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**Keynote Address**  
 by  
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Delivered at the  
**Second World Congress on Agricultural and Rural Finance**  
**“Global Food Security in a Changing Environment”**

31 October – 3 November 2007  
 Royal Thai Navy Convention Hall, Bangkok, Thailand

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Good morning ladies and gentlemen,

On behalf of the Food and Agriculture Organization of the United Nations I would like to thank the organizers for providing us the opportunity to review some of the issues and factors affecting global food security.

This topic is particularly relevant to this Second World Congress on Agricultural and Rural Finance as it offers an opportunity to highlight a number of important issues that the agricultural sector will face in the medium term, in particular as regards food production, agricultural markets and prices.

The eradication of extreme poverty and hunger is one of the priority Millennium Development Goals (MDGs) adopted in 2000 by the United Nations General Assembly for the target year of 2015. The encouraging news is that, supported by robust economies, many countries, particularly those in Asia, are making good progress in reducing poverty levels. A number of factors however, raise concern about the long term sustainability of that progress.

Now, at the beginning of the 21 century, certain conditions that have ensured that there is sufficient food for the people of the world, are changing. We will look at those conditions here today.

On the demand side, steady population gains with world population projected to reach nine billion by 2050 represent an increase of more than one third over the 6.75 billion of today, or an average of 0.7 percent per annum over the entire period. However, over the earlier part of that period, from 2007 to 2017, the increase will still be as much as 1.1 to 1.2 percent per annum.

A second factor on the demand side is the robust economic gains that are supporting demand for more and better quality food. This is accompanied by changing dietary patterns which prompt a shift in consumption from staples to animal products. As individual consumers and countries grow richer, they consume less wheat and rice, substituting them with more fruits, vegetables and animal protein in the form of meat, eggs, fish and dairy products. This trend is expected to continue in the future. The most recent OECD-FAO outlook for the 2007 – 2016

period expects consumption of cereals to go up by an average of one percent per annum for rice, wheat and coarse grains combined, slightly below the expected population growth rate for that period.

To produce one kilogram of meat, multiple kilograms of grain are needed: about five kilograms for beef, three kilograms for pork, and perhaps two kilograms for chicken. Therefore the overall demand for cereals is more supported by demand for animal feed, rather than by demand for human consumption.

The key question is whether the demand increase can be met through increasing production. There are a number of constraints on the supply side which are raising concern among policy makers, industries, and food security specialists.

1. Many of the yield gains in the past were a result of technological innovations of the green revolution. This boosted food grain production through the use of new varieties, chemical fertilizers, chemical pesticides and improvements in irrigation. The yield increases of more than two percent per annum that were achieved between 1960 and 1983 have since been reduced to just a little over one percent. And for rice and wheat the yields since 1997 have increased at a meager 0.8 and 0.6 percent per annum respectively, suggesting that technological progress has slowed.

Now, 40 years later, the green revolution technology package is no longer generating yield growth. The chemical fertilizers and pesticides were instrumental in generating relatively fast and short term boosts in production but the long term sustainability of yield growth is not there. Widespread use of chemical fertilizers and pesticides has led to environmental concerns and lower yields in other areas such as in inland and coastal fisheries. Better-off consumers in developed countries and, increasingly in developing countries, are concerned about their physical health and are requiring assurance that food is clean and safe and environmentally friendly, ie, grown with less, or no, chemicals.

Concerns are being voiced that slower yield increases are not enough to meet the growing demand. If yields cannot be increased faster it potentially implies that new area needs to be put under cultivation.

2. That takes us to the second supply constraint, land. It is clear that land is a scarce factor of production. Arable land defined as land under temporary crops, pastures and vegetable gardens is in limited supply. Much of the land currently out of production is marginal land, or linked to environmental concerns.

During the years of the green revolution, arable land increased gradually, about eight percent over the period 1961-1985. But since the early 1990s, acreage expansion has been limited. In some parts of the world, arable land is diminishing due to losses caused by increasing urbanization, desertification and other forms of land degradation. Pulling new, virgin land into production holds implications for the environment and wildlife resources, possibly threatening biodiversity which itself is a critical resource for future advances in agricultural science and technology.

3. An important input that contributed to the success of the green revolution was investment in irrigation and increased access to water. Total irrigated area is

estimated at about 280 million hectares. But nowadays it is becoming increasingly difficult and costly to build, maintain and upgrade irrigation systems, firstly because the most financially viable sites have already been developed, secondly because of the poor condition of many existing systems, and thirdly because of increasing awareness of the environmental costs associated with building new large dams and reservoirs.

4. It is not only the consumers who want to reduce the quantities of chemical fertilizers and pesticides. Higher oil and gas prices have made chemical fertilizers more expensive than before. The same applies to other chemicals. Over the past five years, costs of fertilizer have continuously increased, in particular the nitrogen fertilizers which are mainly produced from natural gas. The average US price of urea, the main source of nitrogen, has more than doubled since 2002 and it has increased more than 25 percent in the last year alone.
5. Higher oil prices have also made bio-fuel production a profitable alternative to food production for many farmers, both in developed and in developing countries. Some arable land is being shifted from food crops to bio-fuel crops. This is particularly the case when dual-use crops such as maize, sugarcane, cassava, and oil palm are being used to produce fuel instead of food. This year for the first time, in the EU more rapeseed will be used for fuel than for food or pharmaceutical purposes. Not only will there be direct competition for land between fuel and food, also there is already direct competition between maize for fuel and maize for food. Fuel prices and food prices seem destined to remain linked for the future. This issue and ensuing concerns about food security implications prompted the United Nations Special Rapporteur on the Right to Food to demand an international five-year ban on the conversion of agricultural land to bio-fuels, in order to combat soaring food prices.
6. Certainly the most uncertain factor affecting the outlook for basic food production is global warming. The current cropping patterns have historically developed linking the right variety of a specific crop with the appropriate soil type, based on the right temperature and rainfall. These patterns, having been established over the centuries will be challenged by climate changes with, at least in the short term, potentially adverse impacts on production. The adverse impact on rice has been confirmed by research at the International Rice Research Institute (IRRI) which has found that global warming will make rice crops less productive. Increasing temperatures will cause a decrease in yields.

The supply constraints to food grain production raise the possibility that permanently higher price levels for a range of agricultural commodities will be needed to bring demand and supply in balance. This could have serious consequences for the food security of large numbers of people, in particular for the poorest and most vulnerable groups.

Ladies and gentleman, I think you will agree with me that we cannot take global food security for granted anymore. World cereal stocks are today at a very low level, at just 20 percent of annual consumption. We will have to be vigilant and we have to search for solutions that will allow us to overcome the challenges on the supply side. You may recall recent news of countries and consumers concerned about food-price-inflation: Germans are concerned about the price of beer, Italians have protested about price increases for pasta, Chinese are unhappy that the price of pork has increased by 50 percent in one year time, US consumers have to pay more for their cornflakes and milk and Mexicans have protested against the price increases of

corn flour. The government of Argentina earlier this year temporarily suspended the export of beef because of domestic prices concerns. The government of Vietnam in the middle of this year halted the exports of rice for the same reason. It is certain that we will see more of such domestic political moves in future, from other governments under domestic pressure to keep food prices low.

Until now, we have been used to governments in the USA, EU and Japan protecting their domestic agricultural markets and subsidizing exports. But if the current trends persist, export subsidies may quickly dwindle and be replaced by export controls in more countries than just Argentina and Vietnam, to protect domestic consumers.

Impediments to trade like the Argentinean and Vietnamese export controls will aggravate the global situation and put upward pressure on global agricultural commodity prices, prompting governments to try to outdo one another to protect their voters from high food prices.

We should be concerned about the impact that a 50% increase in the price of wheat, as has occurred in the past four months, has on the 1.1 billion people who live on one Dollar or less per day. For those who are already spending most of their budget on basic staples like rice or wheat flour, a big increase in the price of that staple will mean that they will have to spend even more to meet their calorie requirements, leaving even less to buy nutritious food, essential for a proper diet. Women and children are usually the most adversely affected.

What are the lessons and implications in terms of policies, and for the financial sector?

On the positive side, the bio-fuel industry has the potential to revitalize the agricultural sector and to make it more profitable for investment. It promises, through higher prices and returns, new markets to farmers who have been trapped for decades by low priced commodities. Commodities linked to bio-fuels production potentially offer an escape from this cycle. Tropical countries which can grow crops like sugarcane and oil palm will be the first to benefit. It is likely that agricultural commodity prices will stay high as long as oil prices stay high. This will mean that the agricultural sector might recover part of the share it has lost in the national economies. New investment will move into agriculture, shaping asset values and investment flows. The extra demand for agricultural land from the bio-fuel industry will strengthen land values. Land owners, including small farmers who own land, will turn out to be winners. A revitalized rural sector may help to reduce, stop or even reverse the migration out of rural areas.

But on the negative side, the landless poor are likely to be losers. Although a revitalization of agriculture may offer opportunities to those living in rural areas, the urban poor are certain losers because they will have to pay more for basic foodstuffs without being able to benefit from a revitalized rural economy.

Many governments have been optimistic about bio-fuel development with some countries, or groups of countries, even setting minimum targets for bio-fuels to replace traditional fuel. Some of this early enthusiasm may have been based on incomplete information and more consideration may need to be given to alternative strategies if it turns out that food security is threatened. The warning message from the United Nations Special Rapporteur on the Right to Food should be a wake-up call to many.

Banks and financial institutions can contribute to a solution by aiding investments that enhance long term agricultural productivity and that allow farmers to make better use of the scarce resources of land and water. Investment will be needed to modernize irrigation systems and technologies such as drip irrigation, as well as investments in on-farm renewable energy such as biogas. In the near future solar energy may increasingly become economically viable, especially in the more remote rural areas.

Governments have to ensure that the regulatory frameworks are in place for banks, farmers and other investors to play their role in a right and sustainable way. Too often, well intentioned government interventions stifle, confuse or misdirect the private sector. Examples are the US tariff on ethanol imports, the electricity subsidies in various Indian states for the agricultural sector and the increasing occurrence of restrictions on agricultural exports by governments eager to protect consumers. All of these actions send a wrong signal to farmers, investors and consumers.

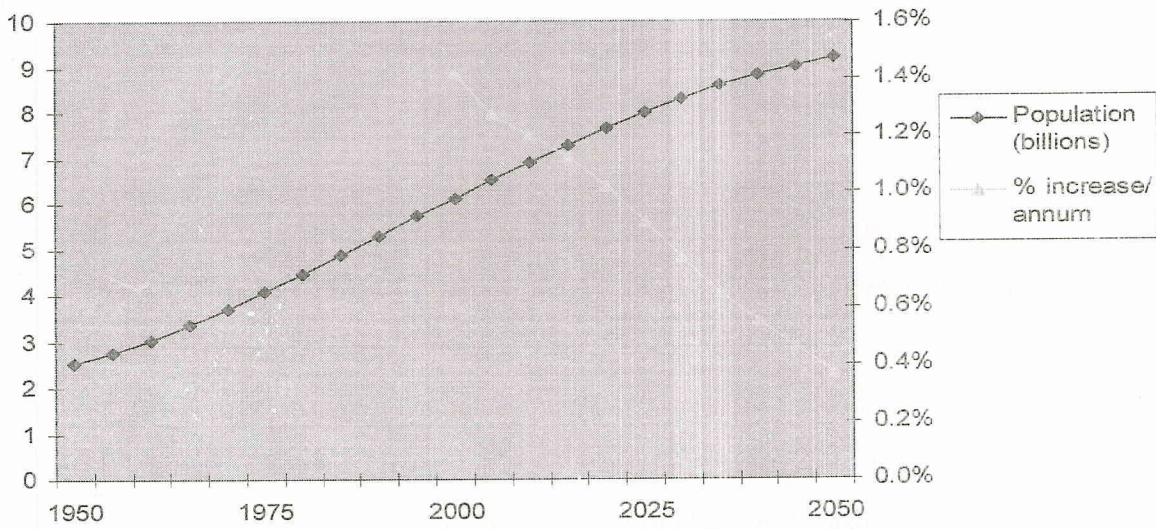
Governments should be supportive of private sector development but be also concerned about vulnerable populations who will be most affected by price increases for staple foods, such as the poor in urban areas. Governments should employ strategies to improve their purchasing power or provide social protection.

FAO is ready to play its role as provider of factual and accurate information and to advise governments and others, including agricultural financiers and policy makers, in an objective manner. To this end, FAO has set up an International Bio-energy Platform (IBEP) in May 2006. The IBEP will provide expertise and advice for governments and private operators to formulate bio-energy policies and strategies. It will also help them develop the tools to quantify bio-energy resources and implications for sustainable development on a country-by-country basis. We also stand ready to work with governments and local populations to ensure food security for vulnerable populations.

Ladies and gentlemen, thank you for your attention and I wish you a fruitful congress.

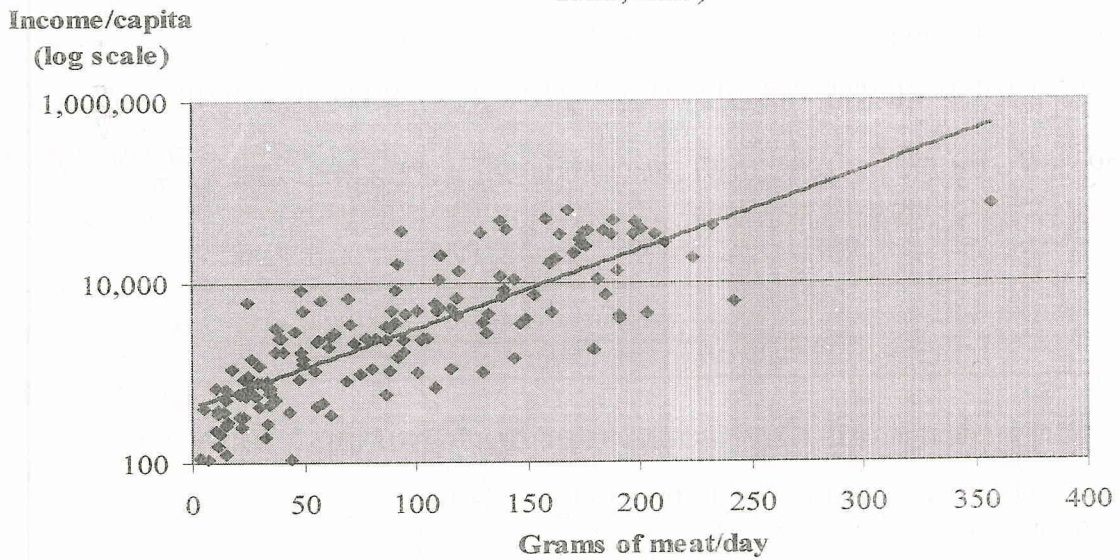
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**World Population 1950-2050**  
**Total Population and % Increase/Annum**  
 (Source: UN)

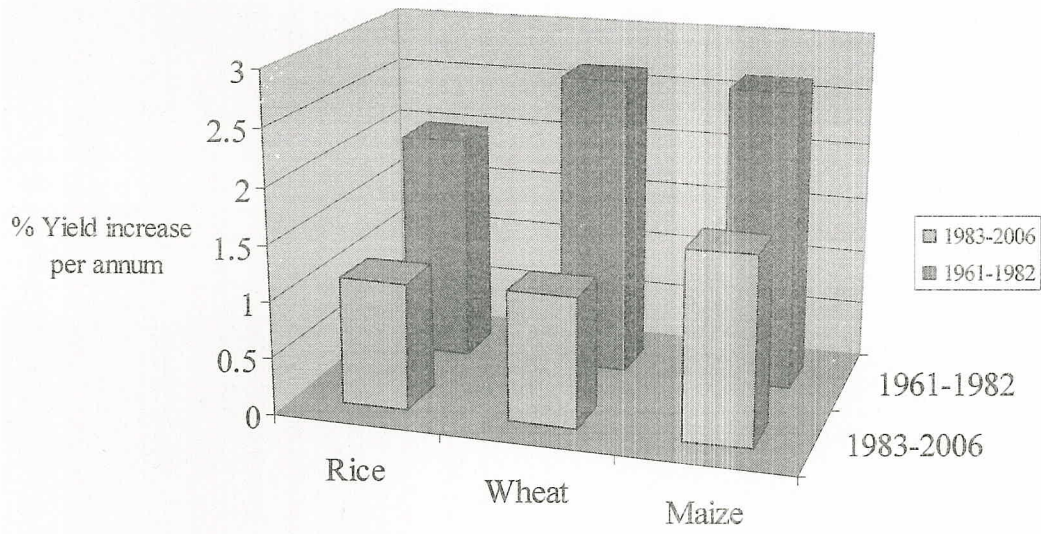


**Meat consumption increases with increasing per capita income ....**

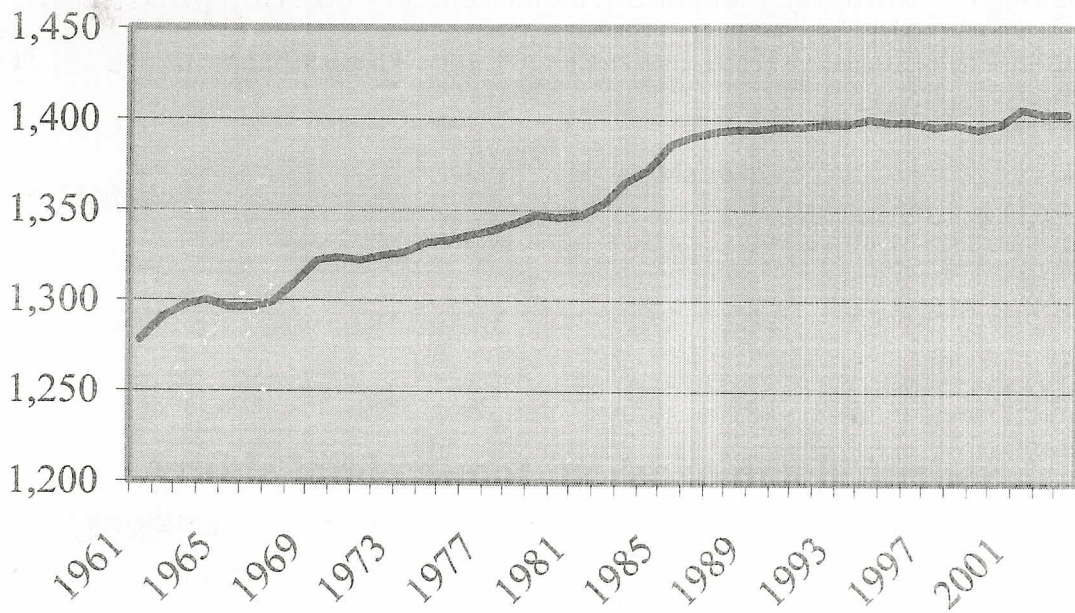
(USD per capita and grams of meat/capita/day for 152 countries; source FAO, IMF)



**Yield growth is slowing .....**  
 (1961-2006; Source: FAO)



**Arable land cannot increase much further ...**  
 (Million hectares of arable land; Source FAO)



## Real fertilizer prices are rising ...

(Urea, USD/ton in constant 2000 prices)

Source USDA)

