

World Food Supply and Demand Projections for 2027

— Forecast Results from the World Food Supply and Demand Model —

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1. Introduction

Japan, as a net food importer, has greatly depended on the global markets of food and agricultural products. Projections of world food supply and demand through an analysis based on multi commodities and multi countries and regions with econometric methods are significant for policy implication designed to ensure food security of Japan. The Policy Research Institute of the Ministry of Agriculture, Forestry and Fisheries has responded by releasing the updated world food supply and demand projections for the global food markets every year since 2008. The institute has developed a model called the World Food Supply and Demand Model that can project demand and supply in the coming decade. The latest projection, released in March 2018, is entitled “World Food Supply and Demand Projections to 2027” which was estimated from the year of 2015 as the base year to the next decade. This paper provides an overview of the projection. For more information on the projection, see the publicly released material available at (<http://www.maff.go.jp/primaff/seika/jyukyu.html>) in Japanese.

2. Characteristics of the World Food Supply and Demand Model

The World Food Supply and Demand Model includes a number of assumptions, such as the rate of population change and the economic growth rate in the future, and is a “large-scaled simultaneous equation method for supply and demand equilibrium model” in the demand and supply for each commodity, which are intermediated by its price and with the entire world as one market and are consistent up to the target year for the projections. It consists of a combination of approximately 6,000 equations. Please refer to *PRIMAFF Review* No.72 of this journal (July 2016) for a detailed description of this model. The model targets a total of 20 commodities: 6 crops (wheat, corn, rice, other coarse grains, soybeans, and other oilseeds), 5 livestock products (beef, pork, chicken, mutton, and eggs), 4 processed crops (soybean meal, other oil meal, soybean oil, and other vegetable oil), and 5 dairy products (raw milk, butter, skimmed-milk powder, cheese, and whole-milk powder). The projection items in the World Food Supply and Demand Model are: consumption volume by commodity, by area, and by country; production volume; net import and export volumes; and real and nominal international prices by commodity.

3. Assumptions for the projections

Since the projection looks 10 years ahead, it uses 2027 as the target year and 2015 as the base year. However, in order to even-out abnormal yearly values, the 2015 base year figures are averages of the three-year period from 2014 to 2016. The projections use the following estimates. The global population in 2027 is projected to reach 8.33 billion (up 12.9%), mainly through population growth in the emerging economies and developing countries in Asia, Africa, and elsewhere. The real per-capita GDP is projected to rise to \$12,903 (up 25.8%). Despite perceived slowdowns in some developed and emerging countries, continued moderate global economic growth is projected for the medium term, and thus the general population growth and economic growth rates of emerging and developing countries are expected to continue affecting food supply and demand.

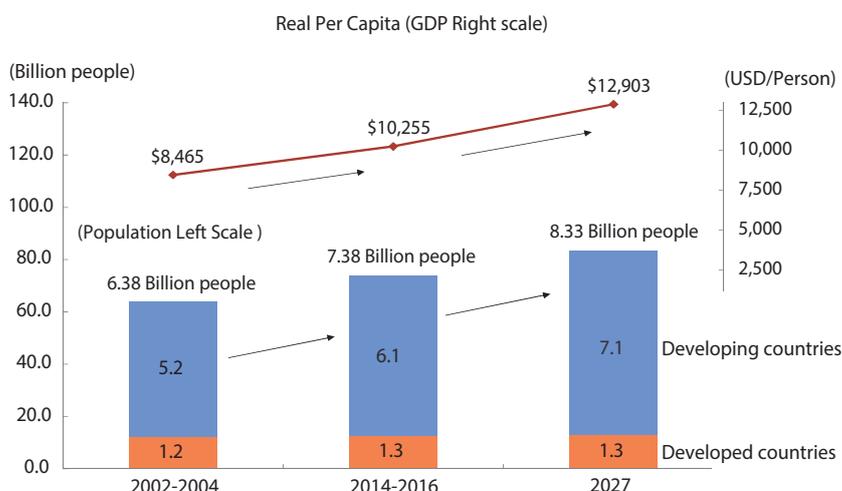


Figure 1. World total population and real GDP per capita

Source: Estimated from the World Bank's "World Development Indicators 2017" and the United Nation's "World Population Prospects: The 2017 Revision".

Note: 2002-2004 and 2014-2016 are the 3-year average values (in the section, same below)

4. Projection results

Demand quantity for world grains is forecast to reach 2.91 billion tons in 2027. Despite slowing growth in demand for farm products in the years ahead, ongoing global population growth and improving income levels will result in growing demand for food and feed, mainly in the emerging and developing countries. Factors such as growth in meat demand will lead to a higher growth rate in demand for feed grain (24%) than for food grain (Figure 2). Grain production volume is projected to grow by 16.4% due to a 16.0% increase in yield,

despite the projection that total harvested land area will be constant. The paragraphs below describe the projections for the supply of and demand for each commodity in each region in 2027.

Wheat: It is projected that the present situation will continue and Asia and Europe will account for approximately 70% of the world production and consumption quantities. It is also projected that the net import will increase, mainly in Africa, Asia, and the Middle East, where the production levels are low compared to the consumption, while the net export will increase in Europe (mainly in Russia, and the Ukraine), and also in North America and Oceania.

Rice: Asia will constitute more than 80% of the world production and consumption quantities and demand in Asia will continue to expand in the future, while in other regions, consumption will increase alongside population growth, particularly in Africa and the Middle East. It is also projected that while the net import will increase in Africa and the Middle East, the net export will grow in Asia, mainly in India, Vietnam, and Thailand and therefore, trade will flow from Asia to Africa and the Middle East.

Corn: The production and demand of corn are projected to increase in all regions. In particular, the net import in Asia and Africa will rise, while net exports will increase in North America and Latin America, driven by the United States and Brazil.

Soybeans: It is projected that the growth in the soybean production will be relatively low in Asia and Europe, but that it will become high in Latin America and North America, and that on the other hand, the demand will increase mainly in Asia. Therefore, it is projected that the increase in the net import in Asia (particularly China) and Europe will be covered by the increase in the net export from Latin America driven by countries like Brazil and Argentina, and from North America driven by the United States.

As described above, it is expected that the supply and demand of grains and other commodities will be basically balanced, so the international prices of grains and other commodities will not return to the pre-2006 levels, but in real terms, they will trend within a flat range (Figure 3).

There are no major changes surrounding the global supply and demand in the commodity markets to the results of current projections compared to the previous projections for 2026 published in the last year, because there have been no significant changes to the conditions with policies and uncertainties in major exporting and importing countries that constitute the assumptions for them. Within this situation, if we were to cite a difference in the current projections, it would be that the prices of grains and other commodities are at a slightly lower level than in the previous projections.

The base year has been updated to 2015, with a 3-year average of 2014 to 2016. (Previously, it was 2014, with a 3-year average of 2013 to 2015.) However, the international agricultural commodities prices have shown a decreasing trend since 2015, which has newly become part of the base year average, and therefore, for practically all of the commodities, the base-year price has fallen compared to the previous projections.

As described above, this paper introduces the World Food Supply and Demand Projections for 2027. In the future, the Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries, shall continue to make timely, appropriate projections based on the latest assumptions.

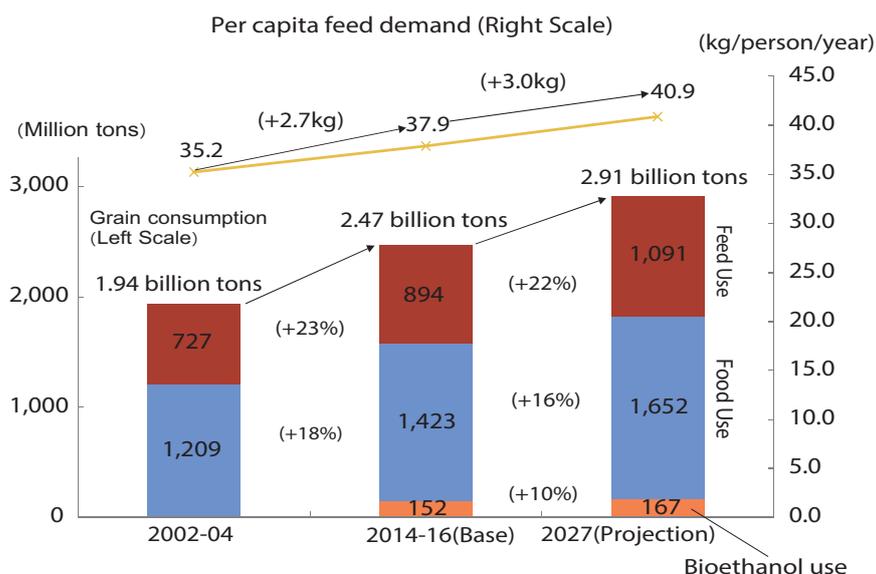


Figure 2. Demand for grains and per capita demand of meat

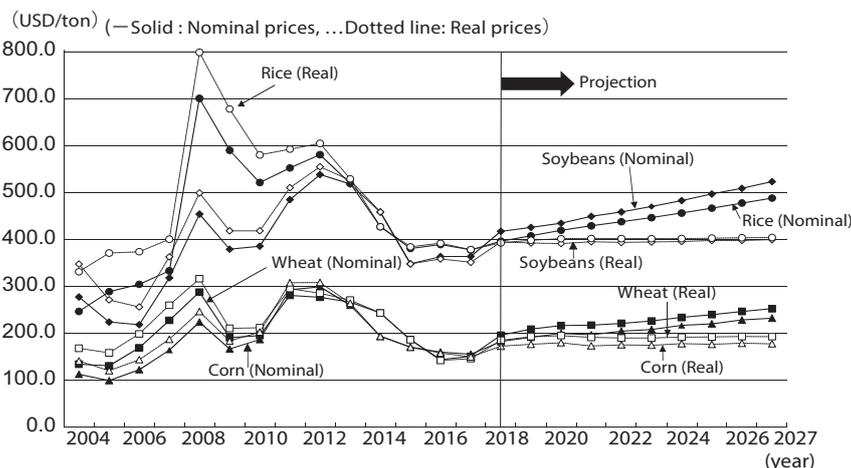


Figure 3. International price projections for grain and soybeans

- Notes
1. Prices till 2017 are real prices. Prices for 2018–2027 are projections.
 2. Past actual prices and future nominal prices use 2015 (average of three years from 2014 to 2016) as the base year. Wheat, corn, and soybean prices were calculated using the U.S. consumer price index (CPI), and rice prices were calculated using Thailand's CPI (all from IMF data).