

Agriculture and Food Security in Asia: Future Scenarios¹

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Introduction

Asia has made significant progress in increasing its agricultural productivity and reducing poverty since the 1960s. Yet real world food prices of most cereals and meats are now projected to rise, reversing a long-established downward trend with adverse impacts on poor consumers in Asia and elsewhere. Growing resource scarcity, particularly of water and land, will increasingly constrain food production growth, and climatic stresses will likely shrink Asian farmers' abilities to produce grains. Meanwhile, growing demand for high-value foods, such as livestock, fish, vegetables, and fruits will put further pressure on the natural resource base. Moreover, bioenergy demands will compete with the land and water resources that are used for food. The consequences of these pressures will adversely affect food security and goals for human well-being, slowing progress in efforts to reduce childhood malnutrition. Drawing on projections of the International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT), we find that policy reforms and increased investments in agricultural research and development are required to boost crop yields and growth in livestock numbers.

Modeling Global Futures

IMPACT was developed in the early 1990s by researchers at IFPRI in response to the prevailing lack of long-term vision and consensus about the actions that are necessary to feed the world in the future, reduce poverty, and protect the natural resource base. IMPACT is a partial equilibrium agricultural sector model representing a competitive agricultural market for crops and livestock. Demand is a function of prices, income, and population growth. Growth in crop production in each country is determined by crop and input prices and the rate of productivity growth. World agricultural commodity prices are determined annually at levels that balance food supply and demand. IMPACT generates projections for crop area, yield, production, demand for food, feed and other uses, prices, and trade; and for livestock numbers, yield, production, demand, prices, and trade (for more details, see Rosegrant et al. 2008).

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Future Global Trends in Food Prices and Food Security

In the business-as-usual baseline scenario, which incorporates our best estimates of income and population growth and investment in agricultural research and irrigation, cereal demand is projected to increase by more than one-third. There will be no growth in per capita food demand for cereals, but there will be expanded demand of cereals for livestock feed, particularly maize and other coarse grains. As a result of income growth and increased urbanization, consumption of meat and dairy is expected to increase very rapidly in Asia. Dietary shifts that are driven by population and economic growth fuel rapid increases in demand for high-value products that put additional pressure on food production systems.

With the declining availability of both water and land that can be profitably brought under cultivation, expansion in area is expected to contribute little to future production growth in Asia. Under business-as-usual, Asian harvested area for cereals is expected to decline from 292 million ha in 2010 to 278 million ha by 2050. The projected decline in crop area places the burden to meet future cereal demand on crop yield growth. Although yield growth will vary considerably by commodity and country, in the aggregate and in most countries, growth is projected to continue slowing. The yield growth rate for all cereals in Asia is projected to decline from more than 1.5 percent per year in the period from 1990–2010 to 0.90 percent annually from 2010–2050.

With slowing growth in production and continued growth in demand for cereals and meat, Asia will import considerably more of these commodities in the future. All sub-regions except Central Asia will increase imports of cereals, with China projected to import 122 million metric tons of cereals in 2050, India 40 million metric tons, and the rest of South Asia another 40 million tons. China is projected to move from small exports of meat to imports of 16 million metric tons in 2050; other Asian sub-regions are projected to import 1–3 million metric tons each.

Due to these trends in demand and supply growth, real world cereal and meat prices are projected to increase in the coming years—in stark contrast to the trends over the past 40 years. The significant projected price increases for cereals and meat are shown in Figures 1 and 2. These changes are driven by new developments in supply and demand—including the much more rapid degradation of natural resources on the food production side, particularly as a result of rapidly growing water scarcity and growing heat and drought stress. Combined with these changes is slowing yield growth that is unable to catch up with market dynamics.

The dramatic reversal of earlier food price declines will slow growth in calorie consumption, with both direct price impacts and reductions in real incomes for poor consumers who spend a large share of their income on food. As a result, there will be relatively slow improvement in food security for the poor in Asia under business-as-usual. The number of people at risk of hunger is projected to only decline from 495 million in 2010 to 357 million in 2050.

Alternative Scenarios

The baseline scenario shows that real world prices of most cereals and meat are projected to increase in the coming decades, reversing trends from the past several decades. Rising prices will slow food demand growth for poor consumers and will adversely impact food security and human well-being in Asia. Rising prices and poor progress on food security are not, however, inevitable. New approaches to financing and implementing agriculture that aim to increase investment in agricultural research and development, as well as irrigation infrastructure, basin-level water use efficiency, rural roads, education, and access to safe drinking water, can increase the food supply, as well as reduce hunger and poverty and improve rural livelihoods and food security. Alternative scenarios in the IMPACT model indicate that increased expenditures in these productivity-enhancing investments can reduce the number of people at risk of hunger by 30–40% in 2050 compared to the baseline scenario.

Policy Conclusions

The challenges posed by the baseline scenario show that significant improvements need to be made in policies and investments for agricultural development and food security. Priority strategies include a) the promotion of productivity and income growth in agriculture and rural development; b) investment in rural infrastructure, including roads and irrigation; c) development of mechanisms to make markets work better for the poor; d) encouragement of improved diets and food safety; e) removal of biases against the poor in public spending, taxation, trade, and regulation; and f) provision of effective social protection for those who are left behind.

Agricultural development cannot be achieved without higher agricultural productivity. The keys to higher agricultural productivity are investment in agricultural research and development; improvement in on-farm management; and investment in rural infrastructure. From the agriculture sector, the emphasis should be on research targeting abiotic and biotic stresses as well as yield potential. Significant gains can also be achieved at the farm level, through policies and extension programs to improve precision agriculture, minimum tillage, integrated nutrient management, and integrated soil fertility management. Rural infrastructure investment to improve access to markets, risk insurance, credit, and inputs, among others, must also be increased, particularly in lagging regions.

Figure 1. Percent change in world prices of cereals between 2010 and 2050.

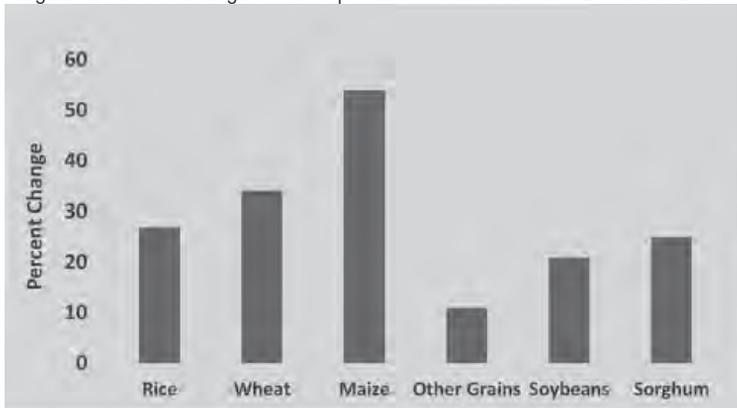
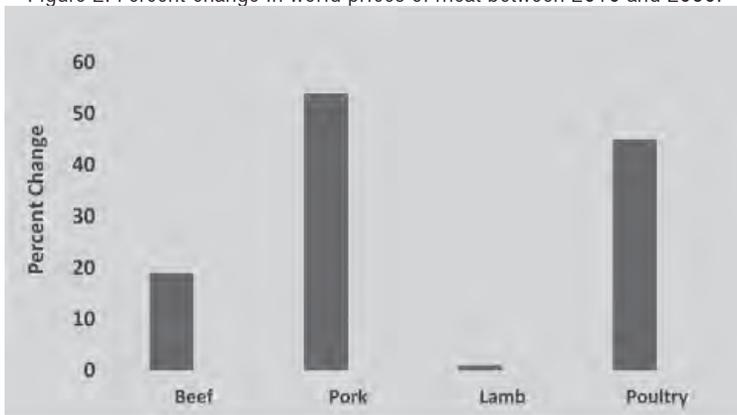


Figure 2. Percent change in world prices of meat between 2010 and 2050.



References

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