

Increasing Rice Production: Solution to the Global Food Crisis

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Introduction

Global warming, environmental crisis, plant diseases and pests, including biofuel needs, have been the factors that decrease food production in many countries all around the world. At this time when the world's population is increasing rapidly and the demand for food is high, these problems have threatened food security and people health worldwide.

24,000 people die of hunger-related causes every day, including one child every five seconds. Malnutrition has impaired physical and mental development in 178 million under-fives worldwide. 967 million people are hungry as a result of the World Food Crisis. The numbers are frightening but people are not numbers. They are children, brothers, sisters, neighbors, and friends. And millions of them are parents facing choices they shouldn't have to make. Like whether to feed themselves or their families and whether to give their sick child food or medicine.

This paper analyzes "Increasing Rice Production" idea which could be another solution employed by students to solve or at least decrease severity of the global food crisis by promoting more production of food to domestic and world markets.

Importance of Rice

Rice is the staple food for more than three billion people all around the world. At least 114 countries grow rice and more than 50 have an annual production of 100,000 tons or more. Rice is the main food for most countries in Asia, while some countries in Africa and South America consume rice in comparable quantity as wheat and corn. Since a large portion of maize crops are grown for purposes other than human consumption, rice is probably the most important grain with regards to human nutrition and caloric intake, providing more than one fifth of the calories consumed worldwide by humans.

Food Security

Food security, which is the condition of having enough food to provide adequate nutrition for a healthy life, is a critical issue in the developing world. About 3 billion people, nearly half the world's population, depend on rice for survival. In Asia as a whole, much of the population consumes rice in every meal. In many countries, rice accounts for more than 70% of human caloric intake. As seen in **Figure 1**, the total consumption of rice (expressed as % of total calorie intake) varies widely between different regions. In Asia in total, just over 30% of all calories come from rice. But within a region, rice intake varies even more widely. **Figure 2** shows fifteen of the

countries most reliant on rice for energy. The graphs show that although total Asian rice intake is around 30%, people in countries such as Cambodia, Bangladesh and Myanmar rely on rice for over 70% of their calories. Africans as a whole gain less than 10% of their calories from rice, but in countries such as Madagascar and Sierra Leone, people use rice for nearly 50% of their energy needs.

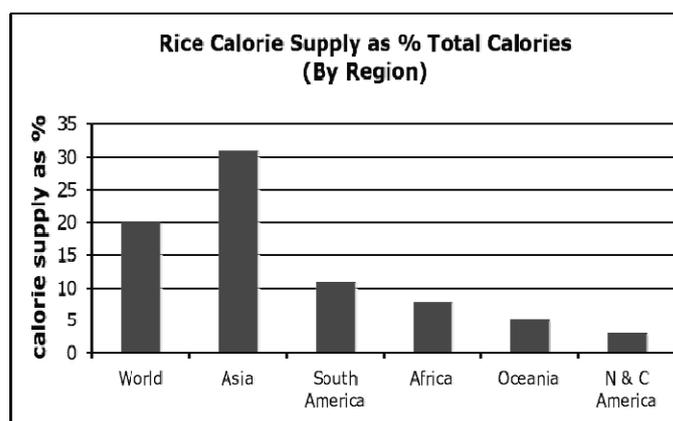


Figure 1: Rice as a percentage of total caloric intakes by region (2000).

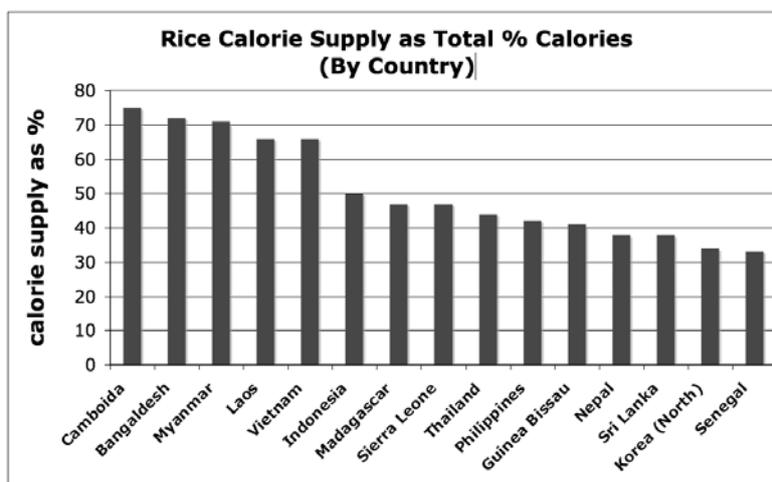


Figure 2: Rice as a percentage of total caloric intakes (top 15 countries)

The Economic Importance of Rice

Because of high domestic consumption of rice in rice-producing countries, the economic importance of rice differs from that of traditional exports. Worldwide, only 5-6% of rice is exported. Japan, for example, consumes their entire domestic production and has to import around 8% of their rice each year. However, this imported rice is not released to the domestic market, ensuring a high local price. Thus the pressures of world trade on these countries are not as great as for exported crops. It also makes these countries vulnerable to local catastrophes, such as crop failure due to inclement weather

(e.g. too much or too little rain), pests (such as insect swarms) or diseases (such as rice fungal diseases).

Furthermore, because both rice growers and people who rely on rice for sustenance tend to be poor, there is a constant pressure from rice growers to keep prices as high as possible, and from consumers to keep the price low. This strain is in constant force in all rice-growing countries, but is particularly important in the poorest countries.

The Cultural Importance of Rice

Beyond providing sustenance, rice plays an important cultural role in many countries. Products of the rice plant are used for a number of different purposes, such as fuel, thatching, industrial starch, and artwork. Growing, selling and eating rice is integral to the culture of many countries. In Japan, rice was historically a product for the wealthy and is now a highly-prized crop. Many rituals surround the preparation of the rice beds, the sowing of the crop, and the harvest. In China, it has been suggested that rice has been cultivated for 3000 - 4000 years, where it gradually rose to become an important part of aristocratic life. China's rural culture has developed around the growing of rice, and foods made from rice are the basis of festivals such as the Land Opening Festival, which marks the start of the rice cultivation season, and the Spring Festival. Even in Western countries, rice is an important part of culture.

World Rice Problems

In this time when the world's population already reeling from higher food prices, many countries have already ban or restricted their rice exports, which makes rice price becomes even higher and the rice amount is not enough for consumption. For example, Brazil had ban rice exports last year which prompted protests in Peru, Africa, and other countries in Latin America who will now be short 500 kilotons of rice. Rice yields have been increasing since the 1960s, but since the 1990s, growth in rice production has been slower than population growth. Indeed, it is anticipated that rice production will need to increase by 30% by 2025 in order to sustain those who need it for sustenance. However, climate change, especially access to water, soil erosion and other problems threaten rice yields. A study by the International Water Management Institute suggested that by 2020, one third of Asia could face water shortages.

Increase Rice Production Idea

While the international focus is on the global food crisis, it is the right time to highlight the importance of not only concentrating on short term solutions. Short term solutions for hunger are like drops of water on a hot plate. Let's give people fish, but also concentrate on "teaching them how to fish". In the context of the global food crisis, this means concentrating not only on emergency food aid, but also on achieving sustainable food security and reducing poverty in developing countries through non-for-

profit and transparent scientific research in the fields of agriculture, forestry, fisheries, policy, and environment.

The main ideas of the strategy are twofold. Firstly, it is to increase quantity and quality of rice production to ensure that there are enough amounts of rice for domestic market needs and may be left for export. Secondly, promote rice to be an alternate crop in non-rice producing countries for they can produce their own foods, and do not have to import rice from other countries.

Case Study from Catholic Relief Services (CRS)

In many African countries, imported rice from Asia was so cheap that local farmers couldn't compete, and so production flagged. But with many Asian nations limiting exports as a result of the food crisis, cheap imported rice is a thing of the past for African families - perhaps forever.

This is certainly the case in Burkina Faso. Rice there is the fourth most important food crop, after millet, sorghum and maize. For years, the West African country imported more than 70 percent of its rice from abroad, with local production covering the rest. But this has all changed after the price of rice rose by at least 60 percent in the first half of this year. Although this is a disaster for urban consumers, small-scale rice farmers can find in it an opportunity to increase their production, which will benefit them and their fellow Burkinabe.

Catholic Relief Services is carrying out a broad-based response to the global food crisis caused by skyrocketing prices for both food and fuel. A key part of our strategy is helping small-scale farmers to boost local crop production, increasing their incomes and putting more food on the market, which should lower prices for all.

An important component of this response is the CRS Rice Initiative, which seeks to increase the productivity of rice farm families in Africa. Sixteen CRS country programs across Africa have committed to participating in the Rice Initiative, which will provide small-scale rice farmers, most of whom are women, with access to improved seed varieties and high-quality nitrogen fertilizer that will quickly produce higher yields. They will also provide support to farmers in preventing post-harvest loss and in marketing their crops.

Students in Action!

We as students studying in areas of agriculture, sciences, economics, and business, could support rice farmers by establish a group or union of students that will go through rural areas and introduce farmers new technologies and techniques of growing rice, promote agricultural extension to farmers in rural areas, provide them a knowledge in preventing post-harvest loss and support them in marketing their crops. The main

concept we have to assist the farmers is to advice them how to maximize production and minimize losses.

Maximize Production

Improved high-yield rice varieties

Nerica - short for New Rice for Africa - combines the hardiness of traditional African strains with the productivity of Asian varieties. Nerica has been developed to yield around 50% more than current African strains, without the need for irrigation. It matures around a month earlier, and is richer in protein.

Super Rice - nearly one fifth of China's rice fields, or about 5.56 million hectares, were under cultivation with high-yield super rice by 2008. According to IRRI, 15-tonne rice will provide a 25% yield increase to feed growing populations on the same or less land. However, growing this rice will need greater amount of nutrients and irrigation.

Fertilizers

The University of Arkansas Cooperative Extension Service is recommending that nitrogen fertilizer be applied to rice in a two-way split. The first application should be made onto dry soil at the four- to five-leaf growth stage and then the field should be flooded as quickly as possible. The second application should be made at midseason between green ring, beginning internode elongation, and 0.5-inch internode elongation.

Irrigation

An abundant supply of good quality irrigation water is needed for optimum rice production. Knowledge of the quality and quantity of irrigation water is required for proper water management.

Recommended pumping rates are based on the different soil textures (**Table 1**). Since most fields may have more than one soil texture, use these pumping rates as a general guide for determining needed pumping capacities as shown in **Table 2**.

Soil Textural Group	(GPM/AC)	
	Minimum	Desire
Silt Loam	10	15
Loam or Clay	15	20
Sandy	20	25

Table 2. General Guide for Maximum irrigated Acreage for Different Soil Textural Groups at Various Pump Capacities.			
Pump Capacity	Irrigatable Acreage		
(GPM)*	Silt Loam	Loam or Clay	Sandy
400	40	27	20
600	60	40	30
800	80	53	40
1000	100	67	50
1200	120	80	60
1400	140	93	70
1600	160	107	80
1800	180	120	90
2000	200	133	100
2200	220	147	110
2400	240	160	120
2600	260	173	130
2800	280	187	140
3000	300	200	150

Example: A 1,000 gpm pump could be used to irrigate a 100-acre silt loam field but only 50 acres if the field is a sandy loam.
*GPM is abbreviation for gallons per minute.

Minimize Losses

According to the Bureau of Postharvest Research and Extension, rice farmers usually experience postharvest losses as high as 30 percent. Majority, or 15 percent, is attributed to postproduction practices of traders and millers, while 5 percent is ascribed to the practice of farmers. Phil Rice-developed flatbed dryer is being recommended to ensure that grains are properly dried. It has a capacity of 1 to 6 tons per batch and removes moisture at a rate of 1 percent per hour.

To help farmers address postharvest problems such as low milling recovery and quality, the research team from the Philippine Rice Research Institute (PhilRice) developed a guide in threshing, cleaning, drying, storing, and milling.

Threshing

Threshing must be done right away after harvesting to prevent grain losses. To do this, farmers must separate grains from the panicle by rubbing, impact or stripping using

either manually or mechanically operated threshers. According to the researchers, there are two recommended kinds of threshers according to method of feeding. These are the hold-on-type, which strips the panicle without damaging the straw or the grain, and the throw-in-type, which has a separating and cleaning mechanism. It is also necessary to consider the speed of the threshing drum since this affects the quality of the grains.' "For throw-intypes, the speed must range from 14.50 meters per second (m/s) to 18.25 m/s, while for the hold-on type, it must range from 10.75 m/s to 13.25 m/s."

Cleaning

Cleaning the grains before drying is another important postproduction activity. The team recommends the use of IRRI grain cleaner, which has a cleaning capacity of 0.25 to 1 ton per hour and a purity output of 99 percent, and the PhilRice hybrid rice/inbred seed cleaner, which has a cleaning capacity of 1 ton per hour and purity output of 98 to 99 percent. Farmers are also advised to clean the grains again after drying since most of the impurities are not easily removed from wet rice during the pre-cleaning process.

Drying

Proper drying of the grains is important to lessen the risk of spoilage, prevent insect activity, and avoid grain discoloration caused by grain heating at high moisture content. Some farmers prefer sun drying because it is cheap, does not entail cost for energy consumption, and because there are drying areas in most places. To ensure the quality of harvested grains, reduce postharvest losses and dependence on weather conditions for harvest and allow more time for postharvest field work. PhilRice promotes mechanical dryers such as the flatbed dryer. The dryer, according to the researchers, has a capacity of 1 to 6 tons per batch and removes moisture at a rate of 1 percent per hour.

Storing

Storage plays a significant role in ensuring the availability of stocks. It also provides reserves for unpredictable circumstances such as drought, flood, and war. The research team advises farmers to store grains at a safe moisture level of 14 percent wet basis or lower for prolonged storage.

Milling

In milling rice, farmers must use the multipass rice mills because according to the researchers, these have an average milling recovery of above 60 percent. Whereas, a single pass mill has a low milling recovery of only 55 percent. They also said that a 14 percent moisture content is needed to mill rice. Moreover, farmers must also consider the quality of palay, milling setup, and the knowledge and efficiency of mill operators.

New Theory Agriculture

New Theory Agriculture is the way of practice that could help poor rice farmers to grow rice without having to eat only rice all year long and also provides farmers various sources of income which brings them to the better way of living.

This "New Theory" was based on the fact that an average farmer owns about 10-15 rai (1 rai = 1600 m³) of farm land, this total amount of land should be divided into 3 parts for the following functions:

Part I: 30% of the total farm area (~3 rai) is reserved for water reservoir. The pond should be built at 4 meter deep with capacity to hold 19,000 m³ of rain water. This amount of water would be enough for agricultural use all year. The pond itself could be used not only for agriculture but for aquaculture as well to add more income to the farmers.

Part II: 30%+30% of the total farm area (~10 rai) is the agricultural land which is further divided into 2 sections. The first half (5 rai) is paddy rice and the remaining (5 rai) is field crops or fruit trees depending on the condition of land and market.

Part III: The remaining 10% of the total farm area (~2 rai) will be used as residential area, roads, dikes, draining canals, as well as for family gardening and animal husbandry.

Conclusion

Increase rice production is a way to put more foods to the global markets to solve the global food crisis which the present world is facing. Rice will be available for everybody who needs, kept for food security, and price for all food will be decreased. The main idea of the strategy is to maximize rice production and minimize losses by having students to introduce and advice rice farmers efficient technologies or techniques in any field they are studying.

We need to push the international community for long-term agricultural research aiming solely at making developing countries food self-sufficient, without any commercial interests at heart, if we want to resolve this food crisis and avoid it from ever happening again.

Maybe we will be in time to turn this food crisis, into an opportunity, and really teach people how to fish, rather than just giving them fish to eat, and the people who will do that tasks are not the governments or some organizations, but us, the new generation students who have high potential and cares much about our world. Maybe queues for food hand-outs in developing countries could be a thing of a past.

Finally, as humans inhabiting this fragile planet, we need to work together. Given the collective will of humanity, no problem is insurmountable. Cooperation is the key – not blaming each other.

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