

# Global Food Crisis: Implications to Asia's Food Security

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# The Case

- Agriculture sector has not progress as fast as the non-agriculture sector.
- Food consumption has been growing at a faster rate than production.
- Food security situation, especially in developing economies, is vulnerable (the food crisis, as it has become known) to changes in supply and demand factors.

# Questions

- **What are the issues in the supply and demand sectors?**
- **How is the food situation in Asia?**
- **What are strategies to address the food security in Asia?**

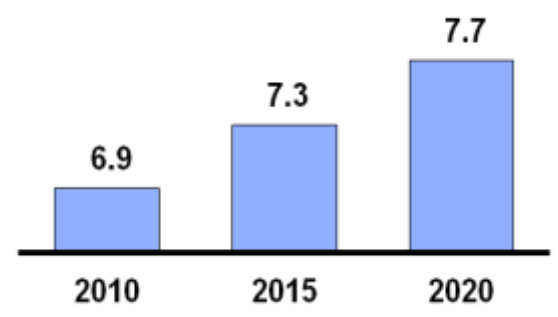
# Presentation Outline

- Global food crises and causes
- Food security situation in Asia
- Implications to Asia's food security

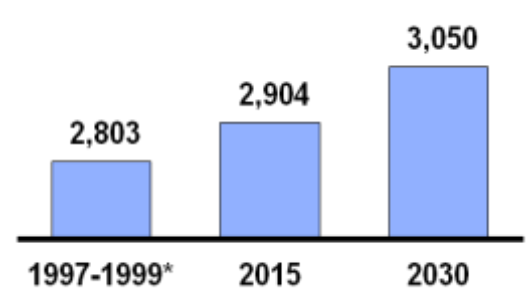
# *Global landscape of food crisis and causes*

Historical trends and estimates indicate that despite the increase in global demand for agriculture, production growth rate has been declining, higher energy prices, increasing demand from emerging economies, underinvestment in agriculture and policy favoring export crop rather than food.

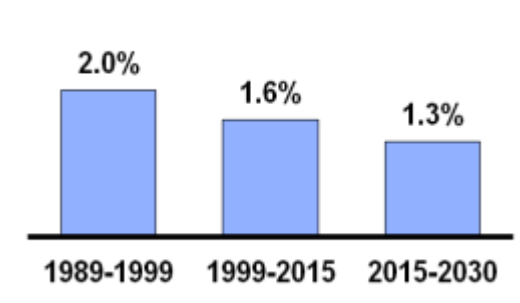
Global population estimates 2010-2020  
Billion



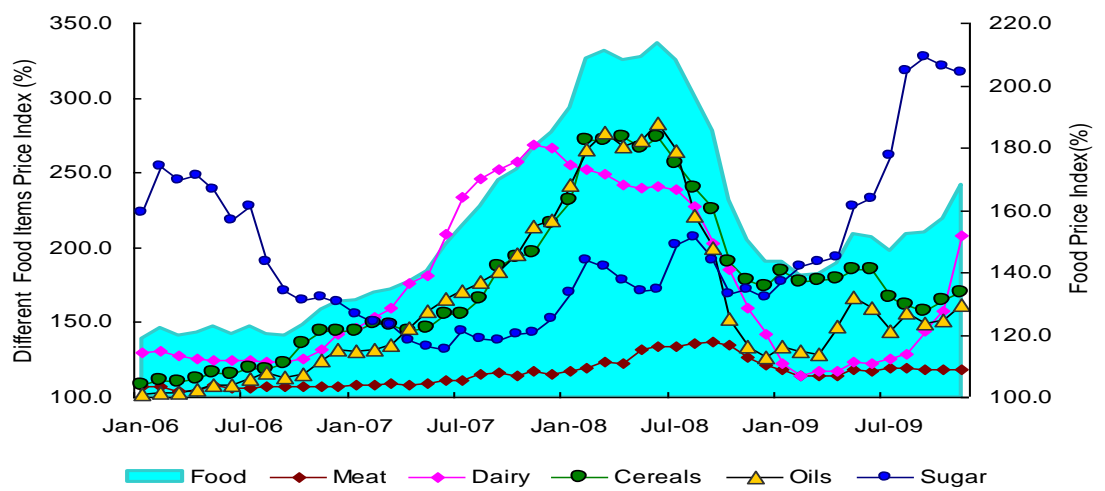
Growth in global food consumption for 1997-2030  
kcal/capita/day



Growth in global agricultural production 1989-2030  
Percent



- With decreasing production growth, developing countries will be more dependant on agricultural imports.
- Inelasticity of supply and demand causes large fluctuation in prices.



Source: World Agriculture: Towards 2015/2030 Report; Food and Agriculture Organisation, United Nations

World Price Index Movements for Different Food Sub-groups (Jan 2006-Nov 2009)

With Knowledge We Serve

Source: FAO (2009a), World Food Situation: @ <http://www.fao.org/worldfoodsituation/FoodPricesIndex>

# Global Food Crises - *due to changes in the fundamentals and hence food equation and technical factors*

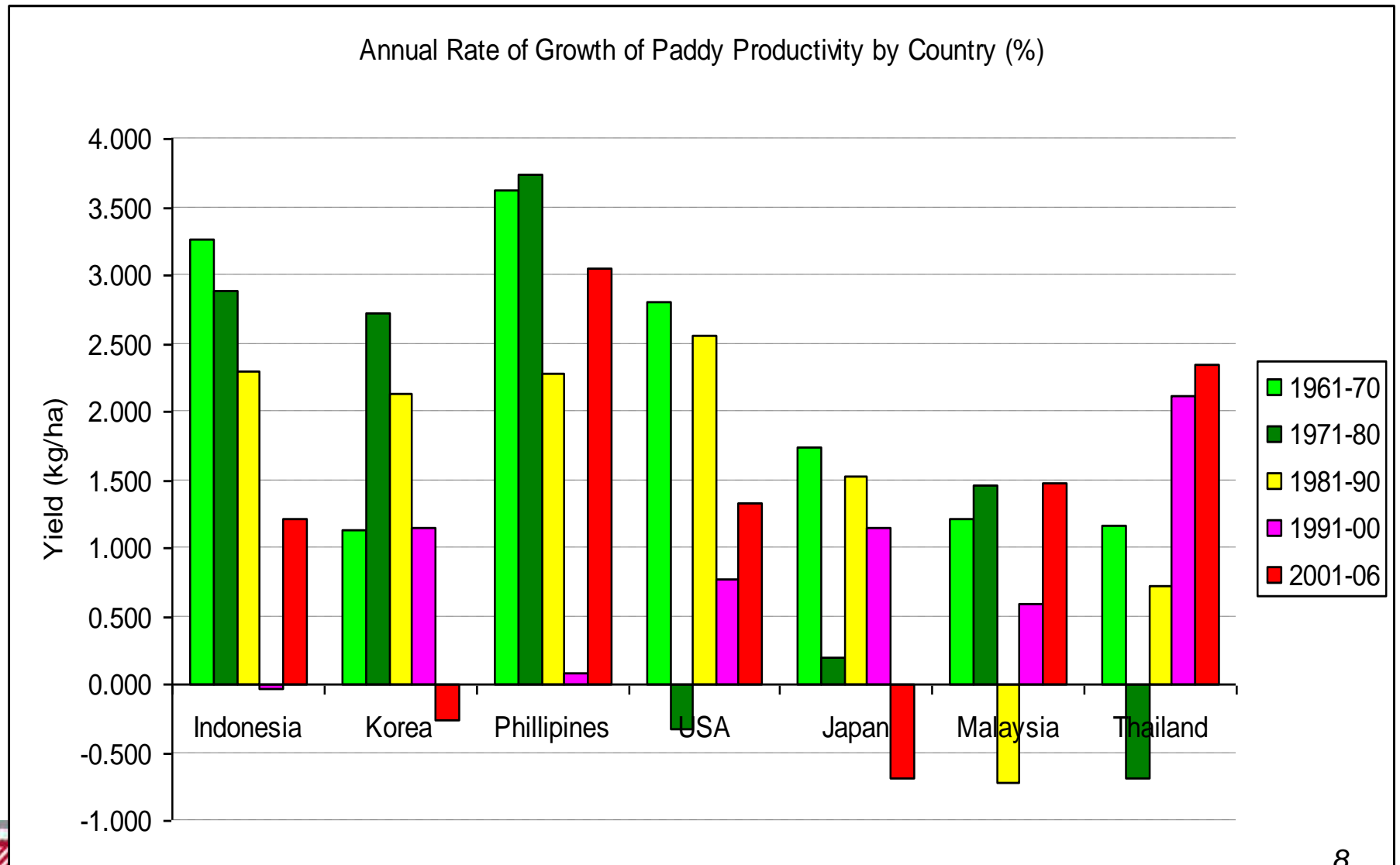
## ■ **Supply sector constraints are imminent**

- Underinvestment in agricultural productivity & technology
- Small scale farms
- Declining stock level
- Climate change and environmental concern and the contribution of agriculture to the problem
- Stronger linkages with oil – input (transportation, machinery & fertilizer) and output (biofuels – food vs energy)
- Depleting resources – particularly arable land and water

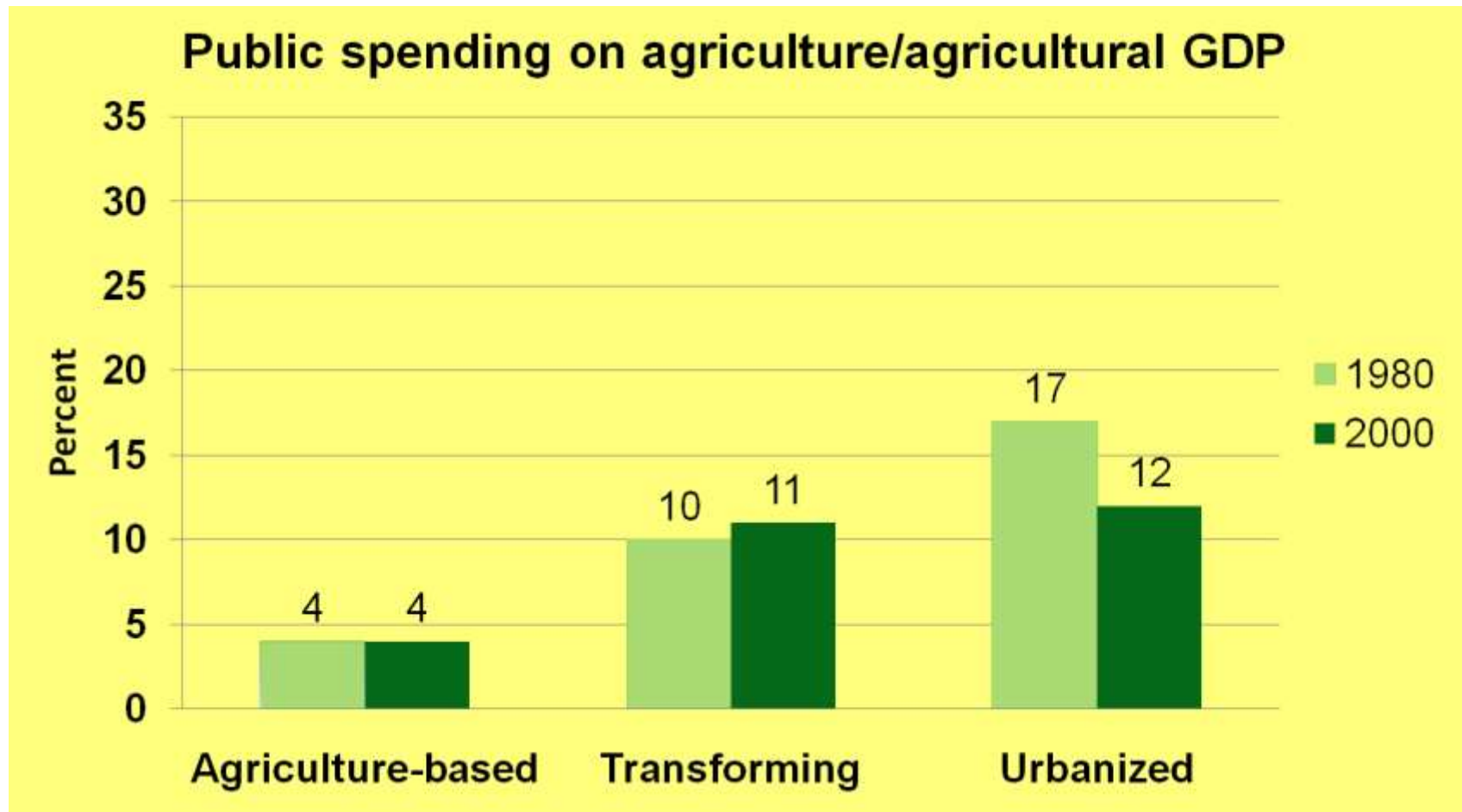
## ■ **Demand sector is booming**

- Income increase that led to changing lifestyle and diet
- Population growth
- Growing concern on Food safety

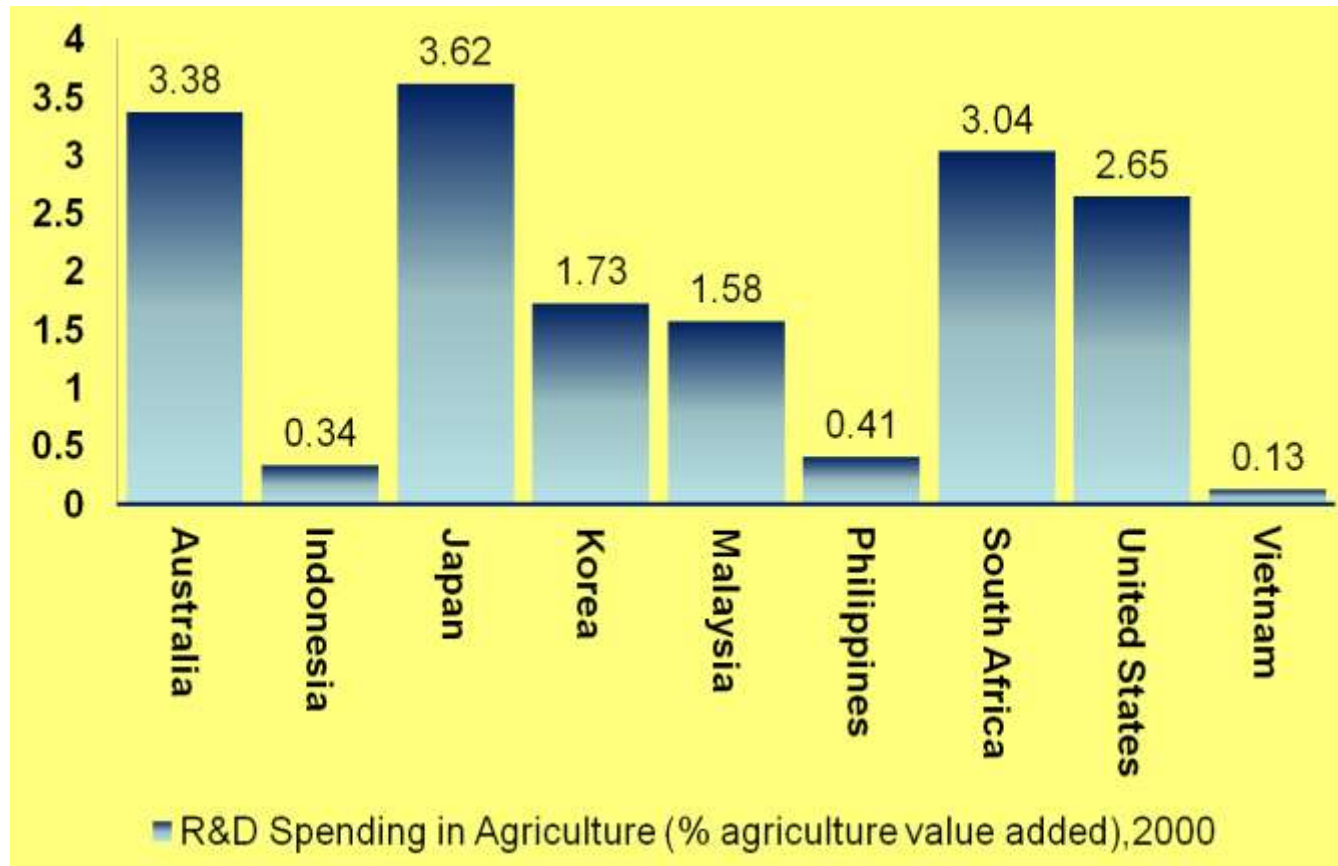
# Supply Situation - *After Green Revolution in the 1960s, even the advanced economies have not shown improvement in rice productivity..*



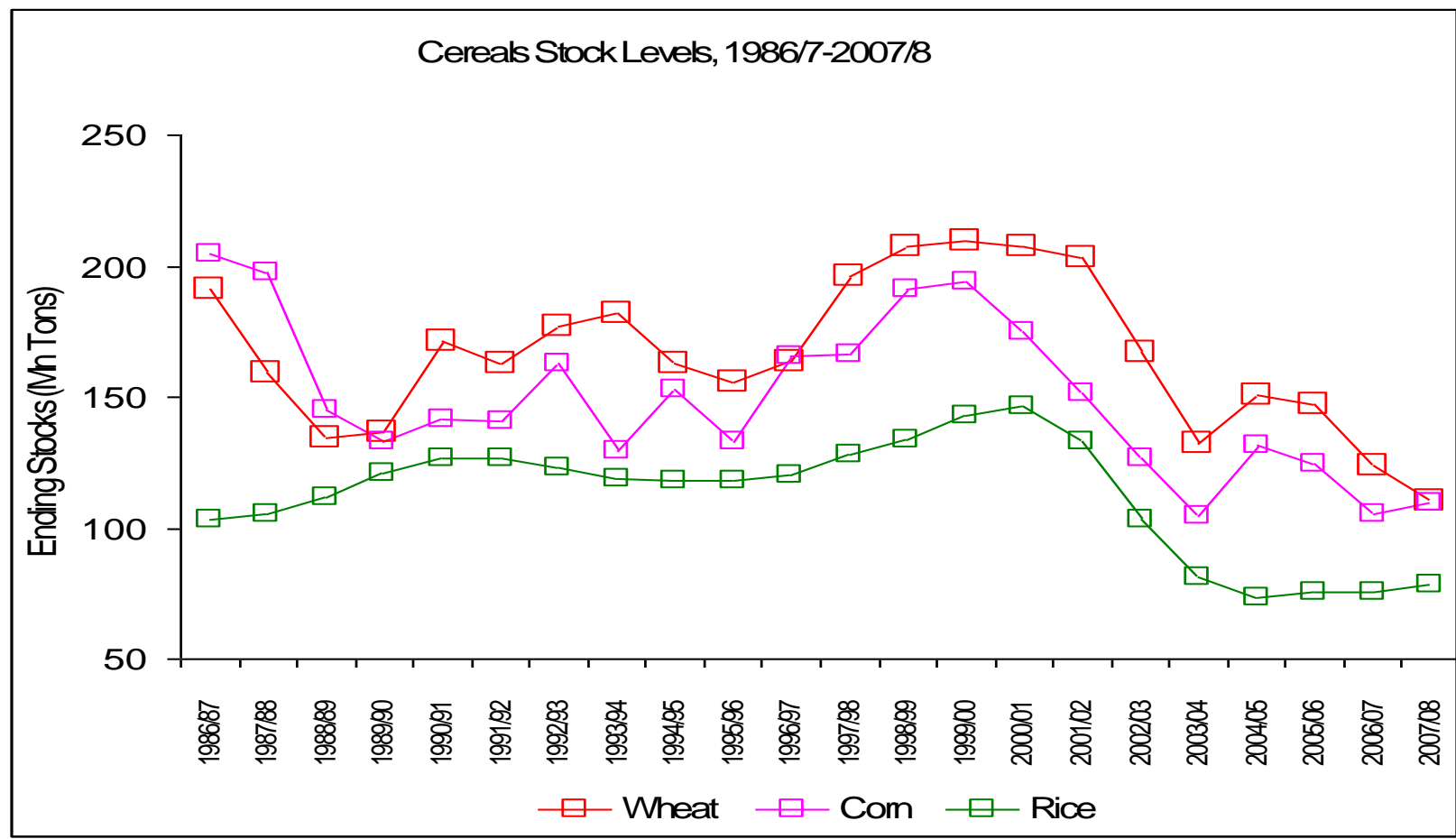
# Supply Situation - *Public spending on agriculture in agri-based & transforming economies is less compared to urbanised economies....*



**Supply Situation** - *R&D expenditure in Asean is relatively low compared to developed economies... has undermined its key role for economic growth. As a result, agricultural productivity growth was marginal and is too low to meet the present challenges.*



# Supply Situation – stock is a significant factor to price volatility....Record low level of stocks....

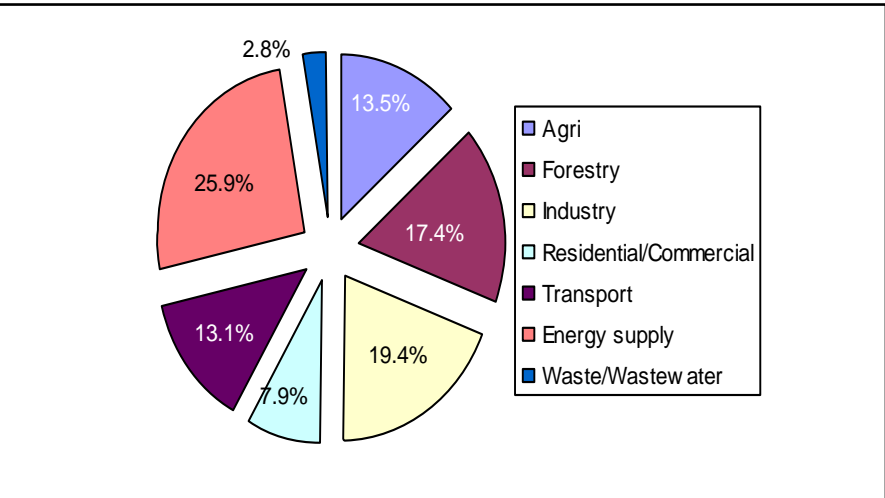


Source: [www.usda.gov](http://www.usda.gov)



# Supply situation - though agriculture is a significant contributor to GHG emissions, it is most affected by climate change.....

*Of all economic sectors, climate change has its most significant impacts on agriculture because of its broad geographic dispersion and obvious close dependence on climate and environmental factors.*



Temp rise	Possible CC impacts on food production
1 C	Modest increase in cereal yields in temperate regions
2 C	Sharp declines in crop yield in tropical regions (5 – 10% in Africa)
3 C	150 – 550 additional millions at risk of hunger (if carbon fertilization is weak). Agricultural yields in higher latitude likely to peak.
4 C	Agricultural yields decline by 15 – 35% in Africa, and entire regions out of production
5 C	Continued increase in ocean acidity seriously disrupting marine ecosystems and possibility fish stocks.

***Agriculture is a significant contributor to global GHG emissions.***

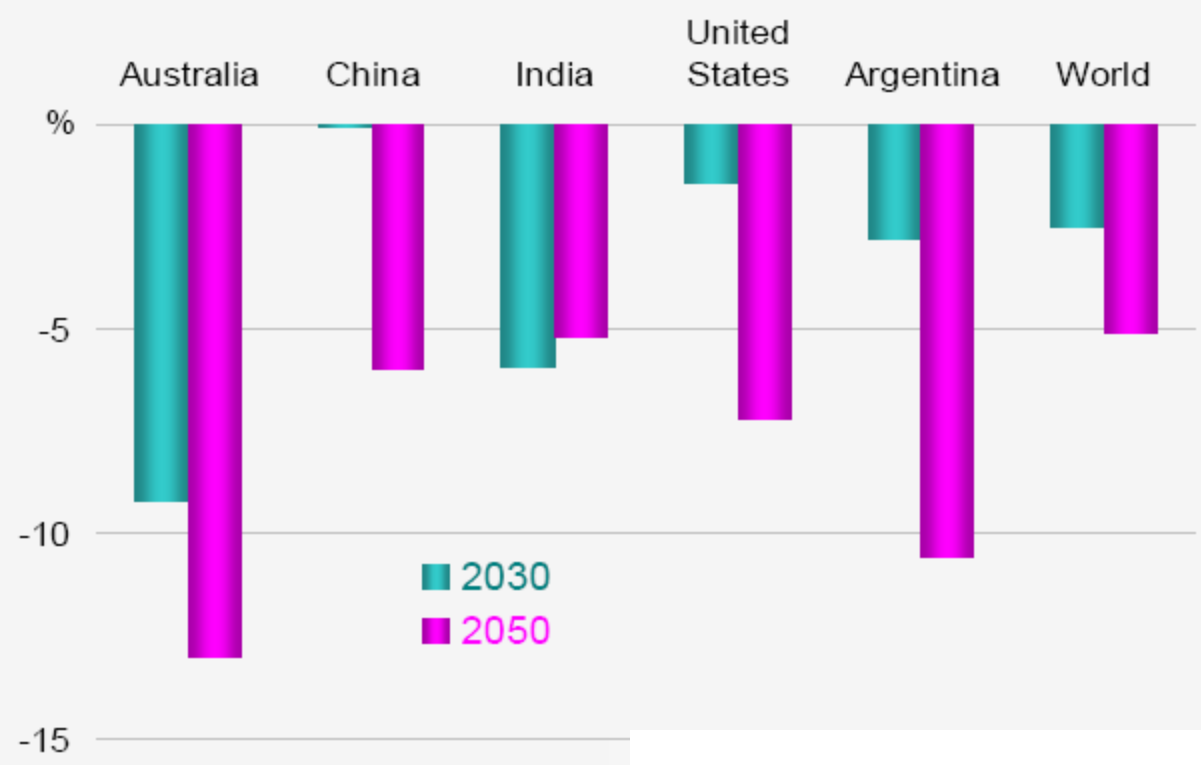
Source: IPCC (2007)



# Supply situation – possible impacts of Climate change on food production

## Climate change – percentage change in global wheat production

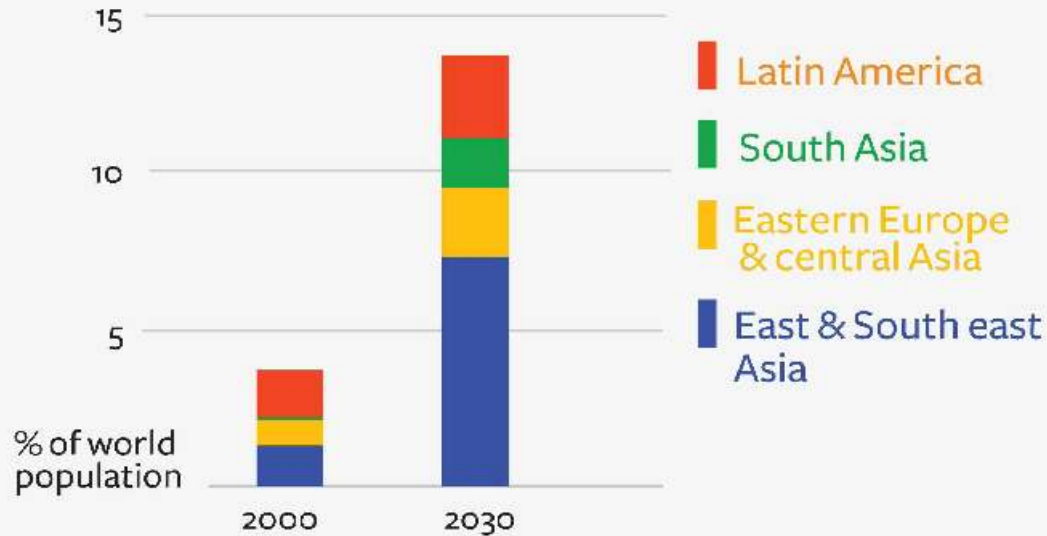
relative to the reference case (no adaptation or mitigation)



Source: ABARE

## rise of the global middle income population

*\$4,000 to \$17,000 per person a year (2000 PPP)*



innovation in economics [abare.gov.au](http://abare.gov.au)

## Economic growth, a dominant force, has...

- *pushed up middle-class consumers' purchasing power*
- *generated rising demand for food, and*
- *shifted food demand away from traditional staples and towards higher-value foods.*

# **Demand Situation – *what consumers want... in food.***

*Income growth has caused changes in food consumption patterns & trend.*



**Taste**

**Quality**

**Convenience**

**Health & Safety**

**Price**

# Demand Situation - *there have been changes in the demand for food attributes, e.g. Leafy Vegetables*

Attributes	Level of Attributes	Coefficients	t-value	Utility	Relative Importance (%)
	(Constant)	5.0946***	51.0947		
Freshness	Not more than 3 days of harvesting	-	-	-0.7364	
	Not more than 2 days of harvesting	0.5236***	4.8150	0.2422	36.7407
	Not more than 1 day of harvesting	1.0684***	11.1041	0.4942	
Food Safety	Conventional	-	-	-0.9466	
	Controlled Environment	0.8282***	7.8769	0.3831	47.2285
	Organic	1.2182***	11.5873	0.5635	
Texture	Slightly Crisp	-	-	-0.1621	
	Crisp	0.3505***	3.8631	0.1621	8.0890
Appearance	Slightly Damage	-	-	-0.1592	
	Wholesome	0.3441***	4.2065	0.1592	7.9418
Price	Actual Price	-0.0778***	-	-	-
			12.0184		

Std. error = 2.1618, F = 49.7208

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

# Demand Situation - Consumers are willing to pay higher prices for food attributes, e.g. Leafy Vegetables

Attributes	Level of Attributes	Coefficients + $\beta_0$	$\beta_0/-\beta$ price	WTP* (RM)	Overall WTP* (RM)
Freshness	Not more than 3 days of harvesting	5.0946***	0.6548	8.27	8.62
	Not more than 2 days of harvesting	5.6182***	0.7221	8.61	
	Not more than 1 day of harvesting	6.1630***	0.7922	8.96	
Food Safety	Conventional	5.0946***	0.6548	8.27	8.71
	Controlled Environment	5.9228***	0.7613	8.81	
	Organic	6.3128***	0.8114	9.06	
Texture	Slightly Crisp	5.0946***	0.6548	8.27	8.39
	Crisp	5.4451***	0.6999	8.50	
Appearance	Slightly Damage	5.0946***	0.6548	8.27	8.38
	Wholesome	5.4387***	0.6991	8.50	

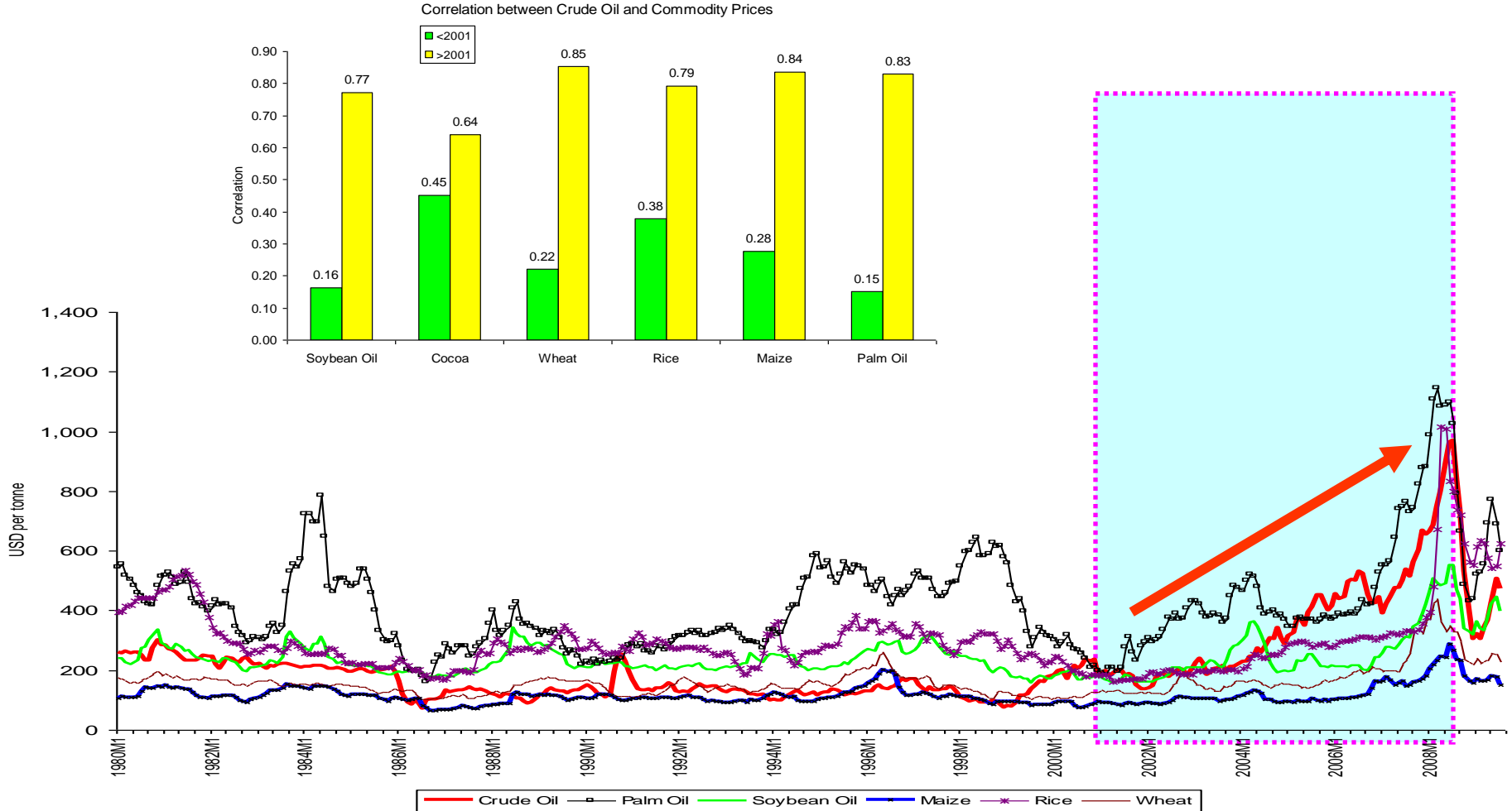
Std. error = 2.1618, F = 49.7208,  $\beta_0 = 5.0946$ , Coefficients of price = -0.0778

Note: Significance levels are denoted by \*\*\* for 1%, \*\* for 5%, and \* for 10%.

WTP\* calculated based on the current average price of leafy vegetables; RM5/kg

# Changes in fundamental (supply & demand) and technical factors - translated into upsurge and volatility in prices...

Prices of Selected Commodities, Jan. 1980-July 2009 (USD/ton)



# Changes in fundamental factors - After the spike, prices are levelling, but projected to remain high...

## Index of projected real food crop prices

	2007	2008	2009	2010	2015
Maize	138	182	197	194	148
Wheat	144	201	179	156	131
Rice	128	231	208	155	160
Soybeans	119	156	149	142	115
Soybean oil	136	187	173	160	110
Sugar	133	157	167	176	182

Source: World Bank, Development Prospects Group, July 2008

# **To summarize – causes of imbalance in global food equation (ranking)....**

- 1. *Income growth***
- 2. *Biofuels (energy price)***
- 3. *Underinvestment in agricultural productivity & technology***
- 4. *Trade policy & low stocks***
- 5. *Production shocks (emerging climate change)***
- 6. *High input & transport costs (energy price)***
- 7. *Population growth***

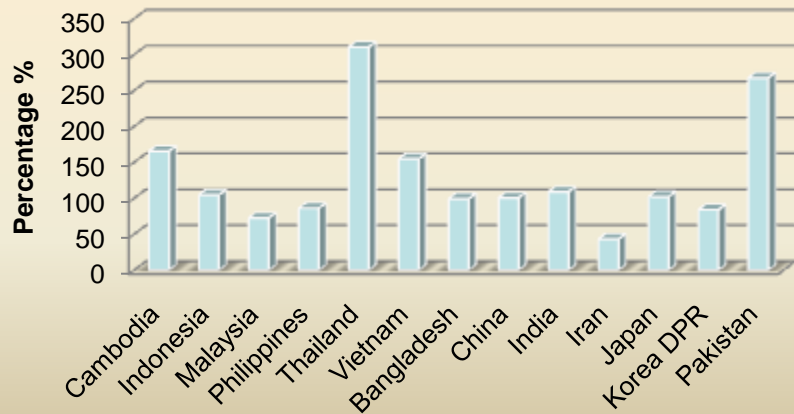
# *Food security situation in Asia*

# Food Security - *very much like “love” means different things to different people and under different circumstances.*

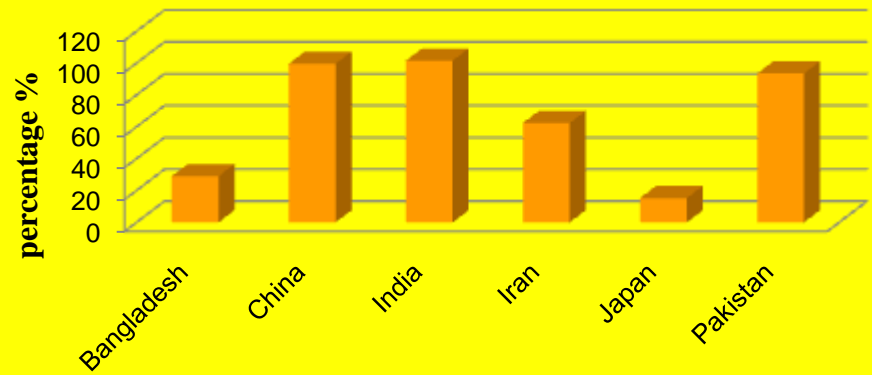
- Maxwell (1996) encountered 32 different definitions!
- Nevertheless, it has four major dimensions:
  - **AVAILABILITY** of sufficient quantities of food of appropriate quality, supplied through domestic production or imports;
  - **ACCESS** by households and individuals to adequate resources to acquire appropriate foods for a nutritious diet;
  - **UTILIZATION** of food through adequate diet, water, sanitation, and health care; and
  - **STABILITY** (Availability + Access)

# Food Security: Availability – self-sufficiency level is low.... Dependency on food imports is high....

### Self-sufficiency Level of Rice, 2004-2006 average

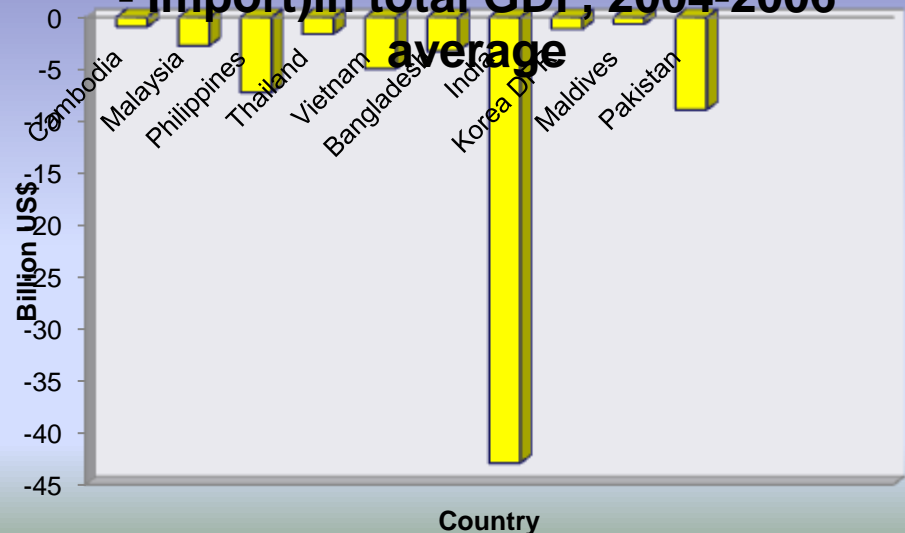


### Self-sufficiency Level of Wheat, 2009 average



**Deficit food trade for most Asian. Hence, with low purchasing power, vulnerable to global fundamentals.**

### Net Food Trade (Export - Import) in total GDP, 2004-2006 average

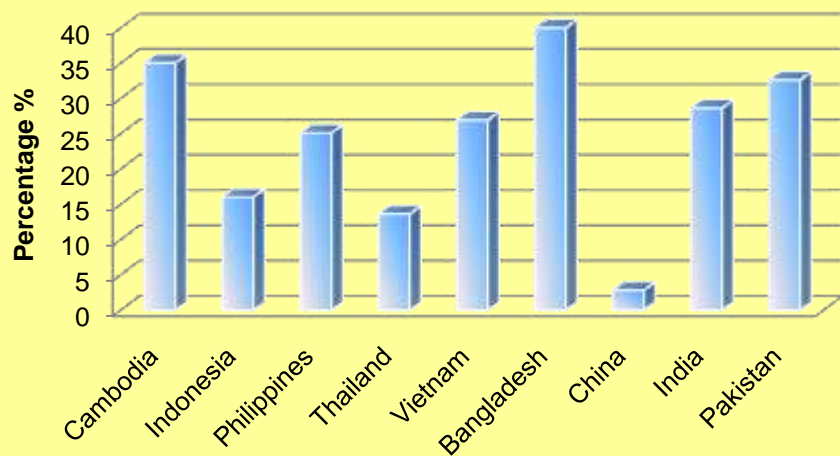


Source: FAO Statistics, 2009

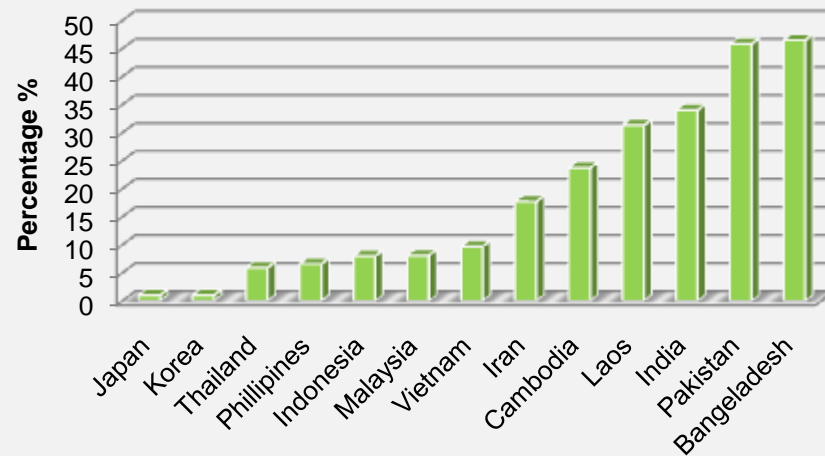
With Know

# Food Security: Accessibility – poverty remains high... Capability to acquire higher income is low...

### National (Poverty headcount), 2004 - 2006 average

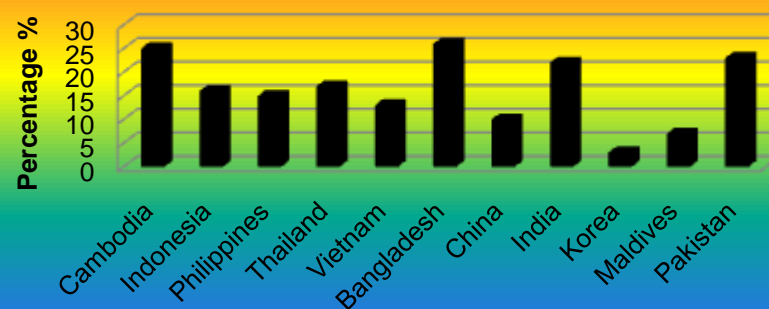


### Illiteracy Rate (% of people aged 15 and above)-2007



**Undernourishment  
remains high...**

### Proportion of Undernourishment, 2004-2006 average

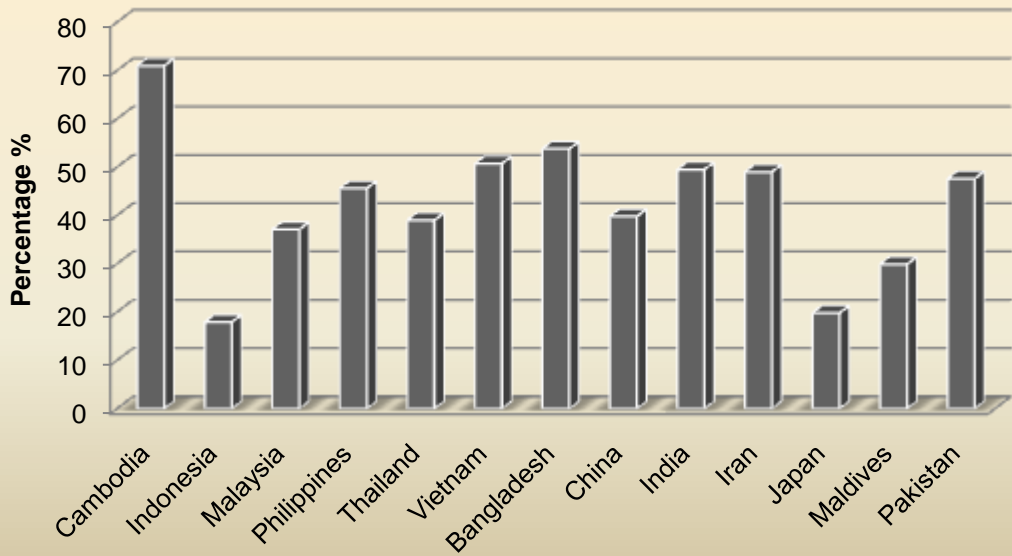


Source: FAO Statistics, 2009

*With Know*

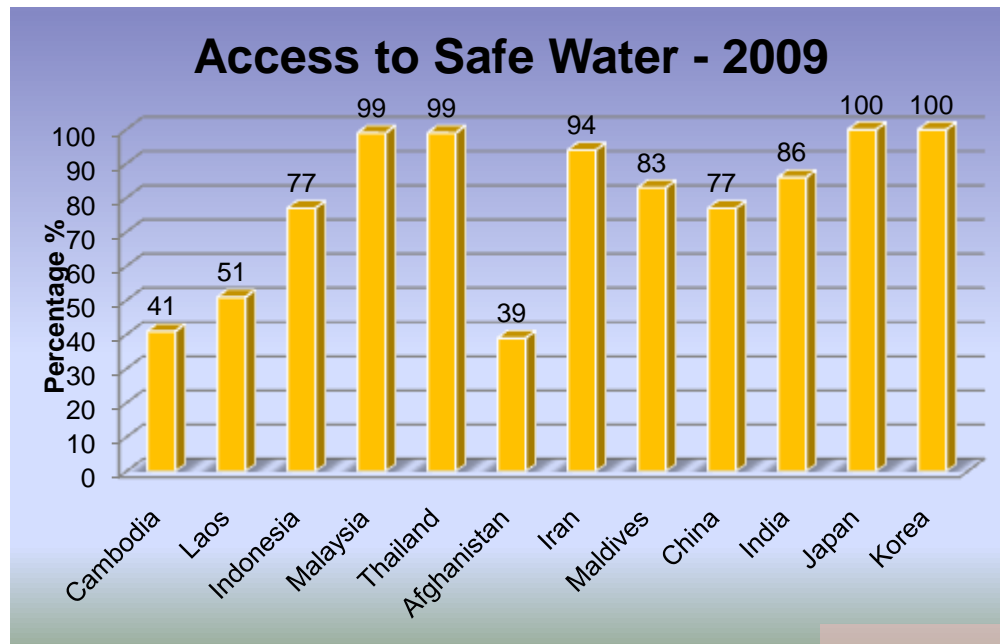
# Food Security: Accessibility – *low income level is translated into high proportion on food expenditure....*

**Share of Food in Total Expenditure, 2004**

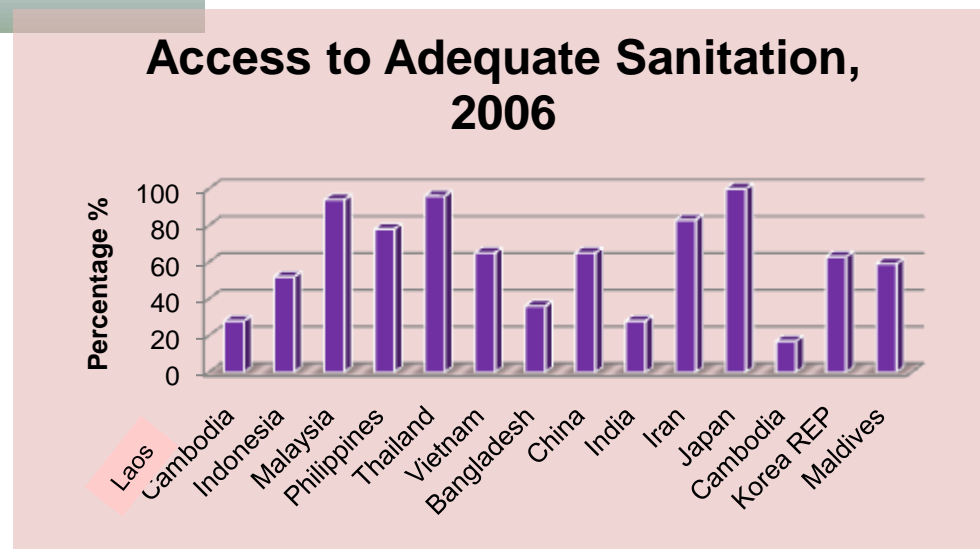


*Hence, little margin for adjustment should food prices increase.*

# Food Security: Utilisation - access to food utilisation for some economies needs to be improved.



Source: The World's Water , 2009



Source: FAO Statistics, 2009

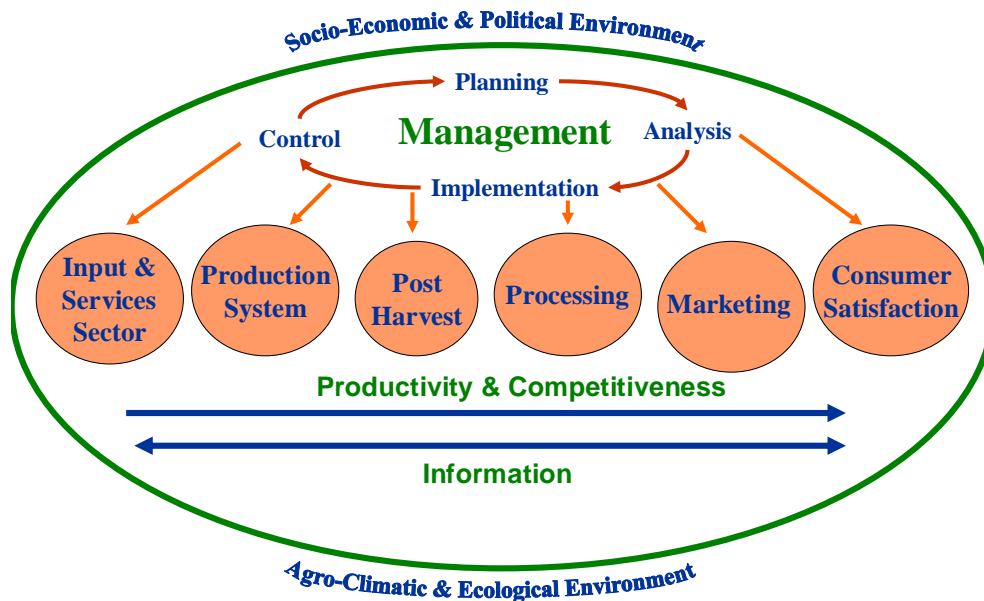
# *Implications to Asia's Food Security*

# Implications to Asia's Food Security: an example of a policy framework

Twin Track Approach	Availability	Access and Utilization	Stability
<b>Rural Development/ productivity enhancement</b>	<p>Enhancing food supply to the most vulnerable</p> <p>Improving rural food production especially by small-scale farmers</p> <p>Investing in rural infrastructure</p> <p>Investing in rural markets</p> <p>Revitalization of livestock sector</p> <p>Resource rehabilitation and conservation</p> <p>Enhancing income and other entitlements to food</p>	<p>Re-establishing rural institutions</p> <p>Enhancing access to assets</p> <p>Ensuring access to land</p> <p>Reviving rural financial systems</p> <p>Strengthening the labour market</p> <p>Mechanisms to ensure safe food</p> <p>Social rehabilitation programmes</p>	<p>Diversifying agriculture and employment</p> <p>Monitoring food security and vulnerability</p> <p>Dealing with the structural causes of food insecurity</p> <p>Reintegrating refugees and displaced people</p> <p>Developing risk analysis and management</p> <p>Reviving access to credit system and savings mechanisms</p>
<b>Direct and Immediate Access to Food</b>	<p>Food Aid</p> <p>Seed/input relief</p> <p>Restocking livestock capital</p> <p>Enabling Market Revival</p>	<p>Transfers: Food/Cash based</p> <p>Asset redistribution</p> <p>Social rehabilitation programmes</p> <p>Nutrition intervention programmes</p>	<p>Re-establishing social safety nets</p> <p>Monitoring immediate vulnerability and intervention impact</p> <p>Peace-building efforts</p>

<sup>1</sup> See P. Pingali, L. Alinovi and Jacky Sutton (2005): Food Security in Complex Emergencies: Building Food Systems Resilience.

**The new paradigm of agriculture:** Most policy frameworks only deal with production. But...food security is not only a production issue. Must also include consumption, processing and marketing issues...therefore, requires both sustainable production and consumption.



The scope of agriculture has changed from production oriented to supply-value chain oriented. The performance depends on the socio-economic and political environment as well as agro-climatic and ecological environment.

How much food is wasted during consumption and processing?

# *The new paradigm of agriculture: Its multifunctional roles and multidimensionality*

*Traditional roles are  
commodity oriented  
Production of food  
and fibre*



## *Multifunctional agriculture covers commodity and space*

### *Commodity*

- Production of food and fibre

### *Non-commodity/space*

- Environmental preservation
- Rural employment
- Biodiversity
- Biofuel
- Soil and water health
- Ecotourism & recreational
- Preservation of rural landscape
- Rural community
- Food quality/safety

Prices of agricultural goods do not reflect the positive externalities of agriculture, competitive vs efficiency equilibrium. Higher prices would increase production.

# Implications to Asia's Food Security: a policy diamond for a transforming economy

Recognise the multi-functionality of agriculture - payments for environmental services to promote production and conservation incentives (e.g. green technology).

**Environmental Services**

Provide safety nets by promoting rural non-farm economy to confront rural employment problem; enhance skills to give access to jobs offered by the growth of rural non-farm economy.

**Sustainable Production**

**Safety nets - rural non-farm economy & skills development**

- **Innovation** - More investment in R&D & intensify TOT to improve productivity
- **Entrepreneurship** – commercial farming practices

**Sustainable Consumption**

Promote efficient post-harvest, processing, marketing & consumption activities

# *Food crisis is serious.....*

- *At a US congressional hearing on the food crisis, some respected food experts repeated a saying, that “there are only seven meals between civilization and anarchy”.*
- *And a recent blog on anarchy was even more dire, that “every government is only two meals away from a revolution”.*



*Terima Kasih*  
*Thank You*

