



# COVID-19 Working Paper: International Food Security Assessment, 2020–2030: COVID-19 Update and Impacts on Food Insecurity

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## Abstract

The international economic upheaval that began in early 2020 with the spread of COVID-19 throughout the world has generated more profound and longer-term shocks than those included in the USDA’s Economic Research Service’s (ERS) report *International Food Security Assessment 2020–30* published in August 2020 (hereafter, the 2020 IFSA report). A fresh set of macroeconomic projections from ERS, reflecting the world’s changing economic conditions and possible path through 2030, became available in September 2020. These projections were used to assess the impacts of COVID-19 on food insecurity in the 76 countries covered by the 2020 IFSA report. The new macroeconomic projections show a deeper-than-expected contraction in economic activity in the IFSA countries. Gross domestic product (GDP) in the IFSA countries as a group is estimated to decline by 5.1 percent in 2020, 5.2 percentage points lower than the 2020 IFSA report estimate. As a result, this updated analysis estimates that in 2020 there will be 921 million food-insecure people, an increase of

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160 million from the pre-pandemic estimate and almost double the COVID-19 estimate published in the 2020 IFSA report. The prevalence of food insecurity for 2020 is now estimated at 24 percent, an increase of 4.2 percentage points from the pre-pandemic level and double the figure in the 2020 IFSA report. However, food insecurity is expected to decline by 2030, with the prevalence of food-insecurity dropping to 11.6 percent and the number of food-insecure people falling to 513 million.

**Keywords:** Food security, food insecurity, food prices, income, food demand, COVID-19, Coronavirus, calories, nutritional target, Sub-Saharan Africa, North Africa, Asia, Latin America, Caribbean.

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## Summary

### What Is the Issue?

The International Food Security Assessment (IFSA), published annually by USDA’s Economic Research Service (ERS), projects per capita food demand and compares it with a nutritional target of 2,100 calories per person per day,<sup>2</sup> an average caloric level necessary to sustain a healthy and active lifestyle. The report aims to help USDA and its stakeholders estimate long-term projections of food security in 76 low- and middle-income countries. The continued spread of the coronavirus and related lockdowns means that the economic recovery projected in the 2020 IFSA report (published in August 2020) will be slower than previously anticipated. In this working paper, we use the more recent gross domestic product (GDP) information and projections from the September 2020 update of ERS’s International Macroeconomic Data Set (IMDS) to re-estimate the COVID-19 impacts on food security for 2020 and 2030 presented in the 2020 IFSA report.

### What Did the Study Find?

In general, the new analysis shows much larger and more persistent impacts from COVID-19 on international food security than were projected for the 76 countries covered by the 2020 IFSA report:

- The number of food-insecure people in 2020 is estimated at 921 million, an increase of 160 million (21 percent) from pre-pandemic estimates. The increase in the number of food-insecure people in 2020 due to COVID-19 is almost double the original estimate in the 2020 IFSA report.
- The sharp increase in food insecurity due to COVID-19 reflects a sharper GDP decline in 2020 than originally projected and a slower recovery in 2021 across the 76 countries covered in the assessment. Asia and Latin America and the Caribbean (LAC) are the two regions with the largest revisions to 2020 GDP, with their GDP growth projections revised downward by about 6 percentage points, on average, from the projection in the 2020 IFSA report.

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<sup>2</sup> The 2,100 kcal/per capita/per day threshold is an internationally agreed-upon level set by United Nations as the recommended level of dietary energy intake for a healthy, well-nourished individual (FAO, 2004).

- By region, the highest shocks to GDP per capita in 2020 from COVID-19 are in LAC (-11.8 percent) and Asia (-10.6 percent). The result for Asia is a reversal from 2020 IFSA report findings, as some countries in this region were previously anticipated to see marginal economic growth in 2020.
- Per capita income over the coming decade is projected to increase 39 percent on average for our 76 countries. This increase is almost 4.5 percentage points lower than the estimate presented in August.
- The impacts of COVID-19 are expected to be persistent and carry long-term reductions in food security. The 2030 estimate of food insecurity is almost 27 percent higher than the pre-COVID-19 scenario. By 2030, the population that is food insecure in the 76 countries studied is projected to be 513 million people, some 12 percent of the population.
- The food gap, defined as the amount of food needed for all food-insecure people to reach the caloric target, indicates the intensity of food insecurity. It can be expressed in calories per capita per day or in grain-equivalent quantities and is used to measure the intensity of food insecurity at the aggregate level. As a result of the revised and lower economic growth prospects for the 76 countries examined, the food gap is 9 percent higher for 2020 and 12 percent higher for 2030 compared with the earlier estimates reported in the 2020 IFSA report.

## How Was the Study Conducted?

The 2020 IFSA report incorporated initial estimates of income shocks from the COVID-19 pandemic as presented in the International Monetary Fund’s World Economic Outlook (WEO) report of April 2020 and compared them with projections from the ERS International Macroeconomic Data Set (IMDS) published in January 2020, which represents the pre-pandemic scenario. In early September 2020, ERS produced an unpublished update to its IMDS estimates, incorporating the best available information on the anticipated decline in GDP in 2020 and potential recovery in 2021. The updated IMDS estimates use data from IHS Global Insight, Oxford Economic Forecasting, as well as estimated and projected values developed by ERS. We used the newly updated GDP information from the IMDS September update to re-estimate the COVID-19 impacts on food security for 2020 and 2030 presented in the 2020 IFSA report.

## Introduction

The USDA Economic Research Service's (ERS) International Food Security Assessment (IFSA)<sup>3</sup> projects per capita food demand and compares it with a nutritional target of 2,100 calories<sup>4</sup> per person per day—an average caloric level necessary to sustain a healthy and active lifestyle—to help USDA and its stakeholders estimate long-term projections of food security in 76 low- and middle-income countries. The 2020 IFSA report (published in August) incorporated initial estimates of income shocks from the COVID-19 pandemic, as reported in the International Monetary Fund's (IMF) World Economic Outlook (WEO) report of April 2020, and compared them with the gross domestic product (GDP) projections in the ERS International Macroeconomic Data Set (IMDS) published in January 2020, before the start of the COVID-19 pandemic. In early September 2020, ERS produced an unpublished update of the IMDS, incorporating the best available information on the anticipated decline in GDP in 2020 and potential recovery in 2021. The updated IMDS uses data from IHS Global Insight, Oxford Economic Forecasting, and estimated and projected values developed by ERS.

The continued spread of the coronavirus and related lockdowns means economic recovery in the IFSA countries will be slower than previously anticipated and slower than in most other regions.

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<sup>3</sup> The results from the IFSA model are not directly comparable with other analyses, such as the modeling work presented in the report *The State of Food Insecurity (SOFI)*, published by the Food and Agriculture Organization (FAO) of the United Nations. The SOFI report has broader country coverage than ERS's IFSA report and a different methodology. While the FAO estimate is more global, the IFSA estimate includes countries—some with high numbers of food-insecure people—that are not included in the FAO estimate. Moreover, because of the use of aggregate data in the IFSA, it cannot be compared directly with evaluations of international food security based on household surveys. It is also difficult to extrapolate the results presented in the IFSA report to the Food Security Information Network's report on global crises, which uses a 5-phase food insecurity measure—a consensus approach across international organizations and development practitioners directly responding to major crises. See Tandon et al. (2017) for a more in-depth discussion and comparison of ERS's IFSA model with other modeling approaches to international food security.

<sup>4</sup> The 2,100 kcal/per capita/per day threshold is an internationally agreed-upon level set by United Nations as the recommended level of dietary energy intake for a healthy, well-nourished individual (FAO, 2004).

The anticipated slower recovery in economic growth of the 76 IFSA countries reflects the dependency of these countries on sectors such as tourism, energy products, and non-cereal commodities, which are not expected to quickly return to pre-pandemic levels. We used the newly updated GDP information from the IMDS September update to re-estimate the impacts of the COVID-19 pandemic on food security for 2020 and 2030. Given the rapidly evolving situation at the country level and the uncertain reliability of estimates of economic shocks at the country and global levels from the health crisis, the results presented in this working paper should not be considered final. Also, the projections presented in this working paper do not consider the impacts of certain types of potential events in the future, such as catastrophic weather, armed conflict, and political and economic instability.

In general, the new analysis shows much larger impacts of the pandemic on international food security than the 2020 IFSA report, with significantly higher estimates of food insecurity for the 76 countries studied. According to ERS's new IMDS estimates, the economies of the 76 countries in the assessment are projected to shrink by 5.1 percent in 2020. This is an additional decline in GDP of 5.2 percentage points from the April 2020 WEO forecast by the IMF, which was used in the 2020 IFSA report (table 1). The downward revision to the GDP forecast for 2020 reflects a worsened pandemic situation in many countries, with deeper-than-anticipated contractions in economic activity, consumption, and services output, lower mobility compared with pre-pandemic levels, larger downturns in labor markets, and sustained retrenchments in global trade (IMF, 2020a). A slower recovery in 2021 from the pandemic in IFSA countries is now anticipated, mainly reflecting persistent adverse aggregate impacts on demand into the second half of 2020; a larger-than-anticipated decline in economic activity during the lockdowns of the first and second quarters of 2020; and a shock to productivity as surviving businesses enhance workplace safety and hygienic practices (IMF, 2020a and 2020b).

**Table 1****Gross domestic product (GDP) growth prospects for 2020 and 2021 deteriorate further for International Food Security Assessment (IFSA) countries due to the COVID-19 pandemic**

	Updated GDP growth estimates		August IFSA GDP growth estimates		Pre-COVID-19 growth estimates	
	Percent					
	2020	2021	2020	2021	2020	2021
Asia	-5.1	5.0	1.1	7.2	6.0	6.1
Latin America and the Caribbean	-9.3	2.9	-3.3	4.1	2.8	3.0
North Africa	-3.5	-1.6	-1.7	4.3	3.7	3.4
Sub-Saharan Africa	-3.2	3.3	-1.4	3.4	3.6	4.0
Total for IFSA countries	-5.1	4.0	0.0	6.1	5.1	5.2

Notes: Regions include only the 76 countries studied in the IFSA report. The August IFSA report refers to results presented in the USDA, Economic Research Service (ERS) *Food Security Assessment Situation and Outlook No. (GFA-31)*. Pre-COVID-19 estimates refer to ERS *International Macroeconomic Dataset* figures released in January 2020.

Source: Calculated by USDA, ERS using the IFSA model.

The 76 countries in this study are divided into four major regions: Sub-Saharan Africa (SSA), Asia, Latin America and the Caribbean (LAC), and North Africa. For IFSA countries in the LAC region, GDP growth in 2020 is estimated to decline by 9.3 percent, 6.1 percentage points lower than the previous COVID-19 projection and 12 percentage points lower than the pre-pandemic projection (figure 1). IFSA countries in Asia have the second-highest drop in projected GDP growth for 2020, but countries in the region also saw the greatest downward revision to their GDP growth prospects. On average, IFSA countries in Asia are projected to record a decline in GDP of 5.1 percent in 2020, 6.2 percentage points lower than the previous COVID-19 estimate, and 6 percentage points lower than the pre-pandemic figure. By contrast, IFSA countries in

North Africa and SSA see the smallest revisions to their 2020 GDP growth prospects. In North Africa, GDP is projected to decline by 3.5 percent in 2020, 1.8 percentage points lower than the previous COVID-19 estimate and 7.2 percentage points lower than the pre-pandemic figure. The economies of IFSA countries in SSA are projected to decline 3.2 percentage points in 2020, 1.8 percentage points lower than in the 2020 IFSA report, and 6.8 percentage points lower than the pre-COVID estimate. The overall GDP of the IFSA countries in 2021 is projected to grow at a rate of 4 percent.



**Figure 1**  
**Inflation-adjusted gross domestic product growth for the four regions in the International Food Security Assessment (IFSA) model, pre- and post-COVID-19 shock**



Note: Index fitted using values in 2010 U.S. dollars to adjust for inflation.

Source: Calculated by USDA, Economic Research Service (ERS) using data from ERS International Macroeconomic Data Set and the International Monetary Fund.

Estimated levels of food insecurity for 2020 vary greatly across these regions. The COVID-19 shock to GDP is projected to increase the number of food-insecure people by 160 million in 2020, a doubling from the previous pandemic estimate in August 2020 (table 2). Most of the additional people who are food insecure because of the pandemic are in Asia (106 million) and SSA (42 million). Of the four regions, SSA (39 countries) has the highest food-insecure share of the population (41.2 percent) and the second-largest number of food-insecure people (431.5 million). Asia (22 countries) had the greatest upward revision to the previous estimate of the population that is food-insecure and is now the region with the largest number of people who are food insecure, overtaking the SSA region. A total of 437 million people in 2020 in Asia's IFSA countries are estimated to be food-insecure, up 105 million from the pre-COVID-19 estimate. The prevalence of food insecurity also increased from the pre-pandemic estimate by 4.4 percentage points to 18.1 percent. In LAC (11 countries), 41 million people (23.7 percent of the population) are food insecure, while North Africa (four countries) has both the lowest number—10.7 million—and the lowest share (5.5 percent of the population) of food-insecure people.

**Table 2****Asia has the largest number of food-insecure people in 2020 of International Food Security Assessment (IFSA) regions after revised GDP growth estimates**

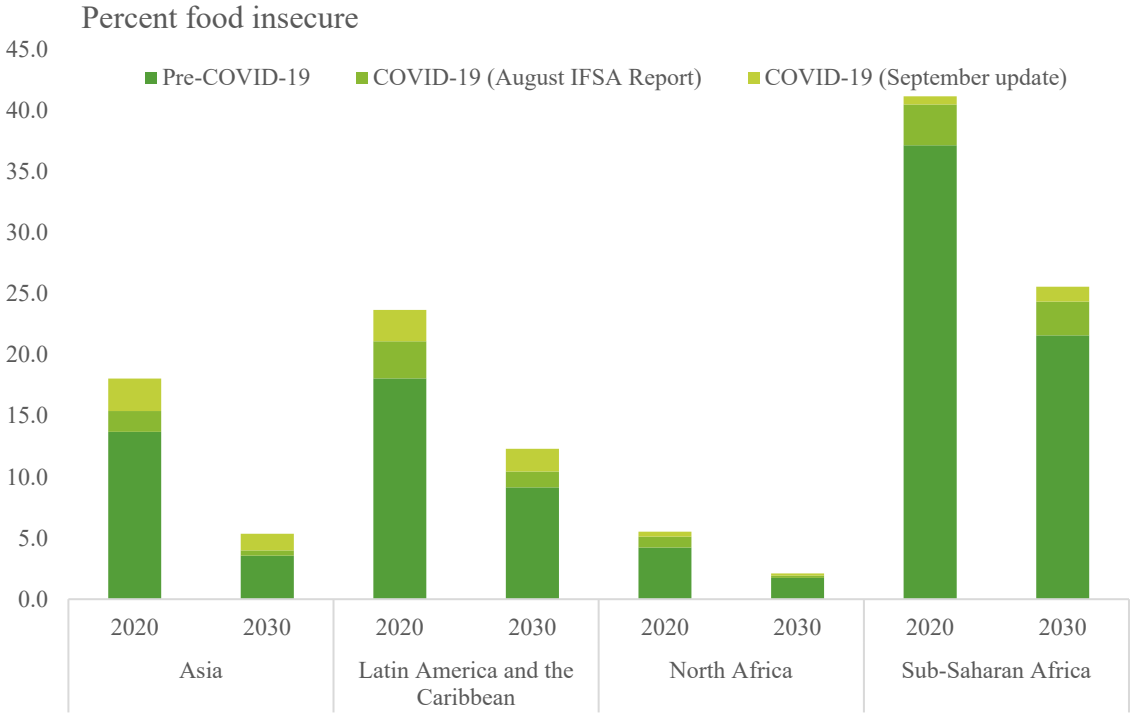
	Updated COVID-19 2020 estimate		August IFSA COVID-19 estimate		Pre-COVID-19 estimate	
	Number of food-insecure	Share of the population food-insecure	Number of food-insecure	Share of the population food-insecure	Number of food-insecure	Share of the population food-insecure
	(million)	(percent)	(million)	(percent)	(million)	(percent)
Asia	437.5	18.1	373.2	15.4	331.8	13.7
Latin America and the Caribbean	41.0	23.7	36.5	21.1	31.3	18.1
North Africa	10.7	5.5	9.9	5.1	8.2	4.2
Sub-Saharan Africa	431.5	41.2	424.6	40.5	389.6	37.2
Total for IFSA countries	920.6	24.0	844.3	22.0	760.8	19.8

Note: Regions include only those countries that are a focus of this study. The August IFSA report refers to results presented in the USDA, Economic Research Service (ERS) Food Security Assessment Situation and Outlook No. (GFA-31). Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020.

Source: Calculated by USDA, ERS using the IFSA model.

Even with a larger-than-anticipated deterioration of economic growth prospects in 2020, food security is projected to improve in all 76 countries over the next 10 years (figures 2a and 2b). The share of the population that is food-insecure is projected to fall to 11.6 percent (513.4 million) by 2030, a 44 percent drop from the number of food-insecure people in 2020.

**Figure 2a**  
**Estimated share of the population that is food insecure pre- and post-COVID-19 pandemic in International Food Security Assessment (IFSA) regions<sup>1</sup>**



<sup>1</sup> Regions include only those countries that are a focus of this study.

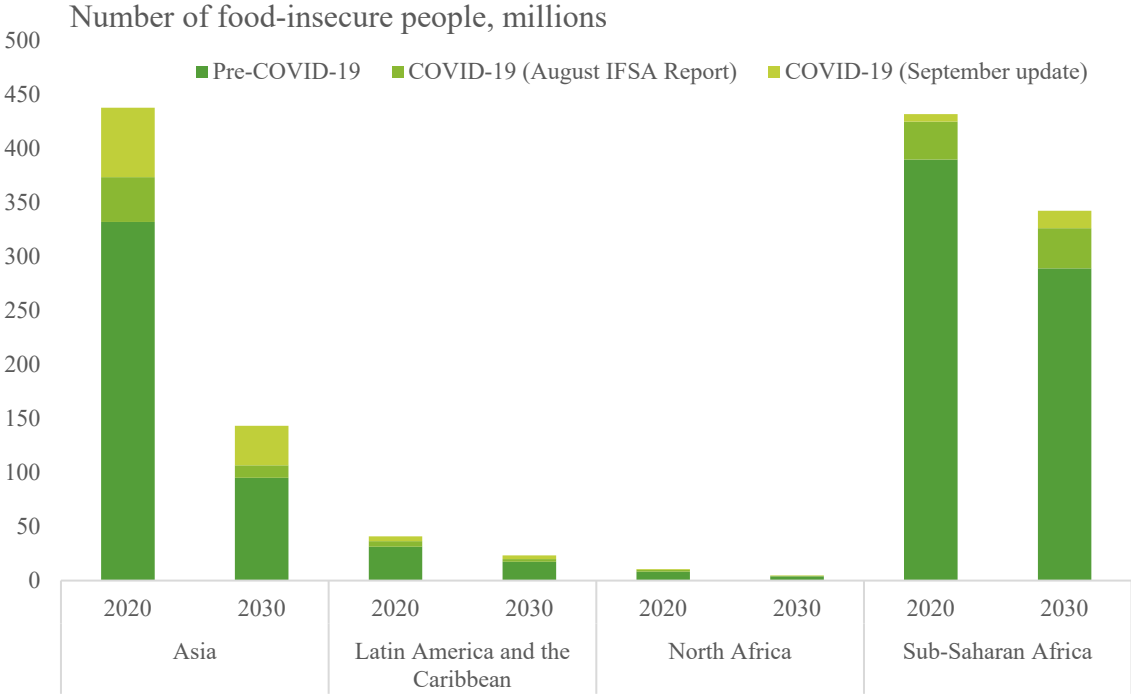
Note: The August IFSA report refers to results presented in the USDA, Economic Research Service (ERS) Food Security Assessment Situation and Outlook No. (GFA-31). Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020.

Source: Calculated by USDA, ERS using the IFSA model.

However, the 2030 estimate of the number of food-insecure people is 108 million people (27 percent), higher than the pre-COVID projection. The previous COVID-19 effect on estimates on the number of food-insecure people in 2030 was an increase of 51.5 million. If per capita

income growth is restored, as the long-term economic projections assume, then the prevalence of food insecurity should decline. In North Africa, the number of food-insecure people is projected to decrease by 61 percent, with 2 percent of the population food insecure in 2030. In the 11 LAC countries included in this study, the share of the population that is food insecure is projected to decrease by 48 percent, falling to 12 percent by 2030. The greatest decline in food insecurity is projected for the 22 Asian countries included in this study, with the food-insecure share of the population projected to drop by 70 percent to 5 percent, and the number of food-insecure people projected to decline from 437 million to 143 million. SSA is projected to see the slowest

**Figure 2b**  
**Projected decline in the number of food-insecure people in International Food Security Assessment (IFSA) countries by region<sup>1</sup>**



<sup>1</sup> Regions include only those countries that are a focus of this study.

Note: The August IFSA report refers to results presented in the USDA, Economic Research Service (ERS), *Food Security Assessment Situation and Outlook No. (GFA-31)*. Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020.

Source: Calculated by USDA, ERS using the IFSA model.

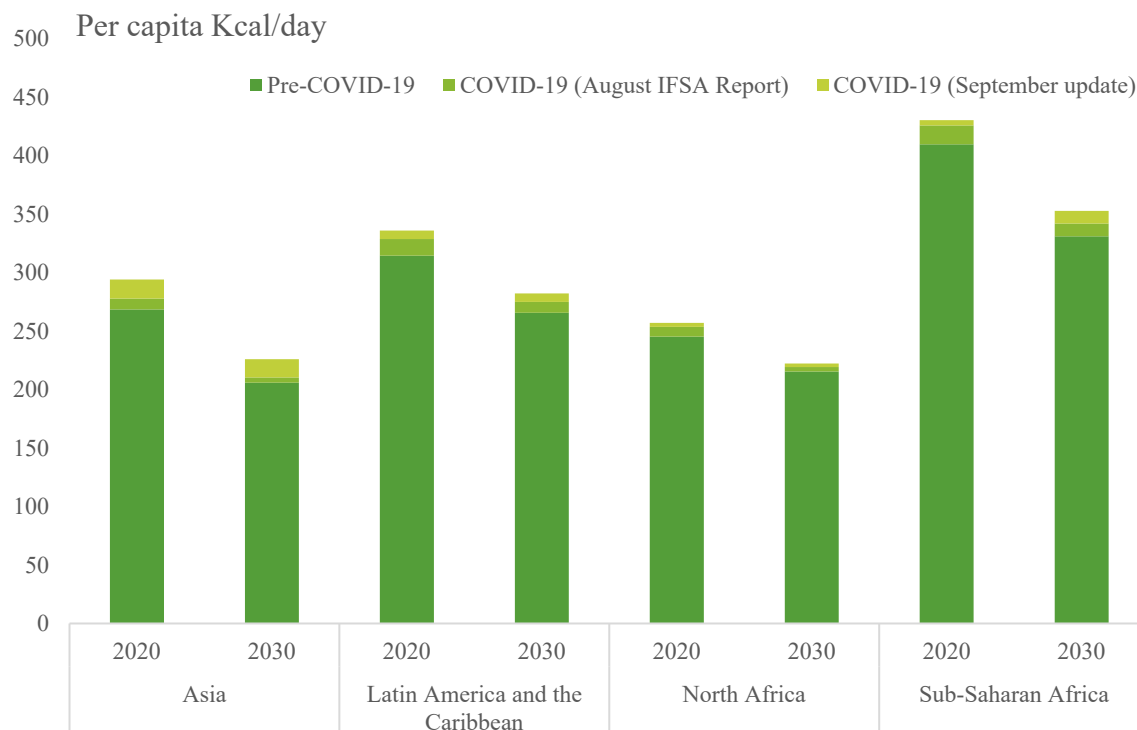
improvement in food security, with the share of food-insecure people falling from 41 percent in 2020 to 26 percent in 2030. In 2030, SSA will have the largest share of the population that is food insecure of any region (26 percent), as well as the highest number of food-insecure people (342 million).

GDP per capita is projected to increase<sup>5</sup> between 2020 and 2030 in most countries examined (table 2). However, reflecting the shock from COVID-19, GDP per capita is lower than originally projected for both 2020 and 2030. As shown by Eo and Morley (2020) and discussed by Cerra et al. (2020), the macro shocks from COVID-19 are likely to leave permanent scars on medium- to long-term economic growth prospects. The highest shocks to GDP per capita in 2020 from COVID-19 are in LAC (-11.8 percent) and Asia (-10.6 percent). The result for Asia is a reversal from the 2020 IFSA report findings, as countries in this region were previously anticipated to see marginal GDP growth in 2020. Most of the change in the Asia region is explained by India, with GDP growth for 2020 revised from 1.9 percent in the IMF's April

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<sup>5</sup> Macroeconomic projections come from the ERS IMDS, which uses data from the World Bank Development Indicators, the International Financial Statistics of the IMF, IHS Global Insight, and Oxford Economic Forecasting, as well as estimated and projected values developed by USDA, ERS.

**Figure 2c**  
**Food gap is estimated to increase as a result of the COVID-19 shock to gross domestic product (GDP) in International Food Security Assessment (IFSA) regions<sup>1</sup>**



<sup>1</sup> Regions include only those countries that are a focus of this study.

Note: The August IFSA report refers to results presented in the USDA, Economic Research Service (ERS), *Food Security Assessment Situation and Outlook No. (GFA-31)*. Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020.

Source: Calculated by USDA, ERS using the IFSA model.

forecast to -6.9 percent in the September revision of ERS’s IMDS. North Africa and SSA have similar declines in 2020 GDP per capita due to the pandemic, close to 6 percent each. Despite the stronger-than-anticipated decline in 2020 GDP per capita for Asia, the region is projected to record the highest income growth of all the IFSA regions in the coming decade. In Asia, GDP per capita is projected to grow by 4.4 percent a year from 2020-30; the faster growth combined with low population growth contributes significantly to reducing food-insecurity over the period. But with a GDP per capita of \$3,400 per person in 2010 U.S. dollars, Asia in 2030 will only have

the third-largest average income of the four IFSA regions. In LAC (2.3 percent) and North Africa (2.1 percent), GDP per capita is projected to grow at very similar rates during the 10-year period, and, as with Asia, population growth is anticipated to be half of the income growth. Moreover, LAC (\$6,238) and North Africa (\$4,226) have the highest and second-highest per capita incomes of IFSA regions, respectively. By contrast, SSA is projected to make the least progress in terms of income growth, with GDP per capita increasing 1.4 percent a year from 2020-30; this is compounded by the fact that the sub-region's population is projected to grow on average 2.5 percent a year during the same period.



**Table 3**  
**In International Food Security Assessment (IFSA) regions<sup>1</sup>, projected per-capita gross domestic product (GDP) is sharply reduced in 2020 and 2030 by COVID-19 for countries in Asia and Latin America and the Caribbean**

	2020	2030	Per Capita GDP: Annual Growth rate
	US dollars (2010)		Percent
Asia	2,225	3,411	4.4
Change (%) from pre-COVID-19 estimate	-10.6	-12.9	
Latin America and the Caribbean	4,974	6,238	2.3
Change (%) from pre-COVID-19 estimate	-11.8	-11.4	
North Africa	3,436	4,226	2.1
Change (%) from pre-COVID-19 estimate	-5.7	-4.3	
Sub-Saharan Africa	1,215	1,393	1.4
Change (%) from pre-COVID-19 estimate	-6.3	-8.7	

<sup>1</sup> Regions include only those countries that are a focus of this study.

Note: Value in 2010 U.S. dollars to adjust for inflation.

Source: Calculated by USDA, Economic Research Service using the IFSA model.

Most of the impact of the COVID-19 GDP decline is projected to affect grain demand for other uses, including feed (table 4). Demand for grain for other uses is estimated to be 42 percent lower than the pre-COVID-19 estimate. As feed grain is mostly imported, the need for imports is also estimated to decline in 2020. A third of total grain demand in 2020 is estimated to be covered by grain from stocks and imports, compared with 35 percent in the pre-COVID-19 estimate. Over the next decade, we project grain demand will grow by 2.6 percent a year and in absolute terms increase by almost a third, from 690 million tons in 2020 to 896 million tons in 2030. By contrast, demand for other grains is estimated to grow at 3.4 percent a year and increase from 222 million tons in 2020 to 309 million tons in 2030. Total grain demand is projected at 912 million tons for 2020, growing to 1.2 billion tons by 2030. However, the 2020 and 2030 projections for total grain demand are 16 percent and 18 percent lower, respectively, than the pre-COVID projection, reflecting the impact of the modeled GDP shock.

**Table 4**  
**COVID-19 shock to gross domestic product (GDP) growth in 2020, demand for grains declines, driven by lower demand for other grain use**

Year	Food grain demand	Other grain demand*	Total grain demand	Grain production	Implied additional supply required**
	Million tons				
2020	690	222	912	645	267
Change (%) from pre-COVID-19 estimate	-2.5	-42.0	-16.4	0.0	-40.0
2030	896	309	1,205	789	417
Change (%) from pre-COVID-19 estimate	-3.0	-43.1	-17.9	0.0	-38.6

\*Other grain demand includes seed, feed, and processing.

\*\*The gap between grain demand and domestic grain production.

Source: Calculated by USDA, Economic Research Service using the IFSA model.

Despite the mobility restrictions applied early in 2020 to arrest the pandemic, there is no evidence that agricultural activity in the 76 countries in the assessment was significantly impacted (FAO, 2020). Cereal output in Central America, Asia, and South America for 2020 is estimated to increase and remain relatively unchanged and, in Sub-Saharan Africa, to increase slightly from the previous year (FAO, 2020). Between 2020 and 2030, grain production is projected to grow 2 percent, well above the population growth rate (1.4 percent a year). Projected growth in grain production exceeds the population growth in Asia, North Africa, and LAC, but in SSA, a 28 percent increase in population slightly outpaces a 24 percent increase in production. Production grows fastest in LAC, followed by SSA. In most of the regions studied, production

gains are expected to come from improved yields because there is little additional arable land to bring into production and because low prices discourage area expansion. An exception is SSA, where input use and yields are low, so some area expansion is also expected as more resilient seed varieties, and investment in irrigation technology could allow for production expansion into areas formerly less suited for grain production.

The gap between domestic grain production and demand, represented by the implied additional supply required, is projected to increase by 57 percent between 2020 and 2030 for the 76 countries studied, driven primarily by increases in SSA and Asia. Food grain demand drives the gap between production and demand in SSA, while both food and non-food use are significant drivers in Asia.

## **How Food Security Is Assessed: Method and Definitions** (for more detailed information on the model, see appendix A.)

Food demand is projected for 76 low- and middle-income countries: 39 in Sub-Saharan Africa, 22 in Asia, 11 in Latin America and the Caribbean, and 4 in North Africa. Food is divided into four groups: (1) the major grain consumed in the country, (2) other grains, (3) root crops, and (4) all other food. To allow for aggregation across food groups, the International Food Security Assessment (IFSA) model's projections of food demand are expressed in grain equivalent based on the caloric content of food; this grain equivalent may be expressed in either kilograms or calories. For example, grains have roughly 3.5 calories per gram, and tubers have about 1 calorie per gram. One ton of tubers is, therefore, equivalent to 0.29 tons of grain.

The IFSA model, as detailed in the appendix, analyzes the gap between projected food demand, which is a function of per capita income and food prices and a consumption target of 2,100 calories per capita per day. This report uses three indicators of food insecurity. The food gap measures the food needed to raise consumption at every income level to the nutritional target. In many countries, per capita consumption in the lower-income deciles is much less than per capita consumption for the country. In these countries, the distribution gap provides a measure of the intensity of hunger—the extent to which the food security of already-hungry people deteriorates as a result of income declines or other negative economic conditions. This measure can be expressed on a per capita basis (in calories per day) or as an aggregate measure (the total tons of food needed to fill the gap in a given country).

The second indicator is the share of the population that is food insecure. Food demand is assumed to be met and equal to consumption. We no longer assess consumption by income decile but instead in a continuous manner across all income levels.

Finally, the number of food-insecure people—those who cannot meet the nutritional target—is based on the total population and the population share that consumes less than the nutritional target. Terms commonly used in this report include:

**Food consumption**—equal to food demand if we assume that the demand is met.

**Food access**—depends on consumer purchasing power. Food access is estimated based on income level and food prices within each country according to an income-consumption relationship.

**Food insecurity**—occurs when estimated per capita food consumption for a consumer at a certain income level falls short of the nutritional target of 2,100 calories per person per day.

### **Modeling the COVID-19 Shock to Gross Domestic Product (GDP)**

The GDP projections used in the International Food Security Assessment (IFSA), published by USDA, Economic Research Service (ERS) in August 2020, come from ERS's International Macroeconomic Data Set (IMDS) released in January 2020. In September 2020, ERS updated the IMDS to incorporate a consensus projection of the effect of COVID-19 on GDP growth in 2020 and 2021, as well as fresh projections through 2030. In the 2020 IFSA report, GDP growth projections for 2020 and 2021 from the International Monetary Fund's (IMF's) *World Economic Outlook* report of April 2020 were used to model the effects of COVID-19 on food insecurity. Moreover, it was assumed that GDP growth from 2022 to 2030 would be the same as previously estimated by ERS in the IMDS published in January 2020. This assumption resulted in GDP growth not converging with its previous projected path. In this update, we substitute the IMF dataset for the new ERS medium-term GDP projections to assess the impact of COVID-19 on food insecurity. The new ERS IMSD projections show a sharper decline in GDP growth in 2020 and 2021. Apart from Sub-Saharan Africa, the new dataset assumes that GDP growth will converge with its previous path towards the end of the projection period in 2030. In absolute real terms, GDP is lower than previously estimated in the IMSD January release across the 10-year period. However, some of the difference between GDP growth in the different datasets reflects differences between sources (i.e., IMF versus Oxford/IHS, or other factors rather than purely impacts of COVID-19). This is particularly the case for low-income countries where statistics are limited and estimates of GDP could be very imprecise.

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**Appendix Table 1**

**Gross domestic product (GDP) growth projections of International Food Security Assessment (IFSA) countries**

	Updated GDP growth estimate		August IFSA GDP growth estimate		Pre-COVID-19 GDP growth estimate	
	Percent					
	2020	2021	2020	2021	2020	2021
<b>Asia</b>	-5.1	5.0	1.1	7.2	6.0	6.1
Afghanistan	3.4	4.0	10.5	4.5	3.5	4.0
Armenia	-3.4	3.9	-1.5	4.8	4.0	3.9
Azerbaijan	-5.4	1.2	-2.2	1.8	3.0	3.2
Bangladesh	1.0	-2.7	2.0	9.5	6.3	6.0
Cambodia	2.6	5.7	6.8	6.1	6.6	6.5
Democratic People's Republic of Korea	-1.1	3.7	0.9	5.8	1.6	5.0
Georgia	-5.2	3.7	-4.0	4.3	3.6	4.0
India	-6.9	6.5	1.9	7.4	6.8	6.8
Indonesia	-3.0	3.3	0.5	8.2	5.1	5.3
Kyrgyzstan	-5.5	2.7	-4.0	8.0	3.2	3.2
Laos	2.9	5.2	5.1	5.6	6.5	6.4
Moldova	-3.8	3.2	-3.0	4.1	3.4	3.5
Mongolia	-3.5	7.5	0.0	15.0	4.5	10.3
Nepal	1.7	5.8	2.5	6.5	4.3	7.4
Pakistan	-2.4	2.1	-1.5	2.1	3.4	3.5
Philippines	-8.3	7.7	0.6	7.7	6.0	9.4
Sri Lanka	-4.7	1.3	-4.0	4.2	4.1	4.4
Tajikistan	-6.5	2.3	1.0	5.5	4.8	4.5
Turkmenistan	-0.5	4.6	1.8	6.4	5.8	4.6
Uzbekistan	-4.8	3.8	1.8	7.0	6.3	6.0
Vietnam	1.1	5.5	2.7	7.0	6.5	6.3
Yemen	-12.3	1.5	0.0	3.0	1.3	3.6
<b>Latin America and the Caribbean</b>	-9.3	2.9	-3.3	4.1	2.8	3.0



Bolivia	-6.0	2.5	-2.9	2.9	3.7	3.6
Colombia	-9.5	2.8	-2.4	3.7	2.4	3.2
Dominican Republic	-4.7	3.3	-1.0	4.0	5.0	5.1
Ecuador	-9.0	1.1	-6.3	3.9	0.2	1.1
El Salvador	-7.2	2.5	-5.4	4.5	2.1	3.0
Guatemala	-2.4	4.0	-2.0	5.5	3.0	4.7
Haiti	-4.4	-0.9	-4.0	1.2	1.5	1.9
Honduras	-3.7	2.5	-2.4	4.1	3.3	3.6
Jamaica	-7.2	3.6	-5.6	3.7	1.7	5.4
Nicaragua	-8.2	3.9	-6.0	7.8	-1.0	5.5
Peru	-14.5	3.5	-4.5	5.2	3.8	3.9
<b>North Africa</b>	-3.5	-1.6	-1.7	4.3	3.7	3.4
Algeria	-10.4	5.3	-5.2	6.2	1.4	9.5
Egypt	2.6	-8.3	3.2	2.8	5.4	4.7
Morocco	-5.1	3.3	-3.7	4.8	3.7	4.1
Tunisia	-6.8	2.5	-4.3	4.1	3.0	3.6
<b>Sub-Saharan Africa</b>	-3.2	3.3	-1.4	3.4	3.6	4.0
Angola	-4.0	3.2	-1.4	3.8	1.0	4.1
Benin	2.9	4.5	4.5	6.0	6.3	6.6
Burkina Faso	2.0	3.9	2.0	5.8	5.2	5.1
Burundi	-4.5	0.0	-3.5	4.2	1.2	2.4
Cabo Verde	-11.2	5.7	-4.0	5.9	4.4	7.1
Cameroon	-2.1	3.2	-1.2	4.1	4.5	4.8
Central African Republic	0.2	3.2	1.0	4.0	4.6	4.9
Chad	-4.5	1.0	-0.2	6.1	3.4	3.4
Côte d'Ivoire	-1.7	5.1	2.7	8.7	6.3	5.6
Democratic Republic of the Congo	-2.4	3.0	-2.2	3.5	4.6	4.4
Eritrea	-2.5	0.0	0.1	5.9	3.4	3.3
Eswatini	-4.0	2.0	-0.9	2.2	1.3	2.5
Ethiopia	3.1	4.0	3.2	4.3	8.2	7.4
Gambia	-3.1	3.8	2.5	6.5	4.8	4.7
Ghana	-1.5	5.9	1.5	5.9	5.7	6.4

Guinea	-0.5	4.2	2.9	7.6	5.4	5.3
Guinea-Bissau	-2.1	3.0	-1.5	3.0	4.4	4.0
Kenya	-0.3	4.0	1.0	6.1	5.7	5.5
Lesotho	-6.2	2.3	-5.2	5.1	1.1	2.5
Liberia	-3.6	2.9	-2.5	4.0	1.4	3.1
Madagascar	1.0	3.5	1.6	5.0	4.2	4.1
Malawi	-0.3	1.5	1.0	2.5	5.0	5.2
Mali	-1.9	2.9	1.5	4.1	4.6	4.3
Mauritania	-2.0	3.2	-2.0	4.2	4.9	5.6
Mozambique	-2.0	4.0	2.2	4.7	4.5	4.0
Namibia	-7.0	1.0	-2.5	3.2	2.0	2.0
Niger	1.0	5.2	1.0	8.1	6.0	6.1
Nigeria	-5.4	2.6	-3.4	2.8	2.0	2.8
Republic of the Congo	-4.5	2.1	-2.3	3.4	2.9	2.8
Rwanda	2.0	3.1	3.5	6.6	6.8	6.4
Senegal	-1.8	4.9	3.0	5.5	6.7	6.5
Sierra Leone	-3.4	3.5	-2.3	4.0	5.1	4.9
Sudan	-7.0	5.1	-6.8	13.3	2.1	7.9
Tanzania	1.9	3.6	2.0	4.6	5.9	5.5
Togo	1.2	3.2	1.4	4.0	5.3	5.4
Uganda	3.0	4.3	3.5	4.3	6.1	6.1
Zambia	-7.4	1.3	-3.5	2.3	3.2	3.3
<b>Total for IFSA countries</b>	<b>-5.1</b>	<b>4.0</b>	<b>0.04</b>	<b>6.1</b>	<b>5.1</b>	<b>5.2</b>

Note: Regions include only those countries that are a focus of this study. The IFSA 2020 refers to results presented in USDA, Economic Research Service (ERS) *Food Security Assessment Situation and Outlook No. (GFA-31)*. Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020.

Source: USDA, Economic Research Service.

**Appendix Table 2****Food security indicators for 2020 in International Food Security Assessment (IFSA) countries**

	Updated estimate		IFSA 2020 estimate		Pre-COVID 19 estimate	
	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure
	(million)	(percent)	(million)	(percent)	(million)	(percent)
<b>Asia</b>	<b>437.5</b>	<b>18.1</b>	<b>373.2</b>	<b>15.4</b>	<b>331.8</b>	<b>13.7</b>
Afghanistan	24.7	67.3	26.8	73.0	24.6	67.2
Armenia	0.1	3.2	0.1	2.9	0.1	2.2
Azerbaijan	0.4	4.4	0.4	3.8	0.3	3.0
Bangladesh	29.8	18.3	29.1	17.9	26.3	16.2
Cambodia	3.4	20.0	3.8	22.2	3.1	18.2
Democratic People's Republic of Korea	16.2	63.1	15.3	59.8	15.2	59.2
Georgia	0.5	9.2	0.4	8.8	0.3	6.6
India	185.1	14.0	139.2	10.5	118.6	8.9
Indonesia	21.5	8.1	19.6	7.3	17.4	6.5
Kyrgyzstan	0.3	5.7	0.3	5.2	0.2	3.7
Laos	0.2	3.0	0.2	3.3	0.2	2.5
Moldova	0.4	10.5	0.3	10.1	0.2	7.3
Mongolia	1.1	33.3	1.0	30.6	0.9	27.5
Nepal	2.7	9.0	2.6	8.7	2.4	8.1
Pakistan	75.1	35.1	73.8	34.5	66.7	31.2
Philippines	27.3	25.0	22.8	20.9	20.7	18.9
Sri Lanka	4.8	20.8	4.9	21.2	3.7	16.2
Tajikistan	4.2	47.5	3.6	41.0	3.4	38.0
Turkmenistan	0.2	4.0	0.2	3.5	0.2	2.8

	Updated estimate		IFSA 2020 estimate		Pre-COVID 19 estimate	
	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure
	(million)	(percent)	(million)	(percent)	(million)	(percent)
Uzbekistan	1.8	5.8	1.2	4.0	0.9	3.1
Vietnam	10.2	10.4	9.8	9.9	8.8	9.0
Yemen	27.5	92.0	17.7	59.3	17.4	58.3
<b>Latin America and the Caribbean</b>	<b>41.0</b>	<b>23.7</b>	<b>36.5</b>	<b>21.1</b>	<b>31.3</b>	<b>18.1</b>
Bolivia	5.3	45.4	4.9	42.0	4.1	35.5
Colombia	5.1	10.5	3.9	7.9	3.2	6.5
Dominican Republic	0.8	7.5	0.7	6.4	0.5	5.1
Ecuador	5.0	29.4	4.5	26.9	3.7	21.6
El Salvador	1.3	20.5	1.2	19.4	1.0	15.5
Guatemala	5.4	31.6	5.4	31.4	4.9	28.3
Haiti	6.5	59.1	6.5	58.8	6.2	55.8
Honduras	2.3	24.2	2.2	23.4	1.9	20.0
Jamaica	0.4	12.8	0.3	12.0	0.2	8.8
Nicaragua	2.5	39.6	2.4	37.9	2.1	34.4
Peru	6.4	20.1	4.6	14.3	3.5	10.8
<b>North Africa</b>	<b>10.7</b>	<b>5.5</b>	<b>9.9</b>	<b>5.1</b>	<b>8.2</b>	<b>4.2</b>
Algeria	4.6	10.7	3.8	8.8	3.0	7.0
Egypt	2.6	2.5	2.8	2.7	2.6	2.5
Morocco	2.6	7.5	2.5	7.1	2.0	5.6
Tunisia	0.9	7.7	0.8	6.9	0.6	5.3
<b>Sub-Saharan Africa</b>	<b>431.5</b>	<b>41.2</b>	<b>424.6</b>	<b>40.5</b>	<b>389.6</b>	<b>37.2</b>
Angola	20.3	62.4	19.6	60.4	19.1	58.6

	Updated estimate		IFSA 2020 estimate		Pre-COVID 19 estimate	
	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure
	(million)	(percent)	(million)	(percent)	(million)	(percent)
Benin	1.9	15.9	1.8	15.1	1.7	14.2
Burkina Faso	5.6	26.8	5.6	26.8	5.2	25.0
Burundi	10.2	80.4	10.3	81.2	9.6	75.7
Cabo Verde	0.1	25.4	0.1	20.1	0.1	15.3
Cameroon	5.0	18.5	4.8	18.0	4.0	14.8
Central African Republic	4.3	71.3	4.2	70.6	4.1	67.7
Chad	11.8	69.7	11.3	66.9	10.9	64.6
Côte d'Ivoire	4.8	17.3	4.3	15.5	3.9	14.2
Democratic Republic of the Congo	76.0	85.1	78.2	87.6	76.0	85.1
Eritrea	5.9	97.7	5.9	97.3	5.9	96.8
Eswatini	0.3	24.7	0.3	22.8	0.2	21.5
Ethiopia	34.8	30.3	34.7	30.3	30.4	26.5
Gambia	0.7	31.8	0.6	26.9	0.5	25.1
Ghana	2.3	8.0	2.1	7.0	1.7	5.9
Guinea	2.0	15.7	1.8	14.0	1.6	12.9
Guinea-Bissau	0.4	22.2	0.4	21.7	0.3	18.0
Kenya	13.6	27.3	13.1	26.3	11.4	22.9
Lesotho	1.4	71.9	1.4	71.1	1.3	66.3
Liberia	2.9	58.1	2.9	57.3	2.8	54.6
Madagascar	16.1	59.8	16.2	60.2	15.4	57.2
Malawi	6.5	30.5	6.3	29.5	5.7	26.8
Mali	3.0	15.2	2.6	13.5	2.4	12.2

	Updated estimate		IFSA 2020 estimate		Pre-COVID 19 estimate	
	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure	Number of food insecure	Share of the population food insecure
	(million)	(percent)	(million)	(percent)	(million)	(percent)
Mauritania	0.5	13.0	0.5	13.1	0.4	10.2
Mozambique	13.2	46.0	12.2	42.8	11.8	41.2
Namibia	1.0	37.8	0.9	33.4	0.8	29.5
Niger	6.2	29.4	6.2	29.4	5.5	26.1
Nigeria	78.6	36.7	74.9	35.0	65.7	30.7
Republic of the Congo	2.8	53.2	2.7	50.7	2.4	45.1
Rwanda	3.8	29.8	3.6	28.7	3.3	26.3
Senegal	2.3	14.4	2.6	16.5	2.3	14.4
Sierra Leone	2.5	37.4	2.4	36.7	2.1	31.9
Somalia	5.6	47.5	6.0	51.1	5.5	46.4
Sudan	24.2	53.1	24.3	53.3	20.5	44.9
Tanzania	21.1	36.1	21.1	36.0	19.7	33.6
Togo	2.3	26.4	2.3	26.5	2.0	23.4
Uganda	16.4	37.6	16.2	37.2	15.3	35.2
Zambia	12.2	70.3	11.8	67.9	11.2	64.1
Zimbabwe	9.1	62.9	8.3	57.2	7.0	47.9
<b>Total for IFSA countries</b>	<b>920.6</b>	<b>24.0</b>	<b>844.3</b>	<b>22.0</b>	<b>760.8</b>	<b>19.8</b>

Note: Regions include only those countries that are a focus of this study. IFSA 2020 refers to results presented in the USDA, Economic Research Service (ERS) Food Security Assessment Situation and Outlook No. (GFA-31). Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020.

Source: Calculated by USDA, ERS using the IFSA model

**Appendix Table 3**  
**Food gap for 2020 in International Food Security Assessment (IFSA) countries**

	Updated estimate		IFSA 2020 estimate		Pre-COVID-19 estimate	
	Per capita		Per capita		Per capita	
	(Kcal/day)	(1000MT)	(Kcal/day)	(1000 MT)	(Kcal/day)	(1000MT)
<b>Asia</b>	<b>294</b>	<b>870</b>	<b>278</b>	<b>701</b>	<b>268</b>	<b>610</b>
Afghanistan	436	1,286	468	1,496	436	1,283
Armenia	178	2	176	2	170	1
Azerbaijan	171	9	167	7	162	6
Bangladesh	273	1,203	272	1,166	265	1,029
Cambodia	289	151	297	172	282	133
Democratic People's Republic of Korea	445	1,046	430	956	427	940
Georgia	228	13	226	13	215	9
India	247	6,072	233	4,306	226	3,559
Indonesia	246	794	242	711	237	619
Kyrgyzstan	209	9	207	8	196	6
Laos	184	7	187	8	180	5
Moldova	199	9	197	9	186	6
Mongolia	337	44	328	40	316	34
Nepal	235	91	233	87	230	80
Pakistan	377	3,582	375	3,496	362	3,053
Philippines	347	1,428	331	1,139	322	1,006
Sri Lanka	263	189	264	193	247	138
Tajikistan	415	220	389	178	377	160
Turkmenistan	191	5	188	5	183	4
Uzbekistan	194	45	184	29	177	22
Vietnam	266	414	264	393	259	348
Yemen	735	2,516	455	1,004	451	977

<b>Latin America and the Caribbean</b>	<b>336</b>	<b>179</b>	<b>329</b>	<b>160</b>	<b>314</b>	<b>135</b>
Bolivia	344	245	333	219	311	173
Colombia	250	172	237	123	230	99
Dominican Republic	211	24	206	20	198	15
Ecuador	269	185	261	165	245	124
El Salvador	281	40	277	38	263	29
Guatemala	363	226	362	223	350	195
Haiti	709	595	707	592	687	546
Honduras	334	86	331	82	317	67
Jamaica	225	11	222	10	209	7
Nicaragua	428	133	421	125	406	110
Peru	280	251	258	164	243	117
<b>North Africa</b>	<b>257</b>	<b>90</b>	<b>254</b>	<b>81</b>	<b>245</b>	<b>65</b>
Algeria	276	165	266	132	255	100
Egypt	234	74	236	82	234	74
Morocco	266	91	264	87	254	66
Tunisia	252	28	248	25	237	18
<b>Sub-Saharan Africa</b>	<b>430</b>	<b>701</b>	<b>426</b>	<b>699</b>	<b>410</b>	<b>625</b>
Angola	499	1,265	488	1,198	479	1,139
Benin	300	77	297	72	293	68
Burkina Faso	440	302	440	302	431	277
Burundi	590	697	597	712	552	615
Cabo Verde	299	6	280	4	262	3
Cameroon	293	189	291	182	278	144
Central African Republic	537	272	533	267	515	247
Chad	628	943	608	876	593	825
Côte d'Ivoire	384	263	375	230	367	206
Democratic Republic of the Congo	932	8,235	971	8,823	932	8,235
Eritrea	857	633	839	617	816	597
Eswatini	286	9	279	8	275	8



Ethiopia	327	1,248	326	1,244	313	1,046
Gambia	332	26	314	21	308	19
Ghana	246	74	241	63	234	52
Guinea	326	90	318	78	312	71
Guinea-Bissau	307	17	305	17	291	13
Kenya	305	515	302	490	290	411
Lesotho	510	83	505	81	477	71
Liberia	614	205	609	201	593	186
Madagascar	458	1,045	460	1,059	445	972
Malawi	369	280	365	268	354	236
Mali	306	116	298	101	292	88
Mauritania	287	19	287	19	274	14
Mozambique	457	790	442	713	435	674
Namibia	307	38	293	32	280	27
Niger	415	360	415	360	400	308
Nigeria	361	3,666	354	3,433	339	2,879
Republic of the Congo	387	143	377	133	356	112
Rwanda	366	171	362	162	353	145
Senegal	249	81	257	95	249	81
Sierra Leone	461	177	458	173	436	143
Somalia	475	304	492	339	470	294
Sudan	453	1,290	454	1,297	417	1,004
Tanzania	465	1,224	465	1,221	453	1,111
Togo	323	91	323	92	312	78
Uganda	420	842	418	830	409	769
Zambia	685	997	667	939	640	850
Zimbabwe	529	571	498	490	454	373
<b>Total for IFSA countries</b>	<b>368</b>	<b>642</b>	<b>360</b>	<b>589</b>	<b>346</b>	<b>520</b>

Note: Regions include only those countries that are a focus of this study. IFSA 2020 refers to results presented in the USDA, Economic Research Service (ERS) Food Security Assessment Situation and Outlook No. (GFA-31). Pre-COVID-19 estimates refer to ERS International Macroeconomic Dataset figures released in January 2020. Kcal = Kilocalories. MT= Metric Tons.

Source: Calculated by USDA, ERS using the IFSA model.