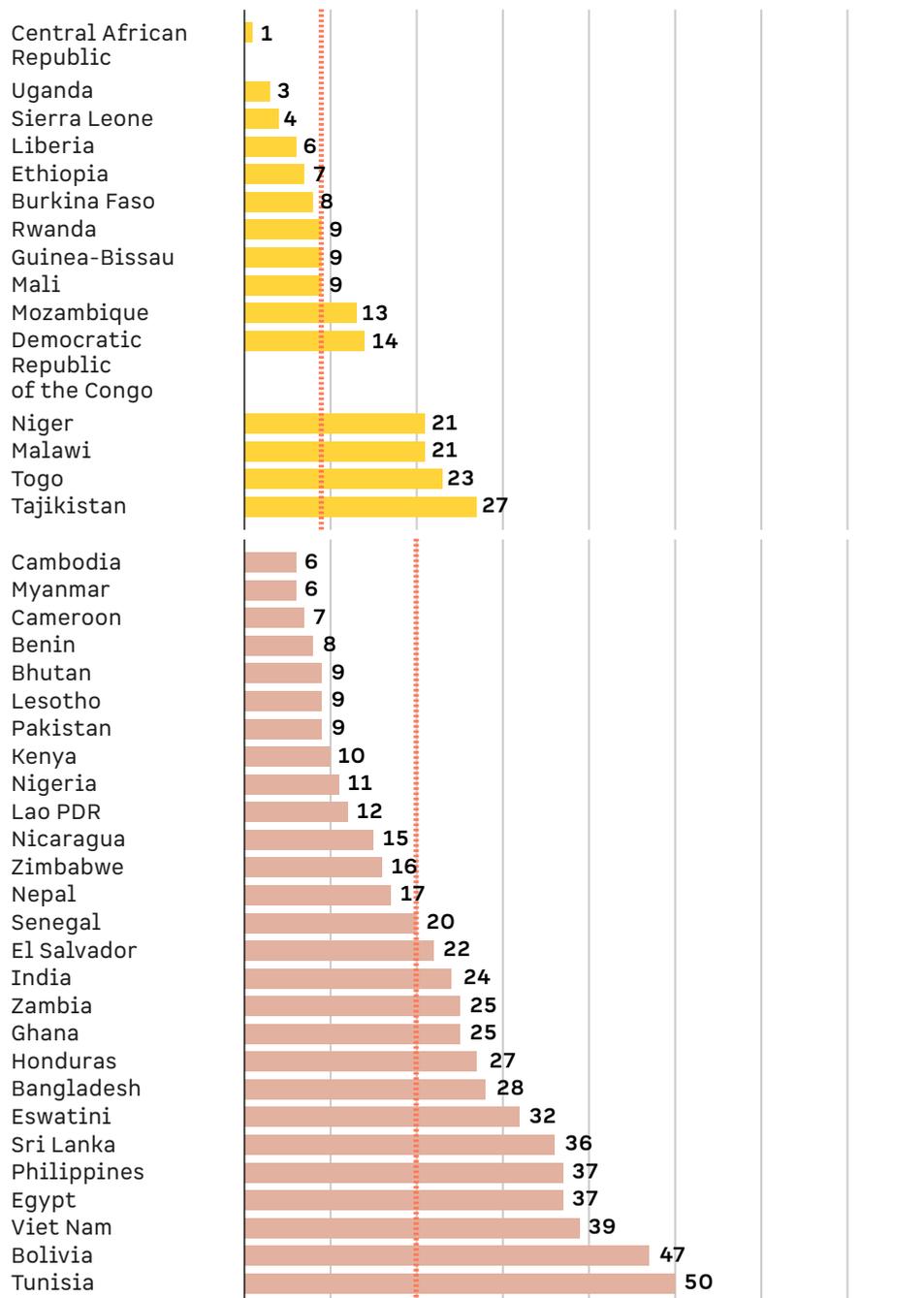
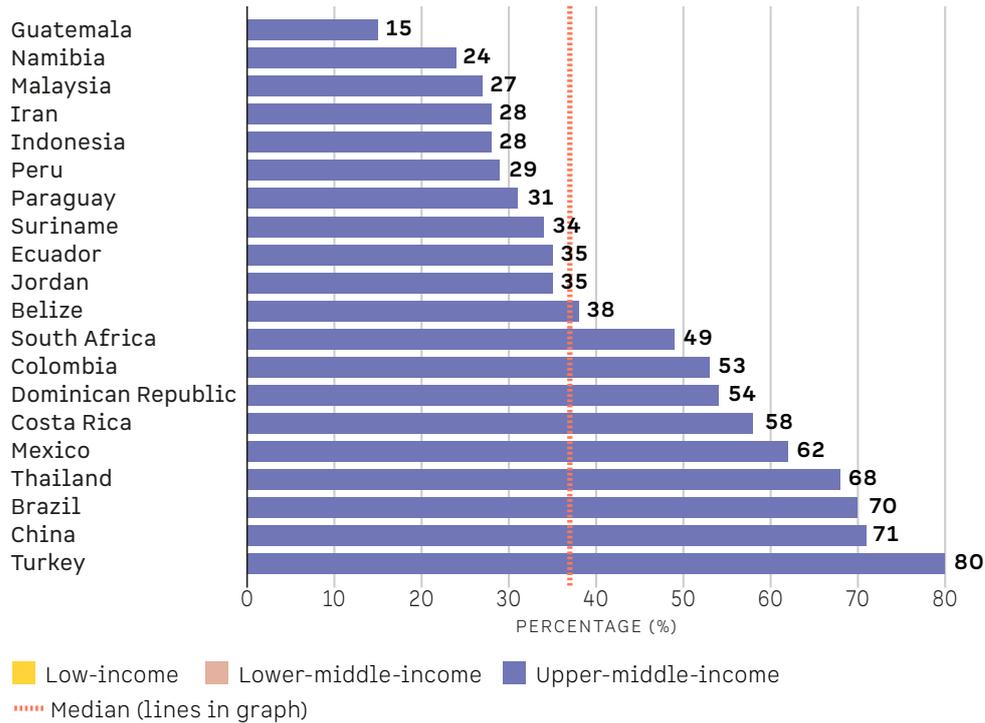


FIGURE A2.19 (CONT.)



Source: Authors' elaboration based on World Social Protection Report 2017-2019: Universal social protection to achieve the Sustainable Development Goals.



Upper-middle-income countries have the highest proportion of their populations covered by at least one social protection benefit (with a median coverage of 37 per cent), as opposed to low-income countries, which have the lowest (with a median coverage of 9 per cent).



None of the low-income countries have coverage as high as the median for upper-middle-income countries.

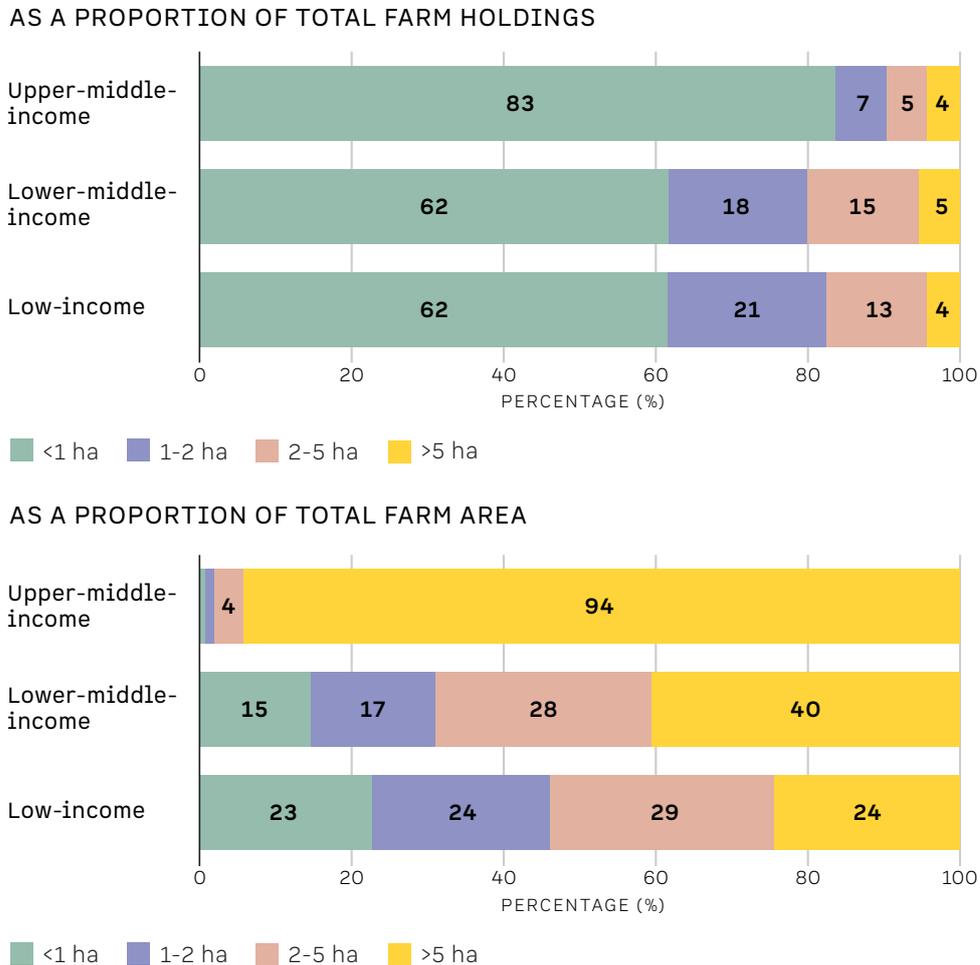
10 Small-scale agriculture



Data compiled by Lowder et al. (2016). <https://www.sciencedirect.com/science/article/pii/S0305750X15002703> (see supplementary data, accessed April 2021).

Data are originally from national agricultural censuses and span years from early 1990s to early 2010s.

FIGURE A2.20 DISTRIBUTION OF FARMS BY SIZE AS A PROPORTION OF TOTAL FARM HOLDINGS AND FARM AREA



Note: Number of countries in each income group varies.

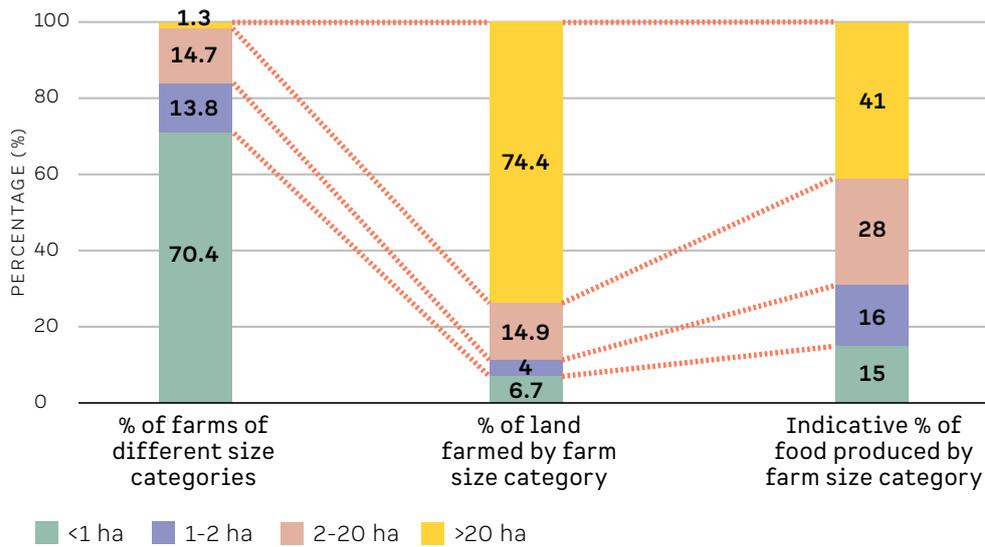


Very small holdings (<1 ha) account for the majority of farms in all income groups. Still, they hold under one quarter of the land in low-income countries, and almost no land (1 per cent) in upper-middle-income countries.



Smallholders are being squeezed, and the farm sector is bifurcating in terms of farm size, with larger farms being owned by relatively few individuals and yet occupying outside proportions of land.

FIGURE A2.21 INDICATIVE RELATIONSHIPS BETWEEN FARM SIZE CATEGORY, AREAS OF LAND FARMED AND FOOD PRODUCTION



Source: Table 3.



Very small holdings (<1 ha) constitute the majority of farms yet they hold 7 per cent of the land and produce over one tenth of the food. Large holdings (>20 ha), on the other hand, constitute 6 per cent of the total holdings yet they account for 80 per cent of the land area and produce almost half (47 per cent) of the total food.

11 Ease of doing business and enabling the business of agriculture



World Bank (2019). Enabling the Business of Agriculture. (Accessed: February 2021).

<https://eba.worldbank.org/en/eba>



World Bank (2020). Ease of Doing Business Scores. (Accessed: February 2021).

<https://www.doingbusiness.org/en/data/doing-business-score>

Ease of doing business. An economy's ease of doing business score is reflected on a scale of 0 to 100, where 0 represents the lowest performance and 100 represents the best performance. The ease of doing business score measures an economy's performance with respect to a measure of regulatory best practice across the entire sample of 41 indicators for 10 doing business topics. For more information on the ease of doing business score methodology, see World Bank (2020).

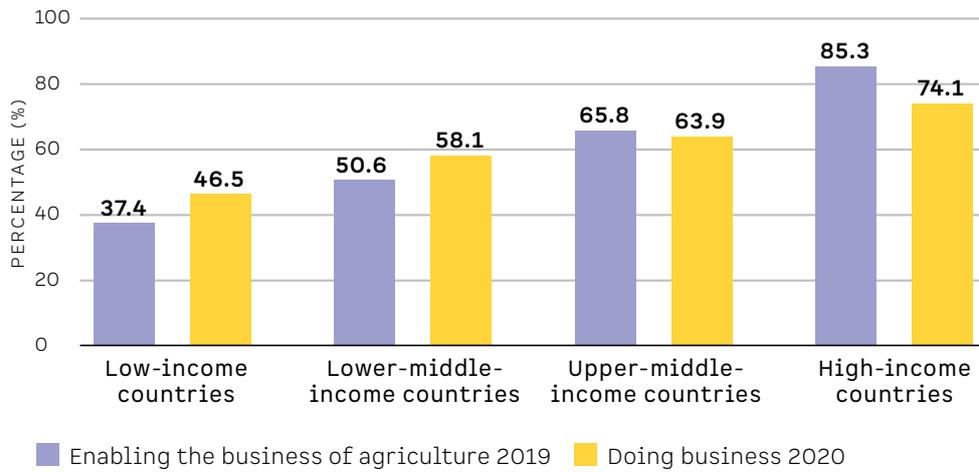
Enabling the business of agriculture. Enabling the business of agriculture presents indicators that measure the laws, regulations and bureaucratic processes that affect farmers in 101 countries. The eight core indicators are: supplying seed, registering fertilizer, securing water, registering machinery, sustaining livestock, protecting plant health, trading food and accessing finance. For more information on the enabling the business of agriculture score methodology, see World Bank (2019).

FIGURE A2.22 shows the average ease of doing business scores of 189 countries in 2020 and the average enabling the business of agriculture scores of 101 countries in 2019 by income levels as classified by the World Bank.

Both the ease of doing business and enabling the business of agriculture scores are generally higher for countries at higher income levels. Regulators in low- and middle-income countries should work towards an enabling environment for businesses to grow and flourish.



Low-income countries face more challenges when doing business, including in the agricultural sector.

FIGURE A2.22 DOING BUSINESS IS MORE DIFFICULT IN LOW- AND MIDDLE-INCOME COUNTRIES

Source: World Bank 2019, 2020a, 2020c.