



CRBOM Small Publications Series No. 20

**Paddy cultivation -
20 years from now**

by

Thi Thanh Van Ngo

**Center for River Basin Organizations and Management,
Solo, Central Java, Indonesia**

April 2010

The '*Small Publications*' are intended for knowledge-sharing and dialogue. In some cases they may present facts, information and lessons learnt. In other cases, they provide news, opinions, ideas or open questions for discussion.

They express the opinions of the author(s) and not those of CRBOM.

They can be freely copied and disseminated.

Contributions are welcome, in English or in Bahasa Indonesia.

The author: Associate professor, dr. Thi Thanh Van Ngo,
Head of Water Resources Economics Department,
Water Resources University, Hanoi
ngo_thvan@yahoo.com

CRBOM
Center for River Basin Organizations and Management,
Solo, Central Java, Indonesia
www.crbom.org
info@crbom.org

Contents

Glossary	ii
Summary	ii
1 Introduction	1
2 The challenge	1
3 Paddy cultivation today and in the future.....	2
4 Stormy weather over the paddy fields	3
5 Policy implications.....	4
References	5

Glossary

GDP (gross domestic product): The total value of goods and services produced per year within a country's borders

IWRM (integrated water resources management) (as defined by Global Water Partnership): A process which promotes the co-ordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems

Paddy: (1) a field with wet rice (inundated during its growth); (2) rice in its husk (also called rough rice)

Value chain (in agriculture): A set of wholly or partly related value-generating activities - for example production of seeds, cultivation, transport, processing and distribution. Agriculture is the basis for generation of a substantial value - revenue and livelihoods - outside the farm

Summary

Since early times, paddy cultivation has been the main supplier of food in many Asian countries. The basic aim food of security could not be achieved in any other way. At the same time, however, many paddy farmers are poor by national standards. Apart from hard work, they are becoming exposed to new challenges such as lower trade barriers; competition; new demands; and a reduced water availability.

In future, revenues of the agricultural sector will increase, but a large part of the value will be generated by crops other than rice, as well as meat, and, quite likely, biofuel. Less labour-intensive production systems will prevail. Competition will benefit the more efficient production systems at the cost of less efficient ones.

The transition between today and the future is a major challenge. If conducted smoothly, the sector will emerge as prosperous and competitive, well placed to generate income for the farmers and food for the population. If conducted less smoothly, there is a risk of unemployment and low incomes.

This paper argues that changes are unavoidable - and indeed desirable - and presents some suggestions on a smooth development.

1 Introduction

Since early times, paddy cultivation has been the main supplier of food in many Asian countries. The basic aim food of security could not be achieved in any other way. Also, paddy cultivation provides the livelihood for many people - in several countries the majority of the labour force.

At the same time, however, many paddy farmers are poor by national standards. Apart from hard work, they are now exposed to new challenges such as lower trade barriers; competition from abroad; new demands; and a reduced water availability.

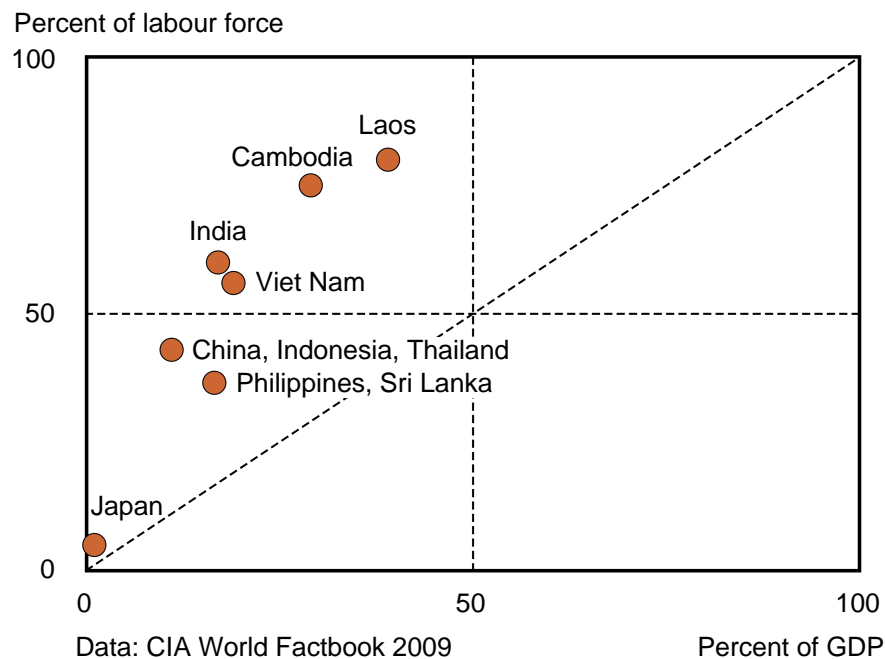
This paper argues that changes are unavoidable - and indeed desirable - and presents some suggestions on a smooth development.

2 The challenge

Many countries see their agricultural sectors lagging behind industries and services in terms of technology and revenue.

This is illustrated by the figure below, which shows examples of employment in agriculture being much higher than the sector's contribution to the national economy. This means that there is less revenue to share than it is the case within industry and the service sector.

Figure 1: The agricultural sector's contribution to GDP and employment



Of course there is no rule saying that each sector should generate an equal value - in terms of money - per employee. (Rather, in an economic perspective, the sectors should contribute to the best of their potential, and in a social perspective, food is important in its own right). On the other hand, the imbalance seems consistent with the fact that paddy cultivation can be a hard way to earn a living.

3 Paddy cultivation today and in the future

In a strongly generalised way, and with a particular view to SE Asia, a simple distinction can be made between three stages of the paddy cultivation sector, as described below.

Today

Traditional production units are household-based and small. Some household members may seek a living off the farm, and bring back cash. A few cows and buffaloes can make a visible difference to the household economy, and so can a bit of seasonal fishing.

Paddy cultivation is labour intensive, but typically the peak demands of labour, for transplanting and harvesting, are extreme, short and synchronised. If the cultivation is rainfed, without reliable access to irrigation water, it becomes vulnerable to weather irregularities. In some places, the yield is low (but the quality can be high). Access to markets can be impeded by a variety of physical and structural (market-related) constraints.

Irrigated paddy cultivation is (and will remain) the predominant off-stream water use.

A transition process

Many Asian countries are in this stage. The process of structural change is important, because it will affect many households over a time span of decades.

The agricultural sector will diversify, and the thrust of its development may occur for production systems other than rice. Food production will increase, but the process will see a big loss of employment in traditional paddy cultivation.

The production unit - the farm size - will increase, driven by new technology that requires less labour but more capital, combined with a need of higher production efficiencies - more output and higher value per unit of input. Labour-intensive production systems - such as the System of Rice Intensification (SRI) - will be marginal.

The changes are driven by a combination of circumstances. Lower trade barriers will increase the exposure to competitive pressure, reflecting comparative advantages and disadvantages, as well as exposure to global price fluctuations - a tendency that will interact, in an unpredictable way, with escalating weather irregularities caused by a global climate change. New lifestyles will affect the demand of many commodities, including food (and energy) - for example if people consume more meat. A new demand of biofuel is a distinct possibility. The recent tendency of large-scale international acquisition of agricultural land (and water) will affect the availability of production factors and have an explicit purpose of increasing the supply of food and other agricultural products - although perhaps in distant countries.

The use of pesticides (and fertilisers) will escalate, partly necessitated by the diversification. Pesticides can end up in the environment and can contaminate edible fish and water used for drinking.

Higher revenue per ha will make agricultural lands an investment object - a bit like it occurred during the green revolution, and as it is clearly seen when an area is supplied with irrigation infrastructure. Small-scale land owners risk to lose their land in connection with irregular weather or in case of social shocks, such as illness in the family.

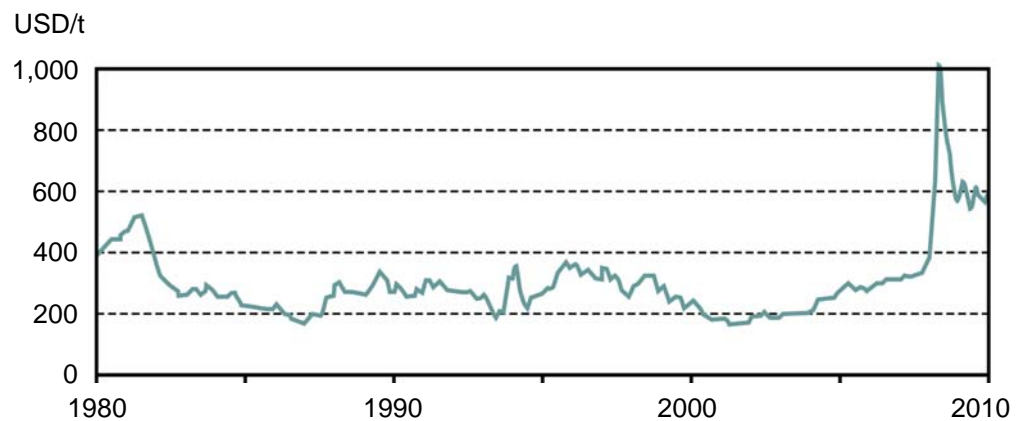
The future

Rice will remain the favoured staple food. Revenues of the agricultural sector will increase, but a large part of the value will be generated by crops other than rice, as well as meat, and, quite likely, biofuel.

Less labour-intensive production systems will prevail. The technological development will proceed in the direction of further diversification and continued efficiency improvements, covering primary production, livestock and processing.

Lower trade barriers will increase the exposure to price fluctuations. Also, there will be a much higher exposure to competition, which will benefit the more efficient production systems at the cost of less efficient ones.

Figure 2: The world market price for rice



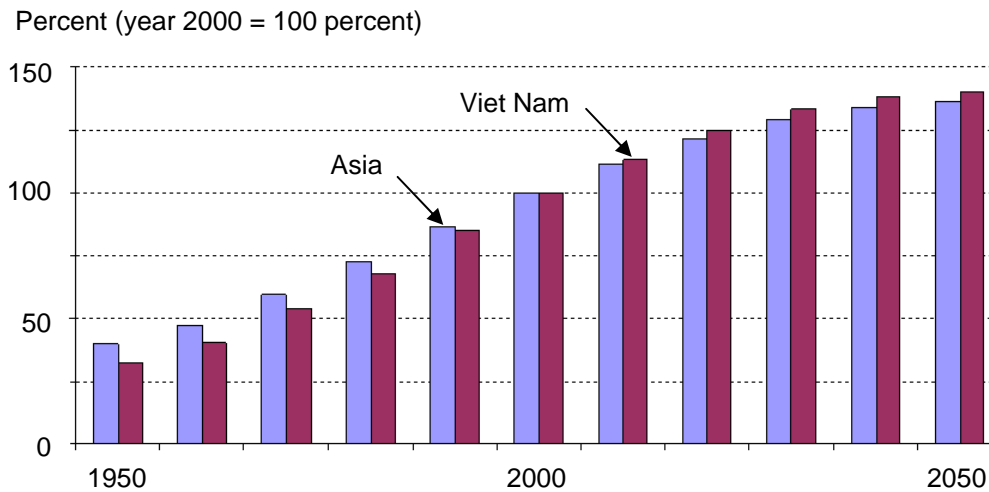
Data: IMF

4 Stormy weather over the paddy fields

The transition between today and the future is a major challenge. If conducted smoothly, the sector will emerge as prosperous and competitive, well placed to generate income for the farmers and food for the population. If conducted less smoothly, there is a risk of unemployment, and farm incomes that are even lower than today. This can happen if the changes take place too fast, or without appropriate support.

The transition will take place on a background of increased demand of water for households and industries. The figure below shows that the population of Asia as a whole is estimated to grow by a factor of more than 3 between 1950 and 2050 - while the population of Viet Nam is estimated to grow by a factor of more than 4 in the same period. The household demand is the population multiplied by the per capita demand, both of which are growing - the latter more than the former. The required larger amounts of food must be produced with less water.

Figure 3: Population in Asia and Viet Nam 1950-2050



In 2000, the population of Asia was 3.4 bio. and the population of Viet Nam was 79 mio.

Data: US Census Bureau, www.census.gov

5 Policy implications

Between them, the various challenges clearly indicate a need of change. Below are listed some policy implications, in random order, as applicable from case to case.

- **Efficiency improvement** is a general aim, considering the need to improve the income of the farmers, in an increasingly competitive environment, while, at the same time, producing more food with less water. This comprises the water efficiency - ton per m³ of water output - as well as the economic efficiency - value generated per m³ of water.
- Another important aim is **livelihood generation**, expectedly mainly outside the farms, but preferably including rural livelihoods, in order to reduce the rate of (an unavoidable and possibly eventually beneficial) urban migration. Towns must grow, and will, but best at a rate that allows for facilities, infrastructure and services to grow accordingly.
- A **value chain perspective** can support generation of revenue and livelihoods, for example by encouragement of agro-processing, including innovative products, and partly undertaken de-centrally by small and medium enterprises.
- **Branding** of products and related marketing can, sometimes, add attractive value at a moderate cost.
- Gentle, pro-poor **market regulation** can be applied in support of shifting to new products (perhaps biofuel), and in support of a common national aim of affordable food prices while at the same time maintaining an income of the farmers that at least exceeds their production cost. A high predictability will support the intended outcome and reduce the risk of adverse effects.
- **Credit**, including (but not limited to) micro-credit, is a general precondition for investment and innovation. Some kind of **risk insurance** can make it possible for the farmers to keep their land in case of emergencies.

- **Water uses must be regulated.** There is a particular scope for strict regulation of new, water-dependent industries, because these can adapt more easily than existing ones with older technology - and sometimes even saving water, energy and money at the same time. The regulation must cover both surface water and groundwater.
- **Disaster preparedness** (for floods, drought and pests) must be in place.
- **Organisation of farmers** (like in water user groups) can facilitate efficiency improvements, other kinds of technological development, and access to markets.
- Interaction must be maintained between development of **irrigation and cultivation**. Upgrading one without upgrading the other is not optimal. An integrated (IWRM) approach can highly increase the returns on the efforts.
- **Soil management** will become more important (and the benefits more visible) when water is sparse and in connection with diversifying the cultivation on lands that are not well suited crops other than rice.
- **Use of pesticides** must be kept at acceptable levels, supported by education and awareness campaigns and supportive extension and weather forecast services.
- **Continued research** is required, including international networking, knowledge-sharing and active collaboration. Results must be made available to the end users by pilot and demonstration activities, well functional extension services, and networking among farmers - possibly across borders.

Agricultural development must be cautious and gradual. There is always a risk of unforeseen adverse side effects when implementing new technologies, and even when implementing existing and well proven technologies in new places. If everyone grew water melons the market would fail.

References

- Cantrell, Ronald P. and Gene P. Hettel (2004): New challenges and technological opportunities for rice-based production systems for food security and poverty alleviation in Asia and the Pacific. FAO Rice Conference, Rome, Italy, February 2004
- EIC (Jan 04): Could Cambodia's farmers be rich? Prepared by Finance and Banking Commission of the Senate and Economic Institute of Cambodia Research Team. Economic Review Volume 1 No. 3, Economic Institute of Cambodia
- Lim Visal (Apr 06): Cambodia's agricultural exports and standards: Trade facilitation or trade barriers? Economic Review Volume 3 No. 2, Economic Institute of Cambodia
- Nesbitt, Harry J. (Feb 05): Lower Mekong Basin - future trends in agricultural production. Prepared for the Basin Development Plan of Mekong River Commission
- Rosegrant, Mark W., Ximing Cai and Sarah A. Cline (2002): World water and food to 2025: Dealing with scarcity. IFPRI, Washington
- World Development Report 2010: Development and climate change. The World Bank
- WRG (Nov 09): Charting our water future - economic frameworks to inform decision-making. Published by the 2030 Water Resources Group

**Center for River Basin Organizations and Management,
Solo, Central Java, Indonesia
www.crbom.org, info@crbom.org**