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# Food Security vs. Food Self-Sufficiency: The Indonesian Case

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# **Food Security vs. Food Self-Sufficiency: The Indonesian Case**

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## **Abstract**

Food security is an important social objective and relying on international food markets to meet the needs of Indonesia's growing population is precarious. The policy of restricting food imports through tariffs or quantitative restrictions promotes the goal of food self-sufficiency, but does so at the cost of reducing the food security of the most vulnerable people – the poorest net consumers of rice. These policies reduce imports through the mechanism of raising the domestic price. The poorest consumers bear the greatest burden from this policy because they are the people for whom expenditures on food form the largest proportion of their household budgets. A preferable strategy for raising self-sufficiency is to promote improved agricultural productivity. This reduces imports by raising agricultural output but does so without raising the domestic price of food and so without creating a conflict between the goals of higher levels of self-sufficiency on the one hand and food security and poverty reduction on the other. Unfortunately, Indonesia's commitment to raising agricultural productivity has seemingly waned. Finally, Indonesia has already demonstrated that practical mechanisms can be designed for shielding poor consumers from price increases that would otherwise be harmful, by designing systems of Conditional Cash Transfers.

Key words: Food security, poverty incidence, rice policy.

JEL codes: Q18, O13, F13

Forthcoming in *The Indonesia Quarterly*

# Food Security vs. Food Self-Sufficiency: The Indonesian Case\*

*Peter Warr*

## INTRODUCTION

The evolution of cities and the vast economic benefits that ensued rested on the existence of secure food marketing networks. These networks moved raw food from the agricultural and fishing areas where it was produced to the cities, in exchange for the produce of those cities. But the products of cities are not like food. While there is a vast demand for the goods and services that cities can supply, these products are generally not necessities. Their purchasers can survive for long periods, possibly indefinitely, without them. Not so with food. A regular supply is needed and without it cities could not develop. That is why city-dwellers can become nervous about *food security*. The concern is similar in countries that consume more food than they produce, relying to some extent on food imports. Food-importing countries worry about food security in a way that, say, clothing-importing countries do not worry about ‘clothing security’.

Recent surges in international food prices have reinforced the mistrust felt within many food-importing countries towards the dependability of the international market as a supplier of affordable food. One possible response is to become less reliant on food imports. Concern about food security thus becomes transformed into concern about *food self-sufficiency*.<sup>1</sup> But food security and food self-sufficiency are different things and they can be in conflict. In this paper I will discuss the relationship between these two concepts in the Indonesian context. Much of the discussion will necessarily focus on Indonesia’s staple food, rice.<sup>2</sup>

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\* In memory of Hadi Soesastro.

<sup>1</sup> This response is feasible for some economies but for others, like Singapore, Hong Kong and presumably Britain, it is not.

<sup>2</sup> A useful, though somewhat dated discussion of Indonesia’s rice self-sufficiency policy is contained in a UNDP document, available at [http://ssc.undp.org/uploads/media/Rice\\_self.pdf](http://ssc.undp.org/uploads/media/Rice_self.pdf) [accessed 14 March 2011].

According to the World Food Summit of 1996,

Food security exists when all people, at all times, have physical and economic access to enough safe and nutritious food to meet their dietary needs and food preferences for an active and healthy lifestyle.<sup>3</sup>

The phrase ‘all people, at all times’ is central to this definition and distinguishes food from almost every other commodity group. For each person food must be consumed regularly – more or less daily. If not, he or she soon dies. But the maximum amount of food that we wish to consume is limited by the capacity of our stomachs. We must meet what the above definition calls our ‘dietary needs’, but in quantity terms we don’t need or want much more than that. Individual food items may have substitutes – other foods – but food in general has no substitutes. We cannot make up for its absence with abundance of anything else.

The economic demand for food is relatively insensitive to both income and price changes. As household incomes rise, expenditures on food also rise, but by a smaller proportion than the increase in incomes; food expenditures therefore decline as a share of total household expenditures – a phenomenon known as Engel’s Law. This occurs even though rich people consume higher quality foods (more expensive per kilogram) than the poor. The highest expenditures on food as a share of total household expenditures are found among the poorest households. In Indonesia, very poor households can devote as much as 80 per cent of their total expenditures to food, though for Indonesia as a whole the proportion is only 17 per cent.

In addition, if the price of food increases the quantity demanded declines, but by a smaller proportion than the increase in the price. Therefore, as food prices rise, total expenditure on food increases significantly. In economic jargon, the demand for food is inelastic with respect to both price and income. This discussion has a simple implication. The people most vulnerable to a loss of food security are the poorest net consumers of food. Their vulnerability lies in the danger of a price increase that would leave them unable to afford their basic food requirements.

For entirely different reasons, the supply of food is also relatively insensitive to price. When the price rises, the quantity of food produced for sale may increase, after a lag that depends on the biology of the

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<sup>3</sup> Source: [http://www.fao.org/wfs/index\\_en.htm](http://www.fao.org/wfs/index_en.htm) [accessed 14 March 2011].

commodity concerned, but the proportional increase in output is normally much smaller than the proportional increase in price. The reason is that food production requires a special input – land – whose total supply can be increased only at a great cost. This phenomenon of inelastic food supply response is especially significant for some staple foods, notably paddy rice.<sup>4</sup> Each of the above features of the demand and supply of food will be important for our subsequent discussion.

## **WORLD FOOD PRICES**

For most food commodities international markets are ‘thin’, meaning that international trade is a small proportion of global consumption. Shifts in weather conditions in major producing countries, outbreaks of plant or animal diseases or pests, changes in petroleum prices (affecting agricultural production costs), shifts in demand (such as new demand for bio-fuels) and speculative behaviour all contribute to the short-run volatility of these prices. The price inelasticity of both the supply and demand for food, discussed above, applies at a global level as well as within individual countries. These features of global food markets mean that relatively small fluctuations in global supply or demand can produce large fluctuations in international prices.

This price volatility is summarized in Figure 1.<sup>5</sup> The chart shows the FAO food price index from 1990 to 2011, along with the components of the index: prices of cereals, edible oils, sugar, meat and dairy products.<sup>6</sup> A sharp increase in the index occurred in 2007-2008 and another more recently in late 2010 and early 2011. It is notable that the increase in 2010-11 was concentrated in sugar (the largest increase) and edible oils. Cereals prices increased far less. This point is made clearer by Figure 2, which focuses on two cereals of special interest, rice and wheat, over the period since 2005. The increase in cereal prices in 2007-08 was dominated by wheat and especially rice, but this was not true of the increase in ‘average’ food prices in late 2010 and early 2011. Rice prices barely increased at all

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<sup>4</sup> An econometric study by Ari Irawan estimated short-term elasticities of supply response for wetland rice in several regions of Indonesia. The estimates were: Java 0.11, Sumatra 0.12, Sulawesi 0.45 and Kalimantan 0.02. Source: Andi Irawan, "Perilaku Suplai Padi Ladang dan Sawah di Indonesia dan Kebijakan Peningkatan Produksi Padi (Supply Behavior of Paddy and Fields in Indonesia and Policies to Increased Paddy Production)" Bogor Agricultural University, unpublished paper, 2001.

<sup>5</sup> The series are indexed such that the average for 2002 to 2004 = 100.

<sup>6</sup> In interpreting the FAO food price index it is important that the weights it uses to aggregate commodities are trade weights, reflecting the importance of the commodities in international trade, rather than their importance in global consumption. Heavily traded commodities like sugar and edible oils receive high weights and some staple foods like rice receive low weights.



and average rice prices for the year ending February 2011 were lower than in the previous year.<sup>7</sup> The basic point remains that international food prices are indeed volatile.

[Figure 1 about here]

[Figure 2 about here]

## **RICE IMPORT POLICY**

Indonesia is a net importer of all of its major staple food commodities, including rice, maize, cassava, soybeans and sugar, even though domestic production of each of these commodities is substantial. Rice is the staple food of most of the Indonesian population. It is also a major source of income for Indonesian farmers in most, though not all, regions of the country. Maize and cassava are important staples in some regions of the country, particularly Eastern Indonesia, where poverty incidence is especially concentrated. Sugar is an important cash crop in some regions of the country. Wheat is an imported commodity, used as an input in many processed foods, but not grown in significant quantities within the country. Indonesia's agricultural exports have tended to be estate crops other than staple foods. They include rubber, copra, coffee and tea.

Prior to the Asian Financial Crisis of 1997 to 1999 rice import policy within Indonesia was to stabilize domestic rice prices at approximately the average international price. Until the early 2000s, Indonesia was the world's largest rice importer. With the country's transition to a more democratic form of government, the successful lobbying power of pro-farmer political groups led first to heavy tariffs on rice imports. Then, since 2004, rice imports have officially been banned, although limited quantities of imports have

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<sup>7</sup> The data seemingly support the hypothesis that the food price increases of 2010-11 were caused by bio-fuel demand, reflecting bio-fuel subsidies in some countries, because they were led by commodities that are used for this purpose – sugar, edible oils like palm oil and maize.

periodically been allowed and some imported rice can usually be found within the Jakarta retail market.<sup>8</sup>

The 'leaky ban' on rice imports may more usefully be understood as a binding import quota, restricting imports to about one tenth of their previous volume, on average, although the magnitude of the import restriction is regularly reviewed.

The import restriction was said by government officials to be motivated by the wish to protect poor rice farmers from the price effects of cheap rice imports. It is significant that the import restriction was accompanied by a ban on rice exports from Indonesia, intended to protect consumers from the possibility of large increases in world prices of rice. The ban on rice imports was followed by increased rice prices within Indonesia, relative to the international price, as shown in Figure 3. According to Fane and Warr by 2006 this policy had increased domestic rice prices relative to world prices by about 28 per cent.<sup>9</sup>

[Figure 3 about here]

The behaviour of rice prices relative to the consumer price index is summarized in Figure 4. There were two components to the real price increase in the years following 2004:

- (a) The import quota initially had a protective effect, increasing rice prices relative to international prices, as shown by Figure 3, especially over the period from 2005 to 2007. This protective effect was subsequently reversed during the period of high international rice prices from late 2007 to 2008. The international price increases eroded (and for a few months, eliminated) the rents associated with the quota and domestic rice prices did not increase as much as they would have under free trading conditions.
- (a) The import quota converted rice from a traded good, at the margin, whose domestic price is driven by international prices, to a non-traded good, at the margin, whose domestic price is determined by domestic supply and demand conditions. The fiscal stimulus implemented following the Global Financial Crisis of

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<sup>8</sup> At the same time, private exports of rice were also officially banned. Thus the policy was designed to prevent both reductions and increases in world rice prices from being transmitted to the domestic rice market.

<sup>9</sup> George Fane and Peter Warr, "Agricultural Protection in Indonesia," *Bulletin of Indonesian Economic Studies*, 44.(1): 133-50, 2008.

2008-09 increased domestic demand and thereby increased domestic rice prices. The sustained increase in the real price of rice following 2004 is evident from Figure 4.

[Figure 4 about here]

In an earlier study it was argued on the basis of a general equilibrium model of the Indonesian economy that the rice import policy had the opposite effect of the poverty reduction that was said to be its goal. Prior to the import ban Indonesia had been a large importer of rice. Net sellers of rice benefited from the restrictions on imports but net buyers were harmed. There are many more poor Indonesians in the second category than the first. The main beneficiaries of the ban were not poor rice producers but the largest producers. Most Indonesians residing in rural areas are net buyers of rice. This includes all landless labourers and a surprisingly large number of small farmers, who produce some rice but sell other commodities to purchase additional rice for their own consumption. It was estimated that an import restriction that raised the real domestic price of milled rice by 10 per cent would raise poverty incidence in Indonesia by 0.8 per cent and that this increase in poverty incidence would occur in both rural and urban areas, with the increase in rural areas even larger than that in urban areas.<sup>10</sup> As discussed above, rice prices actually increased by 28 per cent, implying a projected increase in poverty incidence of 2.24 per cent.

Economic models do not convince everyone. Is there direct empirical evidence that the 2004 rice import ban did increase poverty incidence? Yes. Figure 5 summarizes data from the Central Bureau of Statistics on poverty incidence in Indonesia, drawing upon the *Susenas* household income and expenditure surveys. Between 1976 and 2009 measured poverty incidence declined dramatically in Indonesia in both rural and urban areas and in all provinces. The principal long-term driver was economic growth. Over this period there were just two periods during which aggregate poverty incidence did not fall. The first was the Asian Financial Crisis of 1997-99. A massive economic contraction occurred during which GDP declined by 13 per cent in a single year. It is hardly surprising that poverty incidence temporarily increased (by 5.7 per cent of the population). The second was the period 2005 to 2006.

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<sup>10</sup> Peter Warr, "Food Policy and Poverty in Indonesia: A General Equilibrium Analysis", *Australian Journal of Agricultural and Resource Economics*, 49(3): 429-451, 2005.

[Figure 5 about here]

Explaining the 2005 to 2006 increase in poverty incidence is problematic because poverty incidence rose moderately (by 1.8 per cent of the population, from 16 per cent in 2005 to 17.8 per cent in 2006) despite GDP growth exceeding 5 per cent, an extremely rare combination of events. Based on this growth rate and the long term statistical relationship between poverty reduction and economic growth, a *reduction* in poverty incidence of 0.7 per cent of the population would have been expected over this period, rather than an *increase* of 1.8 per cent, as actually occurred. The unexplained difference is therefore a 2.5 per cent increase in poverty incidence, relative to what would otherwise have been expected, based on the rate of economic growth. What might have caused it? The hypothesis advanced here is that the increase in rice prices explains the rise in poverty incidence, almost exactly.

As described above, it has been estimated that the 28 per cent increase in the real domestic price of milled rice would raise poverty incidence in Indonesia by 2.24 per cent of the total population. The increase in poverty incidence we wish to explain is 2.5 per cent of the population. The price increase resulting from the restriction on rice imports therefore explains almost all (90 per cent) of the otherwise unexplained increase in observed poverty incidence.

Rising poverty incidence as a result of policy-induced increases in staple food prices should not really be a surprise. Moreover, quantitative research which predicted this outcome was available to the government at the time of its decision to restrict rice imports and subsequently. Examples included: a quantitative analysis by Ikhsan based on *Susenas* survey data, focusing on the negative effects that rice price increases have on poor consumers, originally prepared for USAID and circulated in working paper form during 2003<sup>11</sup>; a multi-sector, multi-household general equilibrium analysis by Warr, cited above, originally prepared for the World Bank and circulated in working paper form in late 2003; the World Bank's 2006 poverty assessment report<sup>12</sup>, which emphasised the potential for rice price increases to raise poverty incidence; the introduction by McCulloch and Timmer to a special issue of the

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<sup>11</sup> Mohamad Ikhsan 'Rice Price Adjustment and its Impact on the Poor', *Economics and Finance in Indonesia*, 53(1): 61-96, 2005.

<sup>12</sup> World Bank, *Making the New Indonesia Work for the Poor* (Washington: World Bank, 2006).

*Bulletin of Indonesian Economic Studies* in 2008<sup>13</sup>; and the McCulloch study appearing in the same issue.<sup>14</sup>

Each of these studies pointed out the negative effects that rice industry protection could be expected to have on poverty incidence. The fact that the government chose to implement and maintain the protection policy despite this evidence revealed that the political benefits expected to accrue from protecting the rice industry outweighed the projected negative effects on the poor.

The increases in international food prices in 2007-08 were not transmitted to the Indonesian domestic market.<sup>15</sup> Rice is the most important case. The rice protection policy insulated the Indonesian markets from the temporarily high international rice prices; but it did so at the expense of permanently increasing the domestic price of rice relative to world market prices, thereby permanently raising poverty incidence relative to what would otherwise have occurred.

#### **DISTRIBUTIONAL EFFECTS OF THE IMPORT RESTRICTION**

The argument being advanced here is not that Indonesia's self-sufficiency policy is a bad idea, but that protection policy (the import ban) as an instrument of achieving it results in unnecessary social costs and places food self-sufficiency into conflict with the goals of food security and poverty reduction. The distributional effects of protection policy as a means of reducing imports are the basis of the argument.

Consider the economic effects of restricting the quantity of rice imports. The policy acts directly on the quantity of imports but its effect is *to raise the domestic price*. How much will the domestic price increase?

A quantitative restriction on imports acts on the volume imported and lets the domestic price adjust accordingly. The quantity imported is the difference between the quantity demanded by domestic consumers and the quantity supplied by domestic producers. Both of these quantities depend on the

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<sup>13</sup> Neil McCulloch and C. Peter Timmer. 'Rice Policy in Indonesia: A Special Issue', *Bulletin of Indonesian Economic Studies*, 44(1): 33-44, 2008.

<sup>14</sup> Neil McCulloch 'Rice Prices and Poverty in Indonesia', *Bulletin of Indonesian Economic Studies*, 44(1): 45-63, 2008.

<sup>15</sup> See C. Peter Timmer 'Causes of high food prices' ADB Economics Working Paper Series, no. 128, Manila, October 2008, and David Dawe 'Transmission of the world rice crisis to domestic economies', Agricultural Development Economics Division, Food and Agriculture Organization (FAO), Rome, June 2009.

domestic price: when the price increases the quantity demanded declines and the quantity supplied increases. Imports therefore decline. The domestic price will rise until the difference between the quantity demanded domestically and the quantity supplied domestically declines to the lower volume of imports now permitted under the quantitative restriction. The important point is that when both the demand for rice and its supply are price inelastic (see the Introduction), a *large* price increase is necessary to achieve this reduction in the volume of imports.

Obviously, people who are net consumers of rice are harmed by an increase in the price. But which consumers are harmed the most? Unfortunately, the answer is the households for which rice is the highest proportion of their budgets – the *poorest consumers*. This includes not only the urban poor but also most of the rural poor, the majority of whom are net buyers of rice.

What about the effect on producers? Obviously, anyone who is a net seller of rice benefits. Who benefits the most? The answer is obvious: those who sell the most – the *largest farmers*. Small farmers are both consumers and producers of food. Their net sales of rice might be positive or negative or, if they are subsistence farmers, zero. But if their net sales are positive, they are small. Price changes have very little net impact on this group of farmers, one way or the other.

Some of the largest beneficiaries are not farmers at all. First, there are *absentee landowners*. Agricultural product prices become capitalized into the price of agricultural land. Raising the price of rice benefits anyone who owns rice land, or land that could be used to produce rice and these landowners are not necessarily farmers. Second, there are the *rice millers*. The import restriction operates on milled rice and the immediate impact is on the price of that product, rather than the price of paddy. Rice millers benefit directly from the increase in the price of their product. Paddy prices may increase as a result of the increased price of milled rice, but not necessarily in the same proportion. Third, those *importers* who receive the limited entitlement to import rice receive a windfall profit – the difference between the import price and the higher domestic price multiplied by the quantity of rice they are allowed to import.<sup>16</sup>

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<sup>16</sup> This is the main difference between a tariff and a quantitative restriction. The former generates revenue for the government. The latter generates a similar amount of windfall profit for the quota recipient.

Policies for pursuing rice self-sufficiency by raising the domestic price of rice are, in effect, policies for transferring massive amounts of money from the pockets of the poorest Indonesian consumers of rice to other, much richer Indonesians: large farmers, absentee landowners, rice millers and quota recipients. The policy achieves 'self-sufficiency', but only at the expense of *reducing* the food security of the most vulnerable people – the poorest net consumers.

### **ALTERNATIVE POLICIES FOR IMPROVING FOOD SECURITY**

Policies that raise agricultural productivity do not entail this conflict between food self-sufficiency and food security. They raise agricultural output and thus reduce imports. But they do so *without* raising domestic food prices and therefore without reducing the food security of poor consumers. During the Green Revolution period of the 1970s Indonesia made great strides in raising agricultural productivity and was internationally recognised for this achievement. But since then the commitment to raising agricultural productivity has waned. Expenditure on agricultural research is a sad example.

Figure 6 shows data from the Ministry of Agriculture on Research Intensity in Indonesia – the ratio of public expenditure on agricultural research and development to total value added in agricultural production. Abundant evidence shows that this form of public expenditure raises agricultural productivity and has a high rate of return. But Indonesia's reduced commitment to agricultural research is worrying. The downward-sloping straight line shows a linear trend fitted to the data.

[Figure 6 about here]

The global community was right to emphasize the danger that the dramatic international food price increases of 2007-08 could threaten the sustainability of continued poverty reduction. Fortunately, the international food price increases were temporary, based on the evidence to date. But this does not necessarily mean that similar episodes will not recur. Regrettably, the lessons of the world food crisis appear to have been disregarded in the design of Indonesia's fiscal stimulus spending.

The fiscal stimulus spending package gave little emphasis to agriculture in general or to the improvement of agricultural productivity in particular. But Indonesia's capacity to insulate itself from future shocks to global food prices in the presence of rising domestic demand for food is dependent on raising agricultural productivity growth. Protection policy does not raise productivity. Productivity growth requires expanded investment in domestic agricultural research and infrastructure development. But this is not happening on a sufficient scale.

Beyond raising agricultural productivity, there are additional means of protecting poor consumers from high prices, thereby raising their food security. Along with Mexico, Indonesia has been a pioneer in the development of cash transfer mechanisms to protect poor people from adverse price changes.<sup>17</sup> These mechanisms need to be set up in advance of the increase in food prices, but the Indonesian experience with cash transfers to compensate poor households for the effects of petroleum product price increases shows that it can be done.

## **CONCLUSIONS**

Food security is an important social objective. Relying on international food markets to meet the needs of Indonesia's growing population is precarious. To some extent, this a problem that the international community could usefully address. For example, within ASEAN there are large net exporters of rice (Thailand and Vietnam) and large net importers (the Philippines and Indonesia). ASEAN as an institution could contribute to improving the security of supplies to importing countries and there are initiatives within ASEAN to do exactly this.

The policy of restricting food imports through tariffs or (worse still) quantitative restrictions promotes the goal of food self-sufficiency, but does so at the cost of reducing the food security of the most vulnerable people – the poorest net consumers of rice. The reason is that these policies reduce imports through the mechanism of raising the domestic price. The poorest consumers bear the greatest burden from this policy

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<sup>17</sup> For a useful discussion see *FAO's Initiative on Soaring Food Prices: Guide for Policy and Programmatic Actions at Country Level to Address High Food Prices* (Rome: FAO, 2011).

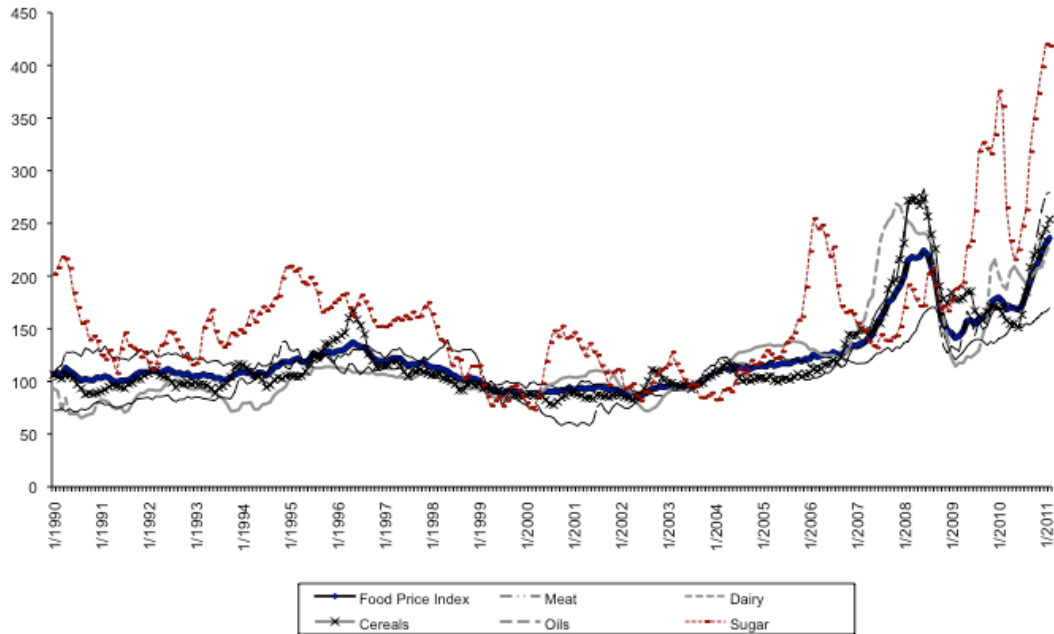


because they are the people for whom expenditures on food form the largest proportion of their household budgets.

A preferable strategy for raising self-sufficiency is to promote improved agricultural productivity. This reduces imports by raising agricultural output but does so without raising the domestic price of food and so without creating a conflict between the goals of higher levels of self-sufficiency on the one hand and food security and poverty reduction on the other. Finally, Indonesia has already demonstrated that practical mechanisms can be designed for shielding poor consumers from large price increases that would otherwise be harmful, by using systems of cash transfers.

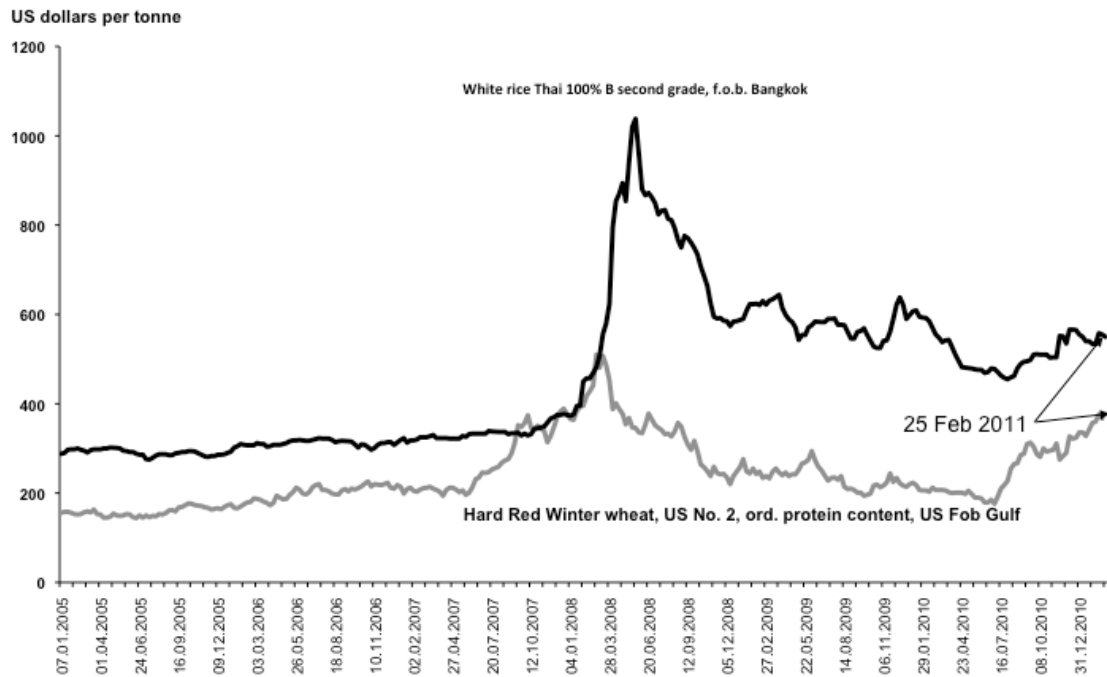
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**Figure 1 World Food Prices, 1990 to 2011**



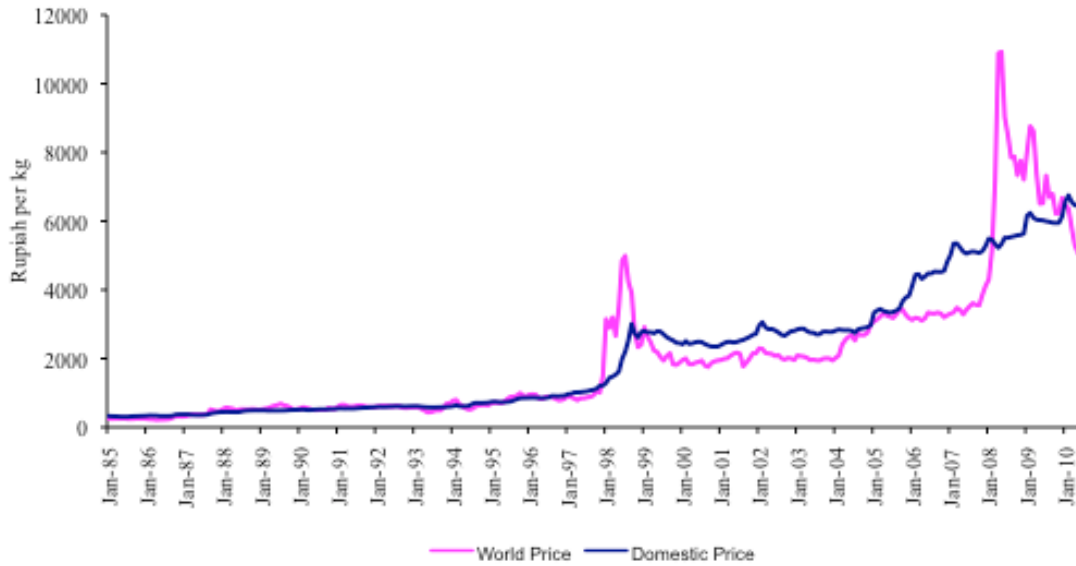
Source: Data from: <http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>

**Figure 2 International Prices of Rice and Wheat, 2005 to 2011**



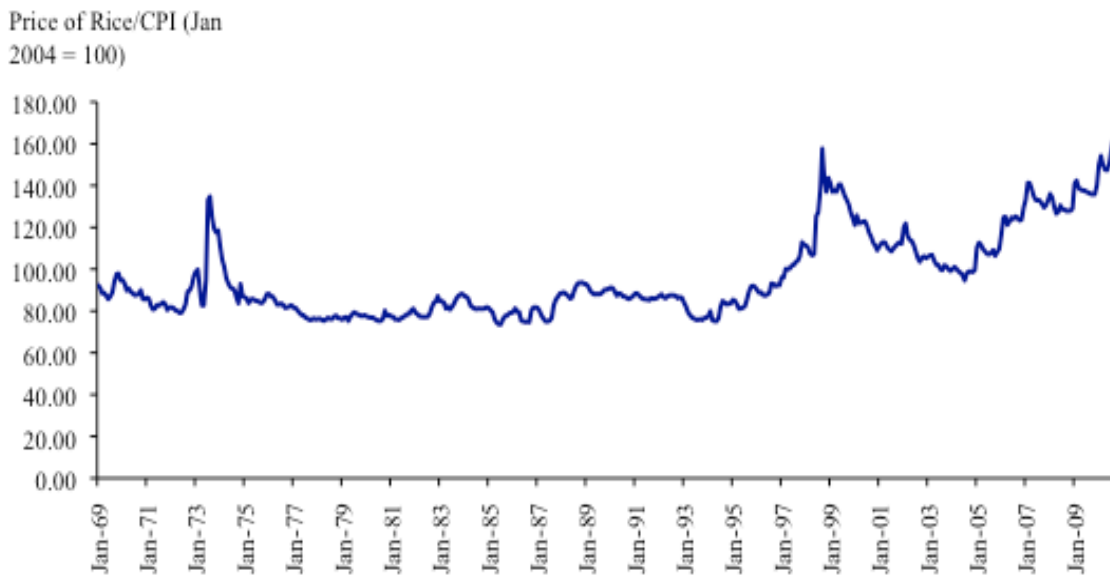
Source: Data from International Grain Council.

**Figure 3 Indonesia: Domestic and world prices for rice, 1985 to 2010**



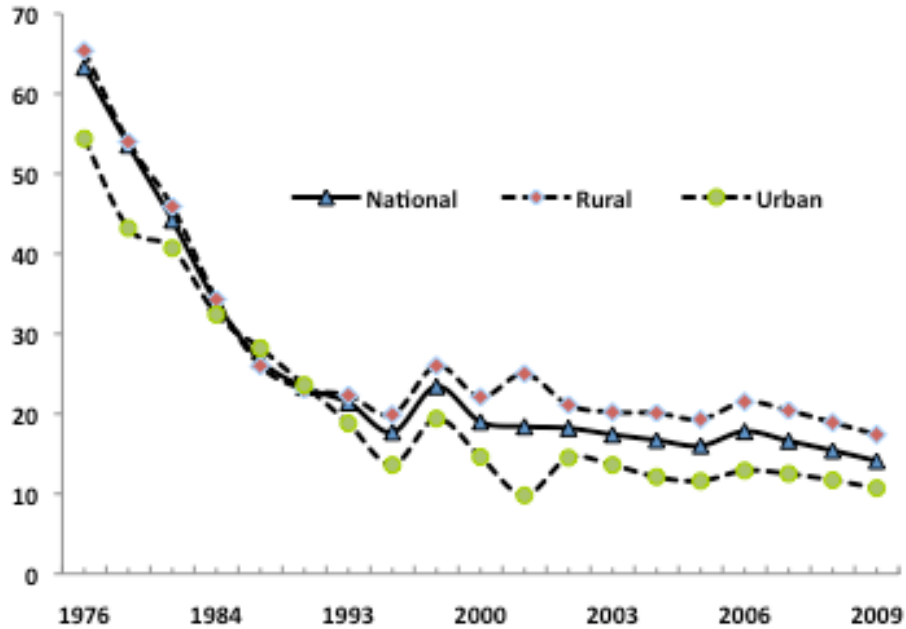
Source: Bulog, Jakarta (rice prices) and Central Bureau of Statistics, Jakarta (exchange rates).

**Figure 4 Indonesia: Real price of rice, 1969 to 2010**



Source: Bulog, Jakarta (rice prices) and Central Bureau of Statistics, Jakarta (CPI).

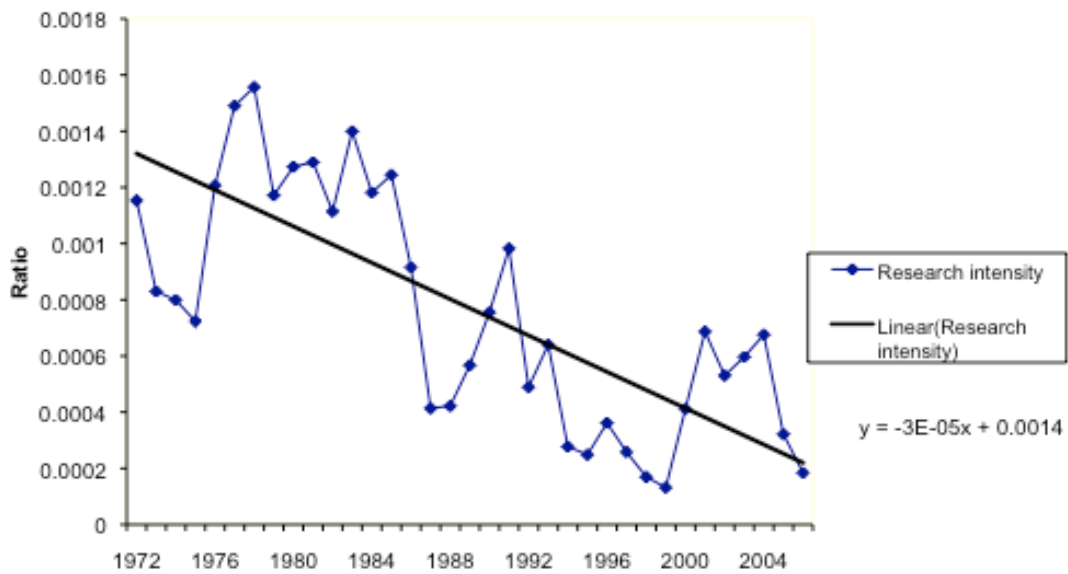
**Figure 5 Poverty Incidence in Indonesia, 1976 to 2009**



Source: Statistics Indonesia (various years), based on household expenditure data collected in the *Susenas* survey.

Note: National poverty incidence is the share of the total population with income below a national poverty line held constant over time in real terms; rural poverty incidence is the share of the rural population with income below a rural poverty line held constant over time in real terms; and urban poverty incidence is the share of the urban population with income below an urban poverty line held constant over time in real terms. The number of poor at the national level is the sum of the number of rural and urban poor, which means that national poverty incidence must always lie between the rates of rural and urban poverty incidence.

**Figure 6 Research Intensity in Indonesian Agriculture, 1972 to 2006**



Source: Data from Indonesian Centre for Agriculture, Socio-Economic and Policy Studies, Ministry of Agriculture, Bogor.

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