

The rice crisis: What needs to be done?

A background paper by the International Rice Research Institute (IRRI)

The rice crisis is now a major concern that is highlighted daily on the front pages of newspapers and on prime-time television. This paper explains the reasons behind the rapid increase in rice prices and what must be done to achieve reliable, plentiful supplies of affordable rice.

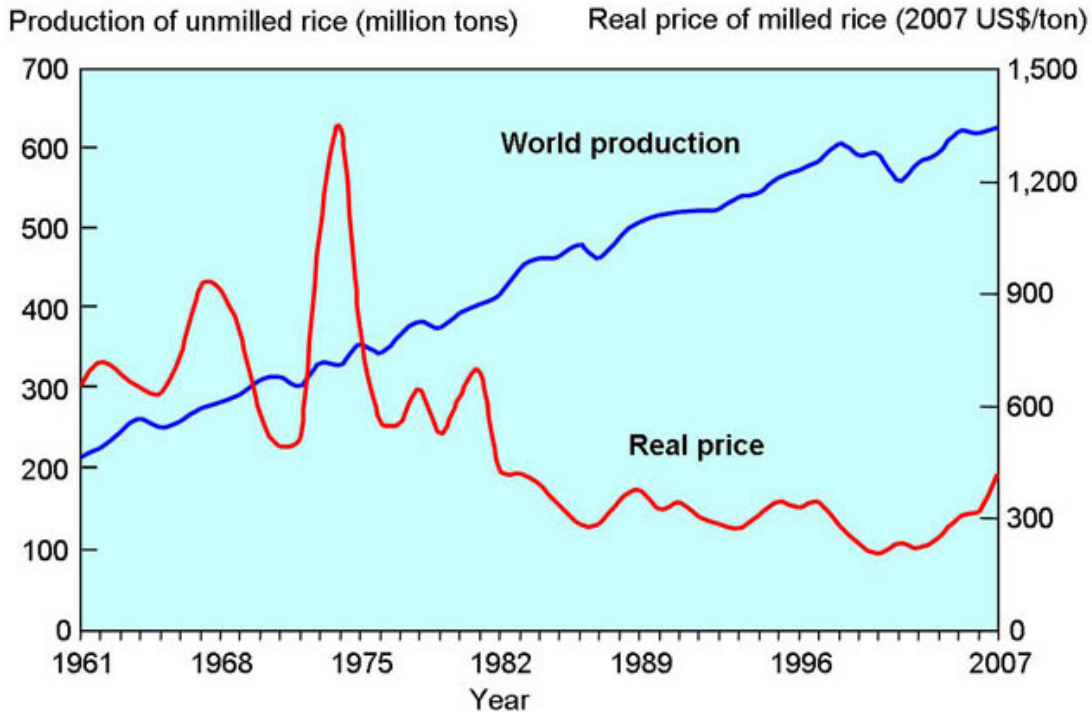
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What is happening?

The poorest of the world's poor are the 1.1 billion people with income of less than a dollar a day. Around 700 million—almost two-thirds—of these people live in rice-growing countries of Asia. Rice, the dominant staple in Asia, accounts for more than 40% of the calorie consumption of most Asians. Poor people spend as much as 30–40% of their income on rice alone. Ensuring sufficient supplies of rice that is affordable for the poor is thus crucial to poverty reduction. Given this, the current sharp increase in rice price is a major cause for concern.

The Green Revolution in Asia, which began in the 1960s with the introduction of modern, high-yielding rice varieties, led to a rapid rise in both rice yields and overall production. This contributed to poverty reduction directly through increased income for rice farmers and indirectly through lower prices for rice, which benefited poor consumers in both rural and urban areas (Figure 1).

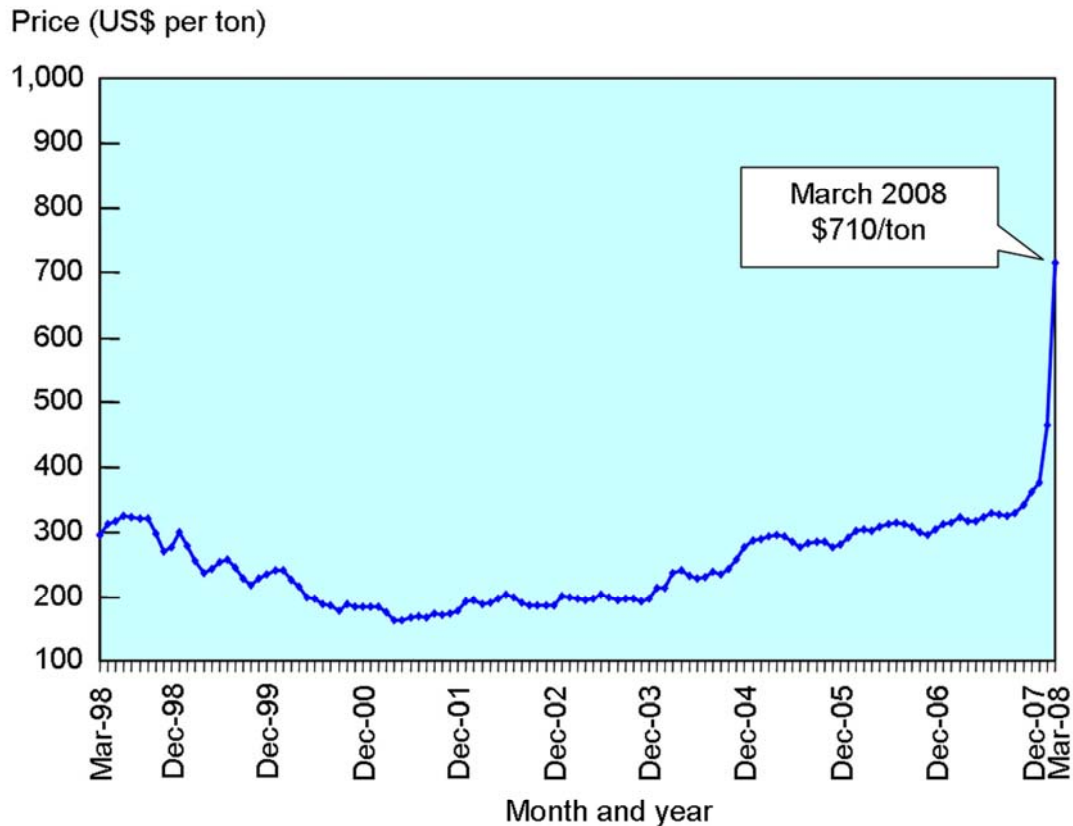


Source: Production: USDA, 14 April 2008
 Rice Price: 2008 is average of Jan-March 2008. Relate to Thai rice 5%-broken deflated by G-5 MUV Index deflator (adjusted based on 27 February, 2008 data update)
 Source: www.worldbank.org

Fig. 1. Trends in world production and real price of rice, 1961-2008

However, this long-term decline ended in 2001, with the rice price taking a sustained upward turn since then. The price continued to rise throughout 2007 and has sharply increased in the first quarter of 2008 (Figure 2). The world price of Thai rice, 5%-broken—a popular export grade—in December 2007 was \$362 per ton but almost doubled to \$715 per ton in March this year.

Major exporting countries such as Vietnam and India have announced different forms of export restrictions to protect their domestic consumers. These restrictions have further contributed to the recent increase in rice price as the rice supply in the world market has dwindled. While exporters are holding on to their stock of rice, importers are rushing into the market to buy more rice to meet their consumption needs and to build their own stock. Hoarding by traders for speculative purposes has added fuel to the fire in some countries. The market shortages and rise in price have now reached a crisis point, with recent quotes for rice price being as high as \$1,000 per ton. Food riots have occurred in several countries and soldiers are guarding food trucks to prevent looting.



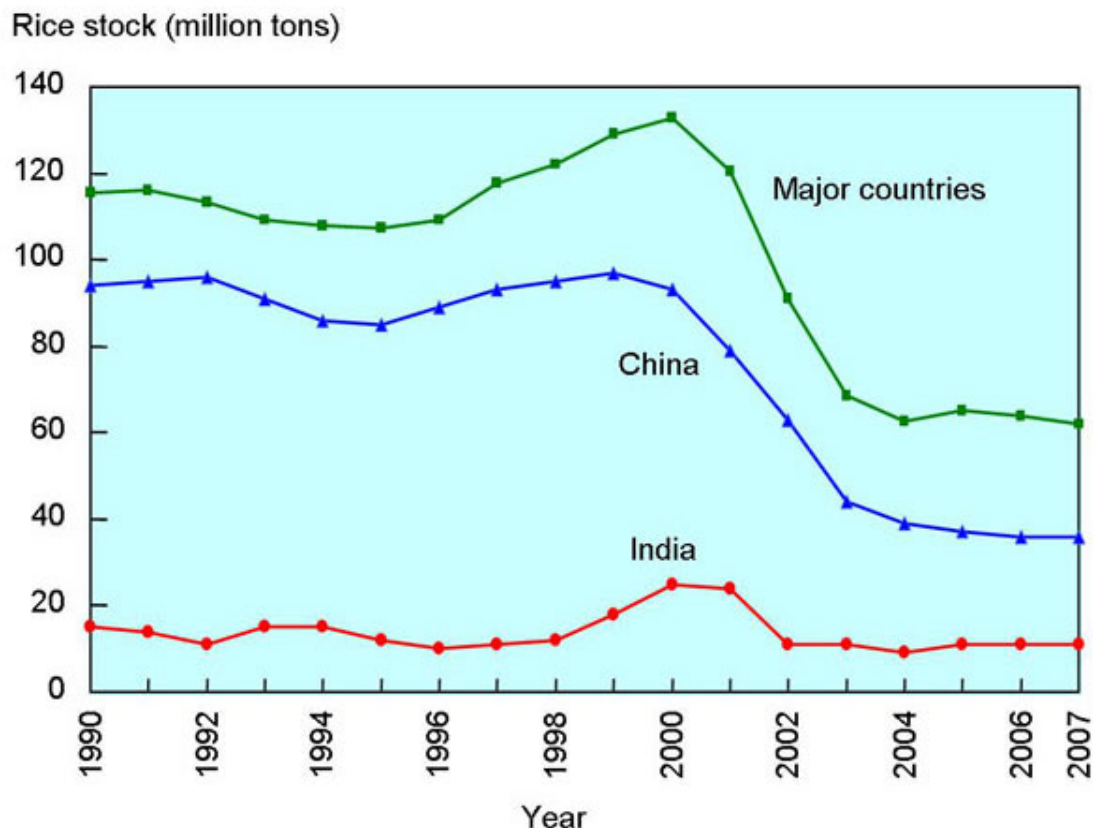
Source of raw data: The Pinksheet, World Bank
Mar 2008 data from Oryza.com

Fig. 2. Monthly export price (US\$/ton FOB) of Thai rice 5%- broken, 1998-2008 (March 1998 to March 2008)

What are the underlying reasons for the rice crisis?

We are consuming more than we are producing

Many factors, both long- and short-term, have contributed to the rice crisis. At a fundamental level, the sustained rise in the price over the past 7–8 years indicates that we have been consuming more than we have been producing. This imbalance between demand and production has been partly masked by a reduction in rice stockpiles. In fact, rice stocks are being rapidly depleted, with current stocks at their lowest since 1988 (Figure 3). This depletion of stock has moderated the rise in price that would have occurred otherwise. The current low stocks, however, negate the chances of such a moderating influence in the future and increase the risk of a sharp rise in price.

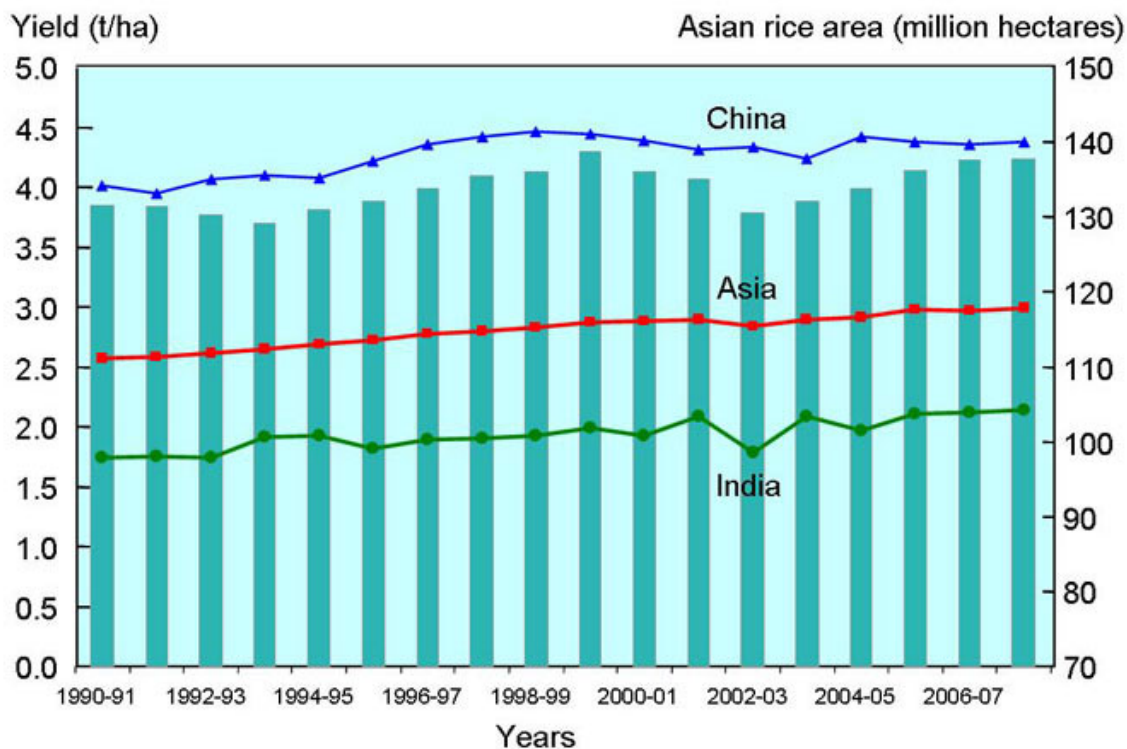


Source of raw data: PSD Online (www.fas.usda.gov/psdonline/psdhome.aspx), USDA, 2008

Fig. 3. Rice stocks, 1990-2007

Annual growth in yield is slowing

A major reason for the imbalance between the long-term demand and supply is the slowing growth in yield, which has decreased substantially over the past 10–15 years in most countries. In South Asia, average yield growth decreased from 2.14% per year in 1970-90 to 1.40% per year in 1990-2005. In some years, this has been below 1%. Yield growth in Southeast Asia has decreased similarly. In the major rice-growing countries of Asia, yield growth over the past 5–6 years has been almost nil (Figure 4). Globally, yields have risen by less than 1% per year in recent years.



Source of basic data: USDA, 1990-2007

Fig. 4. Trends in rice area (columns) and yield (lines) in Asia, 1990-2007

Little room for expansion of rice area

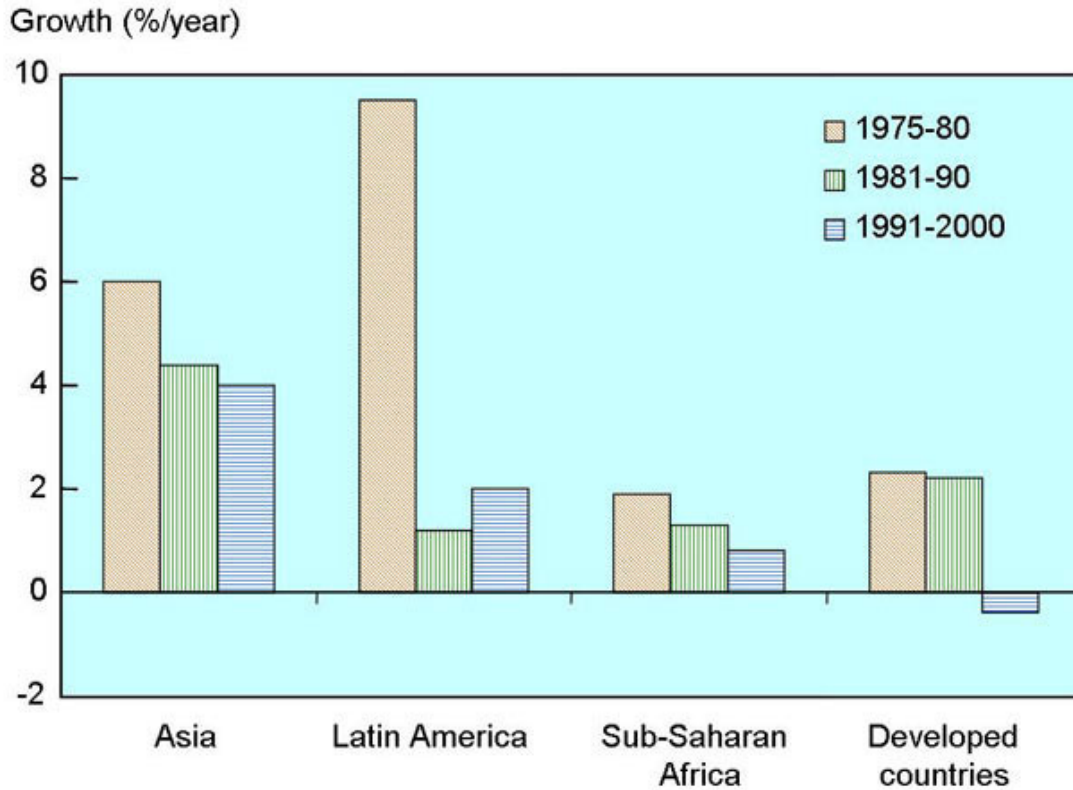
Further, the possibility of increasing the rice area is almost exhausted in most Asian countries. With little expansion in area and slowing yield increases, growth in rice production has fallen below growth in demand as population has continued to increase.

Reduced public investment in agricultural research and development

An important factor accounting for the slowdown in yield growth is the reduced public investment in agricultural research and development (R&D). In particular, international donors have not provided sufficient support for agricultural R&D that is directly related to increasing crop productivity. Many governments have been unable to compensate for this by allocating more of their own resources.

Rice prices declined steadily in the 1990s, leading many governments to believe that the supply of food was plentiful. Lower prices were taken for granted,

leading to complacency in agricultural research and development. Such investment has decreased in Asia in real terms over time (Figure 5). Public spending on agricultural research in Asia grew by an average of 3.9% per year during the 1990s, compared with 4.3% annually during the previous decade. In 2000, overall public research intensity, measured by the percentage of agricultural gross domestic product (GDP) invested in public agricultural research, remained low at 0.53 for developing countries as a whole.



Source: D. Byerlee et al; www.worldbank.org/

Fig. 5. Public investment in agricultural research and development

Africa

Rice has become an increasingly popular food in Africa, with imports into Africa accounting for almost one-third of the total world trade in rice. This has increased over time as growth in rice production is far slower than growth in total demand. It is expected that demand from Africa will continue to grow.

Population increase

Population growth is outstripping production growth and this is projected to get worse. Demand for rice in Asia is expected to continue to rise as its population expands. Even after allowing for some decrease in per-capita rice consumption in Asian countries with higher income levels, it is projected that in 2015 Asia will need to produce 38 million more tons of rough (unmilled) rice than it produced in 2005. Globally, demand is increasing by around 5 million tons each year. This means that in ten years the world will need to produce 50 million tons more than it does now.

Economic growth

With rapid economic growth in large countries such as India and China, demand for cereals has increased substantially for both consumption and livestock production. This income-driven growth in demand has pushed up the price of cereals in general. In many areas with high population density, highly productive rice land has been lost to housing and industrial development, or to growing vegetables and other cash crops.

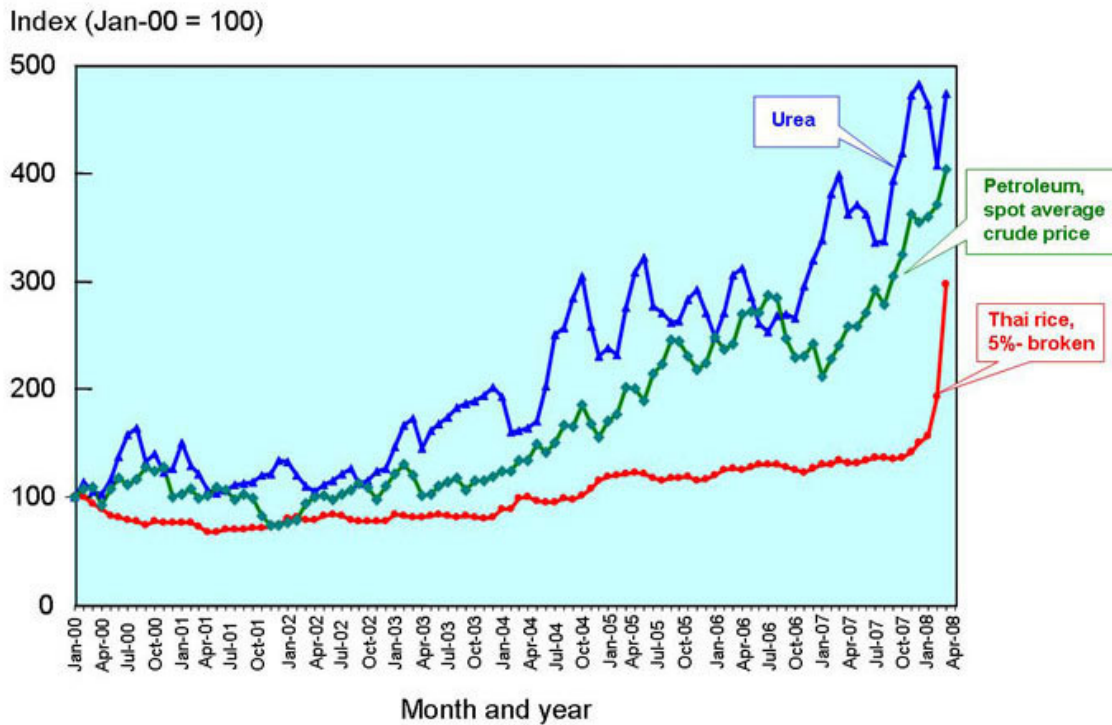
Irrigation

Investments in irrigation, which peaked during the Green Revolution period in the 1970s and 1980s, have decreased substantially. Existing irrigation infrastructure has deteriorated considerably because of inadequate maintenance.

Oil prices

The price of oil has increased rapidly during the past year. In addition to contributing to general inflationary pressure, this has pushed up freight costs for countries that import rice. The world price of fertilizers—which are essential for rice production—has increased sharply, with the price of urea almost doubling over the past four years (Figure 6).

Rising oil prices and concerns about climate change have also spurred rapid investments—particularly in developed countries—in biofuels such as ethanol produced from maize grain or biodiesel produced from oilseeds. This has increased pressure on international trade of grains and livestock feed, as well as on agricultural land in some countries. Until now, the direct impact of biofuels on rice production and rice trade has likely been small. However, if the industry continues to grow, rice production and prices may be affected more seriously.



Source: Pinksheet, The World Bank, various issues

Fig. 6. Rising world prices of rice, urea, and diesel fuel, 2000-08

Extreme weather

Natural disasters such as widespread drought in India and China in 2002, typhoons in the Philippines in 2006, and major flooding in Bangladesh in 2007 have contributed to the shortfall in production in recent years. Global temperatures, particularly night-time temperatures, have steadily risen in recent decades because of increasing greenhouse gas concentrations in the atmosphere. Some evidence suggests that rising temperatures may have already contributed to lower rice yields in recent years, but a thorough global assessment is yet to be conducted. Further, human-induced climate change is expected to increase the severity and frequency of extreme weather events.

Reoccurring pest outbreaks

Pests such as planthoppers, and the various virus diseases transmitted by them, were major threats to rice intensification programs in the 1970s and 1980s. Now, they have returned as major threats to production, primarily due to breakdowns in crop resistance and the excessive use of broad-spectrum, long-residual

insecticides that disrupt natural pest control mechanisms. Since 2005, planthopper outbreaks have affected several million hectares of rice land in countries such as Vietnam, China, Indonesia, Korea, and Japan, particularly in growing seasons with abnormally higher temperatures (which are becoming more likely because of climate change). In Vietnam, planthopper and virus outbreaks were a major reason behind the government's decision to restrict rice exports.

How do price rises affect poor rice consumers?

Domestic rice prices have not risen as much as international prices because of the weakening of the U.S. dollar and stabilization policies implemented by national governments. Nevertheless, a rise in the price of rice is equivalent to a drop in real income for poor consumers in urban areas and landless laborers in rural areas who need to buy rice. Even a small increase in price can seriously affect the household food security of such people. For example, a 25% increase in rice price translates into a 7–10% drop in the real income of poor consumers, as rice purchases often constitute 30–40% of their total expenditures.

Such a drop in income not only increases the number of poor people but also pushes people deeper into poverty and hunger. With less money available, the poor are forced to spend less on such essential needs as health care and nutritious (protein- and vitamin-rich) food—essential for good health, especially for children and pregnant women. Families may even pull children out of schools, thus threatening future generations with ongoing poverty.

The rise in food prices is also affecting the poor indirectly as international relief agencies are forced to provide less food. According to the United Nations Population Fund, its program of school feeding and “food-for-work” is being severely affected as a result of the price rise. The World Food Programme recently said that its costs are increasing by millions of dollars per week.

How do we prevent shortages and price rises?

The best strategy for keeping the price of rice low is to ensure that production increases faster than demand. Rice production can be increased by expanding the area planted to rice, by increasing the yield per unit area, or by a combination of the two. The opportunity for further increasing the rice area in Asia is now quite limited. The total rice area in Asia is unlikely to increase much beyond the

current estimate of 136 million hectares. Although some increase in cropping intensity is still possible, rice land is being lost to industrialization, urbanization, or conversion to other crops.

The main source of additional production will therefore have to be yield growth. Global average rice yields must continue to rise at an annual rate of at least 50 kg per hectare to keep pace with the expected demand, or by 0.5 tons per hectare over the next 10 years (about 12% above current levels).

Productivity growth through the development and dissemination of improved technologies is the only long-term viable solution for bringing prices down, preventing future increases in price, and ensuring that affordable rice is available to poor rice consumers.

To achieve this, a second Green Revolution is needed now as much as the first Green Revolution was needed to avoid famine and mass starvation. The task is equally challenging but not insurmountable, provided a substantial boost is given to agricultural research, which continues to remain highly underinvested. Increased research investment together with policy reforms that make rice markets more efficient will help bring rice prices down to a level affordable to the poor and, ultimately, reduce poverty.

What needs to be done?

In the near term, urgent actions from national governments and international agencies are needed on two fronts: rapidly exploiting existing technological opportunities for increasing rice yields and policy reforms to improve poor people's food entitlements. Rice production can be revitalized, but there are no silver bullets. The world community must invest now and for a long time to come.

Some of the actions listed below deal with the immediate crisis while others provide long-term solutions to prevent future crises.

IRRI is calling for the implementation of the following nine-point program of short- and long-term interventions:

1. Bring about an agronomic revolution in Asian rice production to reduce existing yield gaps

Farmers have struggled to maximize the production potential of the rice varieties they are growing, so there is a gap between potential yield and actual yield. Depending on production conditions, an unexploited yield gap of 1–2 tons per hectare currently exists in most farmers' fields in rice-growing areas of Asia. Such yield gaps can be reduced through the use of better crop management practices, particularly in irrigated environments. This requires funding support for programs aimed at improving farmers' skills in such practices as land preparation, water and nutrient management, and control of pests and diseases.

2. Accelerate the delivery of new postharvest technologies to reduce losses

Postharvest includes the storing, drying, and processing of rice. Most farmers in Asia suffer considerable losses in terms of both quantity and quality of rice during postharvest operations because of the use of old and inefficient practices. Active promotion of exciting new technologies that are currently available for on-farm storage and drying will reduce losses considerably.

3. Accelerate the introduction and adoption of higher yielding rice varieties

New rice varieties exist that could increase production, but farmers are not using them mainly because the systems that develop and introduce new varieties are under-resourced.

4. Strengthen and upgrade the rice breeding and research pipelines

Funding for the development of new rice varieties has steadily declined over the past decade or more. This must be reversed in order to develop the new rice varieties that will be required for sustained productivity growth. Opportunities exist to accelerate the development of new rice varieties with increased tolerance of abiotic stresses (such as drought, flooding, and salinity) and resistance to insects and diseases through new precision-breeding approaches. Likewise, record high fertilizer prices and new pest outbreaks demand the urgent revitalization of research on rice crop and resource management.

5. Accelerate research on the world's thousands of rice varieties so scientists can tap the vast reservoir of untapped knowledge they contain

Working with IRRI, the nations of Asia have spent decades carefully collecting the region's thousands of rice varieties. More than 100,000 types

of rice are now being carefully managed and used at IRRI and in Asian nations. However, scientists have studied in detail only about 10% of these types. It is urgent that researchers learn more about the other 90% so they can be used in the development of new varieties.

6. Develop a new generation of rice scientists and researchers for the public and private sectors

Another vital concern for the Asian rice industry is the education and training of young scientists and researchers from rice-producing countries. Asia urgently needs to train a new generation of rice scientists and researchers—before the present generation retires—if the region’s rice industry is to successfully capitalize on advances in modern science.

7. Increase public investment in agricultural infrastructure

Adequate investments in agricultural infrastructure such as roads, irrigation systems, and market systems are critically important for raising and sustaining productivity growth in rice. As with agricultural research, the underinvestment in infrastructure needs to be corrected urgently.

8. Reform policy to improve the efficiency of marketing systems for both inputs and outputs

Domestic and international marketing systems need to improve so that changes in consumer prices are reflected in producer or farm-gate prices (this is known as efficient transmission of price signals). Policies should be developed and revised to remove barriers to the efficient transmission of price signals and to create conditions that allow the private sector to function smoothly.

9. Strengthen food safety nets for the poor

Poor and disadvantaged people who are highly vulnerable to food shortages require strong food and social safety net programs to ensure that their needs are adequately met. Both urban and rural poor people would benefit from food or income transfers and nutrition programs focusing on early childhood.

Suggested citation

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