

World Food Supply and Demand Projections to 2031: The Agricultural Outlook Beyond the COVID-19 pandemic

FURUHASHI Gen

1. Introduction

In the global food supply and demand, food consumption including that of livestock products has been increasing in emerging economies and developing countries with a background of their population growth and economic growth, while production of crops and oilseeds has been increasing in both developing and developed countries due to productivity improvements, thus ensuring that supply exceeds the growth of demand. In this context, the global outbreak of the COVID-19 pandemic in 2020 has had a major impact on the global supply and demand for food globally, and the sense of unpredictability has increased as supply chain disruptions and other types of uncertainty have spread. As a food-importing country, Japan is one of the world's largest importers of crops and oilseeds and therefore depends heavily on global food supply and demand trends to maintain a domestic stable supply of food.

From this outlook, every year since the fiscal 2008, the Policy Research Institute of the Ministry of Agriculture, Forestry and Fisheries has been publishing its "World Food Supply and Demand Projections" for 10 years in the future as an annual report, using the "World Food Supply and Demand Model." In March 2022, the "World Food Demand and Supply Projections to 2031" (hereinafter referred to as the "2031 Projection") was released with 2019 as the base year (using the three-year average for 2018-2020). This report projects the global supply and demand for food in 2031, taking into account the major slowdown in the global economy caused by policy measures to prevent the spread of the COVID-19 pandemic, which will likely persist beyond 2020 and 2021.⁽ⁱ⁾ This paper presents an overview of the "2031 Projection" and, despite the space limitations of this journal, discusses the projections for maize. For more details, please see the full text of the "World Food Supply and Demand Projections to 2031."⁽ⁱⁱ⁾ However, the impact of Russia's aggression against Ukraine, which has been ongoing since February 2022, has not been factored into these projections, as the situation remains in flux in the world.

2. Features of the World Food Supply and Demand Model

The World Food Supply and Demand Model is a "large-scale simultaneous equations model for supply-demand balance" consisting of about 6,000 equations and that uses equilibrium prices as a intermedium for annually balancing supply and demand for 20 major food and agricultural commodities, including grains and livestock products, into the entire world as a single market through the projection's target year for the future. It's based on assumptions of the prospect for total population, economic growth rates, and other macroeconomic indicators in the medium term. Items projected by the World Food Supply and Demand Model mainly include production by commodity and region, consumption, net exports (or net imports), and international reference prices (real and nominal) by commodity. The 20 commodities comprise six arable crops (wheat, maize, rice, other coarse grains, soybeans, and other oilseeds), five meat and poultry products (beef, pork, chicken, mutton, and hen eggs), four processed products from arable crops (soybean meal, other oil meal, soybean oil, and other vegetable oil), and five raw milk and dairy products (raw milk, butter, skimmed milk powder, cheese, and whole milk powder).

3. The 2031 Projection

(1) Assumptions in the 2031 Projection

The projections of the global food supply and demand generated by the "World Food Supply and Demand Model" are the result of calculations based on normal projections (baseline projections) which assume that each country's policies would maintain the status quo and that weather conditions would remain normal.

The future total population is assumed to increase mainly in emerging economies and developing countries in Asia and Africa, reaching a global total of 8.57 billion in 2031 (up 11.7% from the base year), and real GDP per capita is assumed to increase to US\$13,881 in 2031 (up 26.4% from the base year), while the outlook for the global economic growth is based on projections by the International Monetary Fund (IMF) including a major global economic slowdown following the COVID-19 pandemic and subsequent recovery. The global economy experienced a historic slowdown in the first half of 2020 owing to the COVID-19 pandemic and measures taken by countries to prevent the spread of the disease, including lockdowns. Although an economic recovery was globally underway in 2021, its pace was hindered by waves of COVID-19 variants. Starting in 2022, the economy is expected to pick up thanks to policies and support from a number of countries, but the journey to economic recovery

and the end of COVID-19 is still ongoing. Currently, with the renewed spread of COVID-19, a rapid economic recovery has been suppressed, and economic recovery in individual countries has been mixed. However, relatively high economic growth as the outlook is expected in the medium term in developing countries and emerging economies such as India. Simultaneously, economic growth is expected to be slower than before COVID-19, not only in developed countries but also in developing countries, including China, and the global economy is expected to grow more slowly than it has in the past.

Figure 1 shows the 22–31 average GDP real growth rate in addition to the 2020 and 2021 years after considering the impact of the COVID-19 pandemic. Although growth rates in most major countries fell sharply in 2020 and began to recover in 2021, the medium term 22–31 average economic growth rate would be noticeably slower across the whole global economy, including China, than was projected before the pandemic.

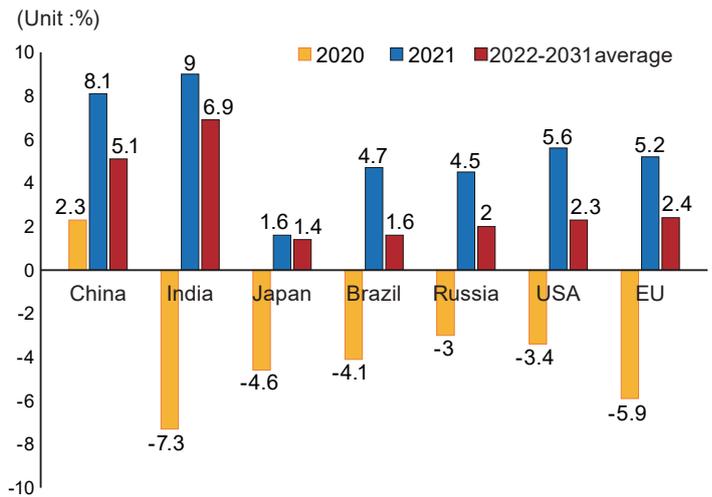


Figure 1. Economic outlook for major countries for 2020 and beyond

Source: the 2031 Projection (from the IMF Economic Outlook, among others)

(2) Overview of the 2031 Projection

Based on the above assumptions, the global demand for grains is expected to slow not only in developed countries but also in emerging economies and developing countries, although it will be supported by demand for biofuel feedstocks. However, total world grain consumption is expected to increase from 2.66 billion tons in the base year to 3.06 billion tons in 2031, as demand for food and feed will continue to rise over the medium term gradually, mainly in emerging economies and developing countries, owing to continued population growth in Asia, Africa, and elsewhere, despite anticipated moderate income growth. Feed grain consumption is expected to grow by 18% over the base year, which is much higher than the 14% growth rate for food grains and the like, due to such factors as higher meat consumption, but it is still significantly lower than the growth rate of the past decade or so. Simultaneously, the world harvested area for major grains is expected to decline by 0.8% overall, compared with the base year, but production will increase due to grain yields rise by 16.5%.

Consequently, international reference prices for grains and oilseed crops are expected to trend slightly downward, as livestock prices would face intensifying downward pressure, while the growth of the global demand and supply for grains and oilseed crops would move almost in tandem.

(3) The Projection for Maize

Due to space limitations, we discuss only maize among the items in the 2031 Projection by commodity and region (Figure 2).

Currently, North America is the largest net exporter of maize, followed by Latin America and Europe, while Asia, Africa, and the Middle East are the largest net importers. In the 2031 Projection, while North America’s net exports will depend on the U.S., where demand for maize-based bioethanol is firm and supports overall demand for maize, overall growth in demand is limited but net exports are expected to increase. Meanwhile, on the supply side, growth in the harvested area for maize in the U.S. will remain almost flat due to projected low real prices, while production is expected to outpace the increase in consumption, as maize yield is expected to increase, albeit more slowly than in the prior decade, and this will result in U.S. net exports increasing to 66.69 million tons by 2031.

Latin America is expected to see a 26.6% increase in production through 2031 over the base year, with net exports increasing to 48.56 million tons. Brazil’s net exports are expected to reach 44.7

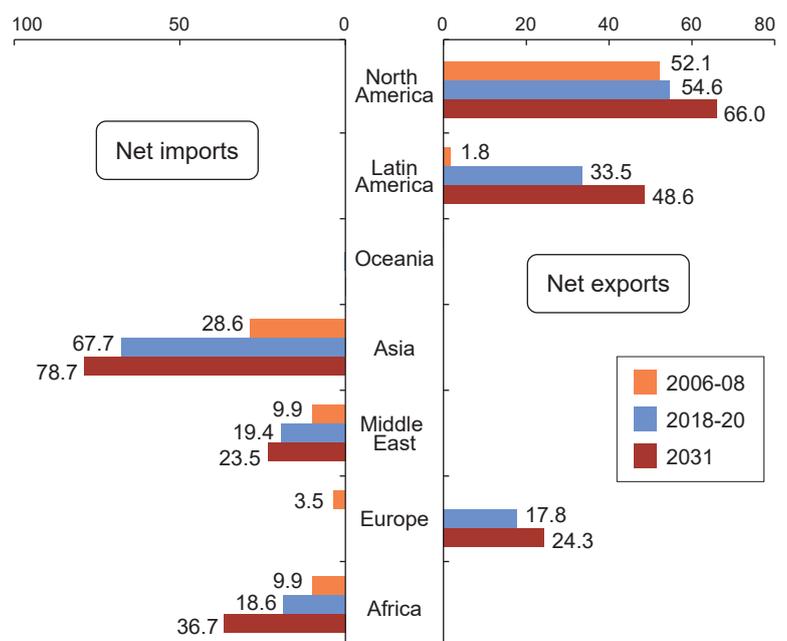


Figure 2. Projection for maize trade volumes (net trade) by region (in millions of tons)

Source: the 2031 Projection

million tons in 2031. Production is expected to continue increasing owing to an expansion of arable land in the "Cerrado" region of the country's Central West area, as well as the introduction of a second maize crop and genetically recombined (modified) maize.

Net imports are expected to continue increasing in Asia, Africa, and the Middle East until 2031, particularly in Asia, where net imports will grow to 78.69 million tons by 2031. China's economic recovery during the COVID-19 pandemic led to increased demand for livestock products, and imports of feed products increased sharply beginning in the late 2020, with net imports reaching 20.63 million tons in the base year. Furthermore, considering China's domestic policy of emphasizing such crops as soybeans and its limited ability to increase maize production further to meet higher domestic demand for feed, if the current policy, which seems to allow for some imports, continues, net imports are expected to rise further, to 22.37 million tons by 2031. Net imports by Southeast Asian countries are also expected to increase, with Vietnam alone accounting for 12.93 million tons of net imports.

4. Conclusion

Released more than two years after the World Health Organization declared the COVID-19 pandemic in March 2020, the 2031 Projection shows that real prices for most grain commodities will be lower than that in the base year owing to downward pressure with lower demand growths. In this context, in addition to further dependence on agricultural exporting countries, which is becoming increasingly skewed, we must watch closely whether the high productivity growth, such as yields, that was maintained throughout the 2010s can be continued in the future. Furthermore, even if the economy is able to get back on track for an early recovery in the post COVID-19 shortly, there are concerns about the risk of a large upward swing in prices for grains and oilseed crops in 2022 and beyond, due to such factors as supply chain disruptions and high inflation caused by soaring energy and resource prices, as well as uncertainty about the impact of the situation in Ukraine.

As mentioned above, uncertainty is expected to grow, even in the medium term, but the Policy Research Institute of the Ministry of Agriculture, Forestry and Fisheries will be carefully analyzing trends in the global food supply and demand based on the latest statistics and new assumptions and will be making appropriate outlook.

(i) These assumptions are based on the outlook for macroeconomic indicators and other factors prior to Russia's aggression against Ukraine.

(ii) "World Food Supply and Demand Projection to 2031"

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