

**INTEGRATED REPORT OF THE PROJECT  
“MARKET PROSPECT OF  
UPLAND CROP PRODUCTS  
AND POLICY ANALYSIS IN SELECTED  
ASIAN COUNTRIES”**

**Sotaro Inoue  
Boonjit Titapiwatanakun**

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The Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific (CGPRT Centre) was established in 1981 as a subsidiary body of UN/ESCAP.

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In co-operation with ESCAP member countries, the Centre will initiate and promote research, training and dissemination of information on socio-economic and related aspects of CGPRT crops in Asia and the Pacific. In its activities, the Centre aims to serve the needs of institutions concerned with planning, research, extension and development in relation to CGPRT crop production, marketing and use.

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2. Human resource development and collection, processing and dissemination of relevant information for use by researchers, policy makers and extension workers.

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**Integrated Report of The Project  
“Market Prospect of Upland Crop Products  
and Policy Analysis in Selected Asian Countries”**

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**WORKING PAPER 28**

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# Foreword

This publication aims to present integrated information from the country studies carried out under the international research project **Market Prospects for Upland Crop Products and Policy Analysis in Selected Asian Countries (MPUPA)**. The CGPRT Centre has executed this project since November 1994 to analyze the rapidly changing food demand in developing countries in Asia and to identify the prospects for upland crops.

Seven countries in the region, China, India, Indonesia, Pakistan, the Philippines, Thailand and Vietnam, participated in the project. The country studies were conducted by respective national experts. They are Dr Cheng Guoqiang, Institute of Agricultural Economics, Chinese Academy of Agricultural Sciences; Dr Praduman Kumar, Indian Agricultural Research Institute; Dr Memed Gunawan, Director, Center for Investment Development and Environment Impact, Indonesia; Dr Muhammad Ramzan Akhtar, Social Sciences Institute, National Agricultural Research Center of Pakistan; Ms Josefina M. Lantican, Bureau of Agricultural Research, Department of Agriculture of the Philippines; Dr Kajonwan Itharattana, Office of Agricultural Economics, Ministry of Agriculture and Cooperatives of Thailand; Mr Dao Huy Chien, Root Crop Research Center, Vietnam Agriculture Science Institute. This integrated report was prepared by Mr Sotaro Inoue, the project expert of MPUPA, CGPRT Centre, and Dr Boonjit Titapiwatanakun, Kasetsart University, Thailand, who participated in the project as the regional advisor.

I thank all the above people for earnest services and the governments of the participating countries for provision of national experts and continuous support. I would also like to express my sincere appreciation to the government of Japan for funding the project.

Haruo Inagaki  
Director  
CGPRT Centre

# **1. Introduction**

## **1.1 Background**

Exports of agricultural products have long been a major source of foreign exchange and of farm income in many developing Asian countries. However, rapid economic growth in some countries in the region and stagnant international farm commodity markets in recent years have been altering the situation. Exports of traditional commodities have been mostly sluggish while a number of new products, either processed or fresh, have emerged in the export markets. More remarkable are the region's dynamic domestic markets which have begun to offer ample market opportunities to these products. Now it is evident that the prospects of regional upland crop products (UCPs) hinge upon these domestic markets as well as on international markets. Analysis on the market prospects for UCPs will provide useful guidance to producers, traders and policy makers.

Based on the above background, the CGPRT Centre initiated the project "Market Prospects for Upland Crop Products and Policy Analysis in Selected Asia (MPUPA)" in November 1994, in collaboration with seven developing Asian countries: China, India, Indonesia, Pakistan, the Philippines, Thailand and Vietnam. The Project was undertaken as an international collaborative research project, where the CGPRT Centre played a role of coordination while the seven national experts carried out the respective country studies.

Reflecting rapid economic growth in the region, the project looked into both passive and active aspects of market prospects with a view to increasing farm incomes from UCPs. In the passive aspect, recent changes in consumption patterns of food and demand prospect for major commodities were investigated. In the active aspect, the potential to improve demand prospects was studied with attention to marketing/processing policies and exports.

The project rested on a working hypothesis that demand would determine or lead supply in the long run, since production issues of a country including crop diversification, technologies, structural problems and credit, might be too broad and complex to be tackled by a country expert with limited time. Production issues were analyzed only in case-studies in the market potential studies.

The main objectives of the project are:

- to analyze the recent changes in domestic demand and external trade performance of UCPs including feed grains;
- to characterize the market prospects of UCPs aiming to match domestic production with shifting domestic demand;
- to examine the possibilities of improving market prospects including exports; and
- to provide farmers, traders, and policy makers in the region with practical information and suggestions on market opportunities and policy directions to increase farm income from UCPs.

## **1.2 Brief record of project implementation**

At the Centre Mr Sotaro Inoue, Project Expert, and Mr Klaus Zambra, Associate Expert, worked for MPUPA, under the direct supervision of the programme leader of the Research and Development Programme and supervision of the director. Dr Boonjit Titapiwatanakun, Kasetsart University, Thailand, participated in the project as the regional advisor throughout the project implementation.

## Chapter 1

November and December of 1994 were devoted to preparing the detailed project workplan. Mr Kunio Tsubota, National Research Institute of Agricultural Economics, Ministry of Agriculture, Forestry and Fisheries of Japan (at that time), participated in the preparation of the detailed project outline. The conceptual framework of the project was intensively discussed among the staff concerned. Most of crucial issues such as scope of study, approaches to be applied, commodity coverage and time schedule were temporarily decided in the detailed project outline.

Country studies were implemented and divided into two groups: the first group (1995) included India, Indonesia, the Philippines and Thailand; and the second group (1996) comprised China, Pakistan and Vietnam. The national experts to conduct the country studies were selected based on the recommendations of their respective governments. The following is the list of the national experts:

- China: Dr Cheng Guoqiang, Institute of Agricultural Economics, Chinese Academy of Agricultural Sciences
- India: Dr Praduman Kumar, Indian Agricultural Research Institute
- Indonesia: Dr Memed Gunawan, Director, Center for Investment Development and Environment Impact Assessment
- Pakistan: Dr Muhammad Ramzan Akhtar, Social Sciences Institute, National Agricultural Research Center
- Philippines: Ms Josefina M. Lantican, Bureau of Agricultural Research, Department of Agriculture of the Philippines
- Thailand: Dr Kajonwan Itharattana, Office of Agricultural Economics, Ministry of Agriculture and Cooperatives
- Vietnam: Mr Dao Huy Chien, Root Crop Research Center, Vietnam Agriculture Science Institute.

The national experts of the first group gathered in Bogor for a planning meeting in February 1995. At the meeting crucial issues in conducting the country studies, such as scope of study, approaches to be applied, commodity coverage and work plan, were finally decided. In the period from May to July 1995, in order to assist the national experts in carrying out their research, the Centre sent interim missions to all participating countries. The mission members were the regional advisor, project expert and associate expert. During the missions, they not only discussed interim reports with the national experts but also joined in interviews with policy planners, farmers and traders, in order to obtain information to be used in reviewing the country studies and preparing the integrated report. The draft report meeting where the national experts presented their country reports was held in September 1995. The final country reports were submitted after the comments made at this meeting were considered.

The work schedule of the second group is more or the less same as that of the first group. The planning meeting was held in December 1995. The second group applied the same research framework as the first group. The interim missions were sent to China and Pakistan in May and June 1996, however, the mission planned to Vietnam was canceled due to unexpected technical problems. The draft report meeting was held in July and the final reports were submitted after necessary refinements were made. The planning meeting for the second group was initially to be held in September 1995, but it was canceled due to special financial measures of the United Nations.

In order to disseminate the project findings, a regional workshop “Market Prospects of Upland Crops in Asia” was held for four days in Bogor in February 1997. All the national experts were invited to present the country studies. Two commentators were also invited from each of the seven participating project countries. Other non-participating countries were also invited to attend the workshop, including Japan, Republic of Korea, Malaysia, Myanmar, PDR Lao and Sri Lanka. The participants actively discussed market prospects of upland crops and policy recommendations for agricultural development in the region. At the opening, Prof.

Masaru Kagatsume, Kyoto University of Japan, provided the keynote address. Results of a study on pulses trade in South Asia were also presented (Kyi, Mruthyunjaya, Khan, Liyanapathirana and Bottema, 1997).

All the country reports were published in the Centre's Working Paper Series. The Proceedings of the regional workshop was also published by the Centre. The following is a list of the country reports published under the project:

- *Market Prospects for Upland Crops in India*  
by Praduman Kumar, Working Paper No. 20, CGPRT Centre
- *Market Prospects for Upland Crops in Thailand*  
by Kajonwan Itharattana , Working Paper No. 21, CGPRT Centre
- *Market Prospects for Upland Crops in the Philippines*  
by Josefina M. Lantican, Working Paper No. 22, CGPRT Centre
- *Market Prospects for Upland Crops in Pakistan*  
by Muhammad Ramzan Akhtar, Working Paper No. 23, CGPRT Centre
- *Market Prospects for Upland Crops in China*  
by Cheng Guoqiang, Working Paper No. 24, CGPRT Centre
- *Market Prospects for Upland Crops in Indonesia*  
by Memed Gunawan, Working Paper No. 25, CGPRT Centre
- *Market Prospects for Upland Crops in Vietnam*  
by Dao Huy Chien, Working Paper No. 26, CGPRT Centre

### **1.3 Introduction to the report**

This integrated report aims to synthesize the findings of the country reports. In the report the issues studied will be discussed as follows: Chapter 2 presents an overview of socio-economic profiles of the participating countries using World Bank and FAO statistics; Chapter 3 provides an integrated view on changing food consumption; Chapter 4 summarizes production and trade trends of major upland crops based on FAO statistics; Chapter 5 provides a summarized picture of demand composition and projections of major upland crops; Chapter 6 presents marketing and processing systems of major upland crops; Chapter 7 summarizes policy measures implemented in major upland crops; Chapter 8 presents major lessons learned from case studies of new emerging products, and successful and failed marketing promotion attempts; and Chapter 9 summarizes the policy measures recommended and identifies some issues for further research.

*Chapter 1*

## **2. Overview of the Socio-Economic Profiles of the Participating Countries**

Basic information on population, gross national product (GNP), social development and agriculture of the seven countries that participated in the project is presented in Table 2.1. Data were collected from World Bank and FAO statistics. The table includes other countries: Japan, Republic of Korea and Malaysia, for comparison.

### **2.1 Population**

Of the ten countries, China has the biggest population of 1,190,918 thousand followed by India with 913,600. The total population of the seven participating countries reaches 2,618,115 thousand. It is possible to say that the project covered the majority population in the developing Asian countries. As for the growth rates, in general, Asian developing countries have relatively high population growth rates, however, the differences among the countries are remarkable. Pakistan ranks at the top of the list with a 2.8% annual increase. The other countries which have a population growth rate over 2% are India (2.0%), Malaysia (2.5%), the Philippines (2.1%) and Vietnam (2.1%). Reflecting the effective implementation of family planning policies, the growth rates of China (1.4%) and Indonesia (1.6%) are relatively low as compared with other developing countries in the region; however, the growth rate of these two countries is still far higher than that of Japan (0.4%).

### **2.2 Gross national product**

In 1994, among the seven countries, Vietnam has the lowest per capita GNP of US \$ 190 per year followed by India (US \$ 310) and Pakistan (US \$ 440). China, Indonesia and the Philippines can be grouped as the medium income group among the seven countries because per capita GNP is in the range of US \$ 500 to US \$ 1,000 per year. Thailand has the highest per capita income of US \$ 2,210 among the seven. However, per capita GNP does not accurately reflect the actual purchasing power of the residents. For example, if we accept the Purchase Power Parity (PPP) figure computed by the World Bank, the actual purchasing power gap between Thailand and India is considered smaller than the difference between their real GNP per capita.

The participating countries, except for Vietnam, may be divided into two groups according to their real growth rates of per capita GNP during the 1985-1994 period. The first group is the rapidly growing economies, including China, Indonesia and Thailand where the economy increased at high rates of 6.9%, 6.0% and 8.2% respectively. The second group is the modest economic growth countries including India (2.9%), Pakistan (1.6%) and the Philippines (1.8%). Unfortunately, information regarding Vietnam's GNP growth is not available; however, it is expected that Vietnam will be one of the rapidly growing economies in this decade.

According to the share of agriculture in gross domestic product, the agricultural sector is still playing a crucial role in the economy of the seven countries. In particular, in India and Vietnam the agricultural share in the economy remains about 30%. Even Thailand, which seems to have the most advanced economy among seven countries, still owes 10% of its total GDP to the contribution of agriculture.



*Chapter 2*

### **2.3 Social development**

Social development in the seven countries is at various stages. In the following, the present situation of social development in each country will be discussed based on information regarding life expectancy, child malnutrition and illiteracy rate as representative indices.

Life expectancy is very low in India and Pakistan where the per capita GNP is also comparatively low. However, it seems that the positive correlation between life expectancy and per capita GNP might not be so significant, especially in the seven countries. For instance, China's per capita GNP is not very high, but it has the highest life expectancy of 69, the same as Thailand. Vietnam also has a relatively high life expectancy of 65.

Child malnutrition is presented as the percentage of children underweight. In India serious child malnutrition of 63% is reported. In Indonesia, Vietnam and Pakistan, child malnutrition is also critical. In these countries there are still more than 40% of children underweight. As for the remaining three countries, Thailand has 13% underweight children, the Philippines 33% and China 24%. There is a strong negative relationship between malnutrition and per capita GNP.

The illiteracy rate is also an important index showing a society's development status. In India and Pakistan, more than half of the population is illiterate. Countries with huge populations such as China and Indonesia also have high rates of illiterate population of more than 20%. The illiteracy rates of Thailand, the Philippines and Vietnam are 7%, 10% and 12%, respectively.

The seven countries may be classified into three groups according to social development status as indicated by the three social statistics or indices. The first group is India and Pakistan where all the three indices are in the worst rank. The second group includes China and Vietnam where life expectancy and illiteracy rates are better. The third group includes Indonesia, the Philippines and Thailand where the three indices are generally better than the other four countries. However, the living standard of the third group still seems to be lower than that of the more developed countries in the region, such as Japan, Republic of Korea and Malaysia.

### **2.4 Arable land**

Thailand has the largest area of arable land per capita (0.303 ha) among the seven countries. India and Pakistan also have relatively larger arable land of more than 0.1 ha per capita. The other four countries, China, Indonesia, Philippines and Vietnam, have per capita arable land of around 0.08 ha. It is true that the seven participating countries are not well endowed with land resources. The per capita arable land figures support the opinion that it is very important for agricultural development in the seven countries to strive for yield augmentation.

However, three non-participating countries in the table, namely Japan, Malaysia and Republic of Korea, have even less land for their agriculture. Therefore the seven seem to have comparatively better potential for increasing agricultural production.

### **2.5 Current account balance**

As a matter of fact, rapidly growing economies tend to have a deficit in the current account of payments. For example, Thailand has the largest account deficit of US \$ -7,609 million among the seven. Among the seven countries, only China has a positive balance of current account. China's balance in 1991 is US \$ 12,885 million. The other countries have large negative balances. Nevertheless, the current account of the modestly growing economies will worsen if the economy has to increase food imports. Therefore, they have to promote their

## *Chapter 2*

domestic farm production to at least partly meet the increasing food demand of society so as to maintain their economic growth.

### **2.6 Summary**

The population growth rate is in excess of 2% in India, Pakistan, Vietnam and the Philippines and the increase is also still firm in the other three countries. The real income increase is especially rapid in China, Thailand and Indonesia. Economic growth is also steady in the other countries.

This brief review of socio-economic profiles shows that there will be an increasing demand for food in the seven countries in terms of quantity due to population and income growth in the near future. Furthermore, changes in food demand in terms of quality will be a more and more important issue to look into because people usually tend to consume more value-added food items such as livestock products or processed food as their income goes up.

### **3. Dietary Pattern Change**

The seven countries studied have diverse dietary habits. Pakistan and Indonesia are countries where a significantly large percentage of the population is Muslim and prohibited from eating pork. In India predominant Hinduism regards cattle as sacred creatures and the majority of the Indian population are vegetarians who obtain their major share of protein from pulses and dairy products. On the other hand, Chinese food may be characterized by a relatively large consumption of pork and fried vegetables. As for South Asian countries, more or less, we can regard rice as the common staple food. However, certain inhabitants in these countries depend on other starchy food, such as roots and tubers, in their daily diet. Moreover, in North China and some states or provinces of India and Pakistan, rice is not a staple food. Despite of these diverse dining customs, according to the country reports, there are certain common changes in dietary patterns of all the participating countries. The changes are firstly described as shifts from traditional diets, where people mainly directly consume cereals, to new patterns with greater consumption of livestock products.

#### **3.1 Food expenditure share**

Five countries, China, India, Indonesia, Pakistan and Thailand, provide information on the relation between monthly per capita expenditure and food expenditure share; however, the data available are for different years (Table 3.1). By and large the food expenditure shares in the five countries confirm Engel's law that, as income or expenditure increases, the food expenditure share decreases. Among these five countries the highest expenditure share is in rural areas of India (62.8% in 1988), while that of Indonesia is the lowest at 36.2% in 1993. However, if the recent data (say 1993) of Thailand were available, one would expect to have an even lower share than that of Indonesia.

In general cereal has the highest percentage share in food expenditure except for China and Pakistan, where there may be price distortion in the urban market. The meat expenditure share seems to be largely influenced by the state of commercialization of the domestic livestock industry. For example, the meat expenditure of Thailand is very high. It may be due to Thailand's relatively well developed livestock industry, especially poultry, as compared to India or Pakistan. The differences in dairy product expenditure share among the countries may be explained by original dietary patterns. Its shares are quite high in India and Pakistan. Moreover, it is observed that higher per capita expenditure tends to have higher vegetable and fruit expenditure.

#### **3.2 Overview of the dietary pattern change in the seven participating countries**

In order to make international comparison possible, the food consumption information was re-grouped into the five major categories: cereal, meat, dairy products, vegetables and fruit. As for the unit, food consumed in weight per capita per year is mostly used. Unfortunately, the data of Indonesia and Thailand are presented in calorie per capita per day (Tables 3.2-3.6).

### Chapter 3

**Table 3.1 Food expenditure share.**

Year	China		India		Indonesia	Pakistan	Thailand
	1988		1987/88		1993	1993	1988
	rural	urban	rural	urban			
Monthly expenditure/capita	Y39.722	Y91.998	Rs172.5	Rs260.5	Rp68,337	Rs545.38	1,124baht
Exchange rate	1US \$=Y3.72		1US \$=Rs12.966		1US \$=Rp2,118	1US \$=Rs30.1638	1US \$=25.344baht
US \$ equivalent	10.678	24.73	13.304	20.091	32.265	18.081	44.350
Food expenditure share (%)	53.41	51.36	62.8	55.4	36.20	48.51	39.8
Cereal	36.55	13.34	39.8	26.6	24.3	21.68	27.3
Meat	16.83	30.03	5.2	6.6	5.2	9.47	28.4
Dairy product	n.a.	n.a.	14.3	17.1	5.0	25.45	6.9
Vegetable	11.59	12.47	8.0	9.0	8.8	10.03	19.0*
Fruit	n.a.	n.a.	2.6	4.4	4.7	3.59	-

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

Note: In India meat includes meat, eggs and fish. In Pakistan meat includes meat, fish and poultry. In Thailand monthly expenditure per capita and food expenditure share are those of production workers. Expenditure share of each food item is those in 1988 cited from page 18, Table 3.6. The shares are percentages in the food expenditure.

\*: Vegetable plus fruit.

n.a.: not available

There is a clear contrast between the long-run trend of direct consumption of cereals and livestock product consumption including dairy products. A decreasing trend of cereal consumption is observed in all the countries except for rural areas in China and Vietnam. This may be due to the overall early stage of rural socio-economic development in China and Vietnam in which cereal consumption has not yet reached its satiation point (Table 3.2). The most remarkable decline of cereal consumption is in urban areas of China, where the per capita cereal consumption decreased from 145.4 kg/capita/year in 1978 to 97.8 kg/capita/year in 1993. As for Thailand and India, there is a relatively large decline in cereal consumption which fell more than 10% during the early or middle 1970s to the latter half of 1980s. In Indonesia, Pakistan, the Philippines and Vietnam, relatively modest changes in cereal consumption are reported.

Information on changes of meat consumption among the seven countries reveals an increasing trend (Table 3.3). Rural China has a sharp increase in meat consumption from 6.1 kg/capita/year in 1978 to 13.3 kg/capita/year in 1993, while in the same period urban meat consumption increased from 20.5 to 24.5 kg/capita/year. This may reflect the income effects in the rural areas as the result of China's opening-up economic policy. It is interesting to observe that in 1993 meat consumption in China and the Philippines is quite close at 11.68 - 13.3 and 23 - 24.5 kg/capita/day in rural and urban areas respectively. Although the data available on the consumption of meat in Indonesia and Thailand cover different years, it is clear that Thailand's meat consumption is more than three-fold that of Indonesia. This is due mainly to the fact that pork is consumed much more in Thailand than in Indonesia; moreover, the livestock industry, especially poultry, is much more developed in Thailand.



### Chapter 3

A clear increasing trend of dairy product consumption is also observed in almost all the countries (Table 3.4). The dairy product consumption of India and Pakistan is the highest and it is still growing rapidly. In China and Vietnam comparable data for dairy product consumption are not available. However, the fact that there is an increasing consumption trend of milk and eggs in Vietnam is strongly supported by local survey data in the country report (Chien 1997).

As for vegetable and fruit consumption, differences are found between South Asian countries and other participating countries. India and Pakistan have a comparatively low level of vegetable and fruit consumption compared to China, Indonesia, the Philippines and Thailand. The differences are mainly due to the country's dietary habits and the availability of vegetables and fruit (Tables 3.5 and 3.6). In India vegetable consumption increased from 28.3 kg/capita/year in 1977 to 54.9 kg/capita/year in 1987 and fruit consumption also increased from 3.4 kg/capita/year in 1977 to 12.5 kg/capita/year in 1987. Although the vegetable and fruit consumption has an increasing trend in both rural and urban areas, the amount consumed is very limited. India's low consumption of vegetables and fruit may be due to the relatively low availability of fresh produce. Development of domestic transportation in India has enabled the increasing shipment of fruit and vegetables from the south to the north. Similarly, in Pakistan vegetable consumption increased from 31.80 kg/capita/year in 1979 to 65.40 kg/capita/year in 1993 and fruit consumption increased from 7.8 kg/capita/year in 1979 to 15.72 kg/capita/year in 1993.

On the other hand decreasing or stagnating trends of vegetable consumption are prevailing in China and South East Asian countries. In China vegetable consumption decreased in both rural and urban areas from 142.0 kg/capita/year and 152.3 kg/capita/year in 1978 to 107.4 kg/capita/year and 120.6 kg/capita/year in 1993 respectively. This distinctive decline may be due to a shift in China's vegetable consumption away from traditional bulky items such as Chinese cabbage to other vegetables. In fact, the amount of vegetable consumed per capita in China is still quite high compared to other countries.

In Indonesia the changes are modest. Vegetable consumption decreased slightly from 40.33 kcal/capita/day in 1987 to 37.75 kcal/capita/day in 1993. The fruit consumption is also decreasing in both rural and urban areas, however, in urban areas imported fruit is becoming popular rather than domestic produce because of the backward domestic transportation system, uncertain supply and low quality of local fruit.

In the Philippines the per capita vegetable consumption has been steadily decreasing from 52.93 kg/capita/year in 1978 to 38.69 kg/capita/year in 1993. Fruit consumption of the Philippine people does not have such a consistent trend. However, the per capita fruit consumption in 1993 is 28.12 kg/capita/year which is much lower than 37.96 kg/capita/year, the level of 1978.

Thai fruit consumption is not presented separately from the figure of vegetable consumption. Thai people increased their fruit and vegetable consumption until the early 1980s; however, it decreased in the period from 1986 to 1988.

As for Vietnam, a huge decrease in vegetable consumption and a rapid increase in fruit consumption are reported (Tables 3.5 and 3.6). These changes seem to have some difficulties in time-series comparison because the changes seem to be too large; however other survey data presented in the Vietnamese country report showed the same directions of decreasing vegetable consumption and rapidly increasing fruit consumption (Chien 1997).

In general, in humid South East Asian countries the availability of fresh vegetables is high compared to India or Pakistan. Moreover, fruits, particularly banana, have played a very important role in nutrition in South Asian countries. It seems that the declining or stagnant fruit and vegetable consumption is a phenomenon in the course of the long term change of traditional dietary patterns in South Asian countries.





*Chapter 3*



### Chapter 3

The food consumption pattern is affected not only by changes in income and relative prices but also by non-economic demographic factors, such as education, occupation, age, and access to information. Urbanization is regarded as a phenomenon which can well represent these influential factors. Migration from rural to urban areas can cause structural shifts in food consumption patterns as a result of changes in behavioral characteristics. The Indian country report introduces the following factors which can induce changes (Kumar 1996):

- wider choice of available foods in urban markets, compared to rural markets;
- urban residents are exposed to the rich variety of dietary patterns of foreign cultures;
- urban lifestyles requires food which take less time to prepare;
- urban occupations tend to be more sedentary and require a lower energy expenditure and so a lower calorie intake; and
- urban residents typically do not grow their own food and thus their consumption is not constrained.

Besides the non-economic factors, in general the average income level is higher in urban areas. Therefore under a growing economy, it may be possible to assume that the dietary patterns of a country will change first in urban areas then the new dining style will spread to rural areas.

The per capita consumption of cereal is higher in rural areas than urban areas, while meat is consumed more in urban areas. Dairy products are consumed more in urban areas except for the case of Pakistan. These observations are in line with most of the overall economic development processes of developing countries.

### 3.3 Differences among income groups

Five countries: China, India, Indonesia, Pakistan and the Philippines, provide information on food consumption by income group. In Table 3.7 there are four income groups for each country in which the ranging of income in each group varies to some extent. Therefore, only the overall tendency of food consumption across different income groups in each country is analyzed.

There is a clear increasing tendency in the consumption of food items such as meat, dairy products, vegetables and fruit in response to increase in income. On the other hand the cereal consumption does not show such a clear trend; and even an opposite tendency in response to the income growth is observed in rural China. The following are major findings for each food group.

- Cereal consumption is relatively constant among different income groups. The magnitude of cereals consumed differs considerably from country to country.
- In response to income growth, meat consumption increases in all the countries; however, the amount consumed is quite different among countries. Religions and the absolute level of income may be main reasons.
- There is a clear cut trend in all the countries showing that, as income grows, dairy product consumption increases.
- In general, as income increases, the consumption of vegetables increases; however, Pakistan and the Philippines do not have such a clear tendency according to the income grouping. In China income group data show that, as income increases, a greater quantity of vegetables is consumed; however, the whole country data from the 1970s to 1990s indicate a decreasing trend. This may be due to the fact that there has been development of new vegetable varieties and they have become popular with higher income groups.
- Similar to vegetables, as income increases, the consumption of fruit increases.



*Chapter 3*

### **3.4 Summary**

Surveys on food consumption trends from the 1970s to the 1990s in each country show a shift away from cereal consumption towards other food items such as meat and dairy products. This common trend clearly reflects the region's economic growth. People in the seven countries are likely to consume more meat and dairy product as their income improves. The consumption of vegetables and fruit shows an interesting contrast between South Asia, namely India and Pakistan, and the other countries: China and South East Asian countries. The differences are due to the diversity of traditional diets and the availability of fresh fruits and vegetables. The comparison of food consumption by different region (rural and urban) or different income group more or less supports this observation.

*Chapter 3*

## 4. Production and International Trade of Major Upland Crops

The project selected maize, soybean, and cassava as the major upland crops, for which domestic market prospects were studied by all the participating countries. However, considering the minor domestic production of cassava, Pakistan studied potato instead, and China analyzed potato and sweet potato. The market prospects of rice were also intensively studied in the country reports of China, India, Pakistan, Thailand and Vietnam. The production and international trade of these four crops are reviewed in this chapter. Data were collected from FAO statistics.

### 4.1 Production, yield and international trade of major upland crop products

The total production of maize, soybean, cassava and rice of the seven countries as a whole was 132,105 thousand tons, 21,773 thousand tons, 47,415 thousand tons and 399,262 thousand tons in 1994, respectively (Table 4.1). The percentage shares of these commodities in world production are: 23% for maize, 16% for soybean, 31% for cassava and 75% for rice. Except for rice, the production share of the seven countries is not very high.

At present the seven countries are not important importing countries of these four commodities. However, they are the important exporters of cassava and rice. As for maize and soybean, the shares of international trade of the seven countries are not very high. Their maize import and export shares are 8.7% and 16.7% of the world total in 1993 respectively. The seven countries import 11.9% of the world trade of soybean and export only 1.3%. Among the seven countries China's share is so huge that it mostly determines the total figures of maize and soybean trade. On the other hand, the share of the seven countries in cassava export is very high (97.6%). The commodity is mainly exported by Thailand and Indonesia. Thailand, Vietnam, Pakistan and China are important rice exporters. The total share of the seven countries in the world rice export is 62.9%. They largely influence the situation of the world rice trade.

#### *Maize*

China has an outstanding production of 103,550 thousand tons. Indonesia, the Philippines and Thailand are relatively large maize producers with production of 6,617 thousand tons, 5,400 thousand tons and 3,800 thousand tons in 1994, respectively. China has a high yield level of 5,033 kg/ha, exceeding the world average of 4,330 kg/ha, while the other participating countries are lower than the world average.

The seven countries as a group are a net exporter of maize. Important exporters are China and Thailand. China exports a huge amount; however, it is also a big importer. China's maize export and import are still increasing, but the growth rates declined for both (Table 4.2). Thailand is an important net exporter of maize in the region; however it is now rapidly increasing imports due to its emerging domestic livestock production to serve the expanding domestic demand and export markets. Thailand's annual growth rate of maize export is -34.38% for the period 1985 to 1992, while the import growth rate is 104.39%. As a matter of fact, it is expected that Thailand will gradually stop exporting maize and may eventually become a maize importing country.



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### *Production and International Trade of Major Upland Crops*

As for the other countries, Vietnam has recently emerged as a maize exporter. The annual growth rate of maize export from Vietnam is recorded at 64.72% from 1985 to 1992. India exports a limited amount of maize, and the import is negligible. Indonesia is a net maize importer and its trade fluctuates considerably. Pakistan is also a net importer and its import is increasing. The Philippines used to be a net importer, its import is declining and the Philippines has becoming more or less self-sufficient in maize in recent years.

#### *Soybean*

Similar to the case of maize, China is the biggest producer in the region with a high yield of 1,589 kg/ha. India, Indonesia and Thailand are also prominent soybean producers among the seven countries.

In fact, the seven countries as a whole are a net importer of soybean grain. China and Indonesia are outstanding importing countries, while the soybean grain trade is very limited in India and Pakistan. China's share of soybean import and export is the largest among the seven countries at 9% and 1.3% of the world trade, respectively. However, its export growth rate is declining while the import growth rate is increasing. Indonesia, the Philippines and Thailand are net importers of soybean. Both Indonesia and the Philippines have a comparatively high growth rate of soybean import during 1985-1992. Vietnam, the only net exporter among the seven countries, exports a limited amount of soybean.

#### *Cassava*

Thailand is the biggest cassava producer in the region with a production of 19,091 thousand tons in 1994, followed by Indonesia with a production of 15,000 thousand tons. These two countries are big exporters of cassava products. In China and India, cassava is grown in limited areas. Pakistan's production is almost negligible.

In 1992 five of the seven countries ranked in the top ten cassava product exporters, namely: Thailand, Indonesia, China, the Philippines and Vietnam (Table 4.3). These countries dominate the world trade of cassava products and have an export share of 98% of the world export. Thailand is the most important exporter of cassava. However, its export growth has declined. Indonesia exports a large amount of cassava and it is increasing. Vietnam's cassava export is rapidly increasing and it will become an important exporting country in years to come.

#### *Rice*

China, the biggest rice grower in the world, produces 178,251 thousand tons of rice or 33% of the total world production in 1994. The second biggest producing country is India which harvests 118,400 thousand tons (22%). In China the yield of rice is very high, reaching 5,869 kg/ha. The remaining six countries have relatively low yields of rice. In particular, the yield of India, Pakistan and Thailand is lower than 3,000 kg/ha. The differences of rice yield among the ten countries could be explained not only by the quantity of inputs used (e.g. fertilizer), but also by the quality of rice. For example, in general the quality of rice produced in Thailand is widely regarded as good quality among consumers of East and South East Asian countries and its yield is rather low at roughly 2,000 kg/ha.

**Table 4.2 Annual growth rate (%) of trade of maize, soybean, cassava and rice.**

		Maize		Soybean		Cassava		Rice	
		1970-80	1985-92	1970-80	1985-92	1970-80	1985-92	1970-80	1985-92
China	Exports	22.32	7.22	-10.19	-7.29	-	7.68	-2.02	0.46
	Imports	21.13	8.37	9.38	6.98	-	7.08	38.25	-8.81
India	Exports	-	-	-	-	-	87.01	33.16	8.59
	Imports	-7.30	-	0.00	-	-	-	-38.87	-2.80
Indonesia	Exports	-25.53	67.83	-	-	1.31	7.48	-	-23.55
	Imports	-	6.24	-	12.62	-	-	7.88	46.54
Pakistan	Exports	-	-	-	-	-	-	16.79	11.20
	Imports	8.45	-	-	-	-	3.24	-	-
Philippines	Exports	-	-	-	-	-	124.90	77.65	-
	Imports	73.70	-38.90	19.62	12.36	-	46.12	-	-60.29
Thailand	Exports	4.24	-34.38	-6.70	5.96	14.78	3.57	10.27	3.59
	Imports	-	104.39	-	-	-	-	-	-
Viet Nam	Exports	-	10.57	-	-10.94	-	-	5.62	64.72
	Imports	-	-	-	-	-	-	-17.13	-52.85

Source : Trade Year Book, FAO

Thailand is the world biggest exporter with an export share of 31% of the world trade in 1993. China's rice export is large (9% of the world trade in 1993) but stagnating. India's rice export is substantial and increasing while the import of rice is decreasing. Pakistan's rice export is large (6% of the world trade in 1993) and increasing. In spite of the comparatively small share in the world export, India and Pakistan dominate the world trade of Basmati rice. Indonesia used to be the world's biggest rice importer. After the achievement of self-sufficiency in rice, the country still remains as a possible important importer. Vietnam also used to be the world biggest importer of rice. It has become the third biggest exporter of rice next to Thailand and USA. Vietnam's rice export is still rapidly increasing.

## 4.2 General observations

There are some observations and issues that emerged from the review of production and trade of the major upland crops: maize, soybean, cassava and rice. In the following, observations and issues with regional implications are summarized, based on the assumption that the total figures of the ten countries in Table 4.1 (the seven project-participating countries and three other Asian countries: Japan, Republic of Korea and Malaysia) can represent the production and trade situation of the whole ESCAP region:

The seven countries as a whole are a net exporting area of maize, however, the surplus of these countries cannot fulfill the total maize demand of the region. As a result, the ESCAP region as a whole is still a net importer of maize. In 1993 the magnitude of net maize import stood at 20 million tons and the import dependency ratio (import/production) was 25% for the region. It is very unlikely that such a quantity could be filled up by the exporting countries within the region in the near future.

The seven countries, as well as the ESCAP region as a whole, are net importers of soybean at as much as 3 and 9.6 million tons in 1993, respectively. The import dependency ratios for the seven countries and the ESCAP region are 15% and 45%, respectively for 1993. Thus, it is expected that the region as a whole will be a net soybean importer for the years to come, if production technology remains unchanged.

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**Table 4.3 World trade of maize, soybean, cassava and rice ('000 tons) and principle trading countries in the ESCAP region.**

	1970	1980	1990	1992
<b>Maize</b>				
World import	29,446	70,105	61,008	65,118
Principle importing countries	Japan (1)	Japan (1)	Japan (1)	Japan (1)
In the ESCAP region	China (2)	China (5)	Rep. of Korea (3) China (4)	Rep. of Korea (2) China (3) Malaysia (6)
World export	29,971	81,011	73,794	74,779
Principle exporting countries	Thailand (5)	Thailand (5)	China (3)	China (2)
In the ESCAP region			Thailand (6)	
<b>Soybean</b>				
World import	12,234	25,670	25,599	29,558
Principle importing countries	Japan (1)	Japan (1)	Japan (1)	Japan (1)
In the ESCAP region	China (6)	China (5)	China (5) Rep. of Korea (7)	China (5) Rep. of Korea (8) Indonesia (10)
World export	12,621	26,858	25,878	29,112
Principle exporting countries	China (2)	China (6)	China (5)	China (5)
In the ESCAP region	Thailand (8) Indonesia (10)		Vietnam (6)	
<b>Cassava</b>				
World import	5,109	17,351	34,698	29,903
Principle importing countries	Japan (5)	China (6)	China (2)	Rep. of Korea (3)
In the ESCAP region		Japan (7)	Rep. of Korea (7) Japan (10)	China (5) Japan (9)
World export	5,634	18,752	29,734	30,534
Principle exporting countries	Thailand (1)	Thailand (1)	Thailand (1)	Thailand (1)
In the ESCAP region	Indonesia (2) Malaysia (5)	Indonesia (2) China (3) Malaysia (8)	Indonesia (2) China (4) Vietnam (8)	Indonesia (2) China (3) Philippines (4) Vietnam (10)
<b>Rice</b>				
World import	9,273	13,291	13,119	16,317
Principle importing countries	Vietnam (1)	Indonesia (1)	Philippines (1)	Iran Islamic Rep. (1)
In the ESCAP region	Indonesia (2) Rep. of Korea (3) India (4) Sri Lanka (5) Bangladesh (6) Malaysia (7)	Rep. of Korea (2) Bangladesh (4) Iran Islamic Rep. (8)	Iran Islamic Rep. (2) Bangladesh (8) Malaysia (9)	Indonesia (4) Malaysia (6)
World export	9,476	14,688	14,381	18,488
Principle exporting countries	China (1)	Thailand (1)	Thailand (1)	Thailand (1)
In the ESCAP region	Thailand (1) Myanmar (4) Japan (6) Nepal (8) Pakistan (9) Cambodia (10)	China (3) Pakistan (4) Myanmar (5) Japan (6) India (8) Philippines (9)	Vietnam (3) Pakistan (4) India (6) Australia (7) China (8) Myanmar (10)	Vietnam (3) Pakistan (4) China (5) India (7) Australia (8)

Source: Trade Year Book, FAO.

Note: Numbers in parenthesis are rankings in the world trade.

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The ESCAP region is the biggest exporter of cassava products of which more than 23 million tons of cassava products (fresh root equivalent) are exported to the world market. More than half of the cassava product is exported to the EU market for animal feed, while the rest is traded in the form of cassava starch. The effects of the reforms of the Common Agricultural Policy of EU and the trade liberalization scheme under the WTO will eventually decrease the importation of cassava products for animal feed in the EU market. As a result, the market for cassava products for animal feed is shrinking, while the market for cassava starch is not expanding fast enough to offset the declining demand. Therefore, one can expect that an excess supply of cassava will be realized in the region.

The ESCAP region is the biggest rice producer in the world, producing more than 80% of the world total, and it is also the largest rice exporting region with an export of 63% of the world total in 1993. This is mainly due to the success of many countries in pursuing their rice self-sufficiency programmes, which has shifted the countries' position in the international trade from a net importer to exporter. This means that with on-going rice production subsidy programmes adopted by countries in the region, there will be even more rice to be exported to the world market. At this juncture it is worth considering to what extent the world market can expand to absorb the increasing rice production, while the region is indeed the major rice consuming region. In addition, as income increases, people tend to consume less cereal or rice and become more quality conscious with a strong preference for high quality rice. Therefore it may be timely to review the direction of rice production and research programmes, e.g., for increasing production quantity with less emphasis on quality or the reverse.

## 5. Domestic Demand Composition and Projections for Major Upland Crops

Major upland crops, maize, soybean, cassava and rice, are consumed in various forms. In order to study the future market prospects of these crops, domestic demand was divided into major uses or demand components which were analyzed by country. Demand composition of the four commodities is summarized in Table 5.1. Moreover, middle-term demand projections were carried out. In estimating the future quantity demanded, a common simple econometric method using income and population growth rates and income elasticities was employed as far as possible. In cases where relevant income elasticities were not available, the most simple time trend approach of the amount produced was applied. The results of demand projections to the year 2000 are summarized in Table 5.2.

### 5.1 Maize

Among the seven countries only China, India and the Philippines provided information on maize demand divided into direct human consumption, feed and industrial use. However, statistics available in Indonesia, Pakistan and Thailand for feed demand and other industrial uses are not separated. In the case of Vietnam, only seed demand is specified in the total use (Table 5.1).

Maize demand composition differs mainly according to the development level of the domestic livestock industry. India and Pakistan are countries where maize is consumed mainly as direct human consumption. In terms of percentage, maize is directly consumed at 79.0% and 66.7% of the total maize demand or production in India and Pakistan, respectively. On the other hand in China, the Philippines, Indonesia and Thailand, maize is mostly used as animal feed or in processed forms. In particular, a large share of feed demand (64% to 99% of the total maize production) is observed in China, Thailand and the Philippines.

China and Vietnam estimate relatively rapid increases in demand for maize, of which the compound annual growth rate from the base year to the year 2000 is 6.7% and 7.9%, respectively (Table 5.2). Feed demand is the most important contributing factor to the maize demand projection in China. For Vietnam, there is no information available for specifying which usage is the determining factor. Pakistan estimates that demand for maize is increasing at 2.6% per year in which feed demand is expected to increase rapidly. These three countries clearly indicate that future demand change is closely linked to development of the livestock industry in the country. India, the Philippines and Thailand expect a moderate increase or stagnant demand for maize. Since Thailand has a promising livestock industry, the projected feed demand in the year 2000 may be an underestimate.

The seven countries as a whole are expected to have a quantity demanded of maize totaling 178.316 million tons in 2000 (Table 5.2). This figure is far larger than the amount produced in 1994 of 132.105 million tons (Table 4.1). The seven countries may turn into an importing area of maize in 2000.

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## 5.2 Soybean

Information on soybean demand by each use is available in five countries, excluding Indonesia and Vietnam. Around half of the total domestic demand for soybean is for direct human consumption in China and India (Table 5.1). In Thailand, due to the well developed domestic livestock industry, soybean meal demand is very high (82.9%). In Pakistan and the Philippines soybean demand is still limited. Pakistan's total demand is 102 thousand tons in 1996/97 and the Philippines' total demand is 52 thousand tons during the period of 1989-1993. In Indonesia direct human consumption of soybean is very limited at only 0.8%. This may be due to the fact that the consumption of processed soybean food such as *tempe* is not included.

Soybean demand is expected to increase more rapidly compared to maize demand. The countries that estimate rapid increase of soybean demand are China, Pakistan, the Philippines, Thailand and Vietnam in which projected annual growth rates are 6.7%, 7.1%, 14.4%, 6.8% and 10.2%, respectively. In all the participating countries, the share of direct human consumption is projected to decrease while other uses, particularly the proportion of the demand for soybean meal, are expected to increase except for the case of India. Similar to maize, the future demand of soybean is closely linked to development of the domestic livestock industry. However, the demand projection is based on the past production trend in Pakistan, the Philippines and Vietnam, where soybean production is still limited. Therefore, their soybean demand projections may have to be treated carefully.

The participating countries as a group are estimated to have a total soybean demand of 22.926 million tons in the year 2000. The quantity of soybean produced in 1994 is 21.773 million tons. Therefore, the seven countries as a whole may remain as importing countries of soybean.

## 5.3 Cassava

In the five countries studied, India, Indonesia, the Philippines, Thailand and Vietnam, the domestic cassava demand is not large. Indonesia has the biggest domestic demand of cassava among the five countries. Thailand's cassava production is chiefly for export and its domestic demand was only 3 million tons in 1993 while its production was more than 19 million tons in 1994.

Cassava is mainly used in a processed form. Thailand, Indonesia and the Philippines directly consume 15 to 20% of their cassava while in India 40% of cassava is used for direct human consumption. The high direct use in India probably due to the undeveloped cassava-processing industry in India.

In general relatively moderate demand increases are expected (Table 5.2). Thailand estimates a relatively high demand increase of 4.5% per year, probably due to its growing domestic cassava-processing industry. India, Indonesia and the Philippines project a moderate increase of less than around 2% per year. Vietnam even expects a decreasing demand of -1.3% per year. This may be due to the lack of cassava usage information in Vietnam. In fact one can expect Vietnam to become an exporting county of cassava products in the near future.

The total production of the five countries is 43.912 million tons in 1994 (Table 4.1). The estimated total cassava demand of the five countries in 2000 is 30.584 million tons. Therefore the five countries as a whole probably will remain important exporting countries. It is very likely that these countries will be key players in the international trade of cassava products. However, the total quantity of cassava trade may not increase due to the decreasing import in the EU. Therefore, as pointed out earlier, the region may face a problem of surplus cassava if production increases at the current rate.

## 5.4 Rice

### *Domestic Demand Composition and Projection of Major Upland Crops*

Rice is an important staple food for all the participating countries. Five countries, China, India, Pakistan, Thailand and Vietnam, studied the domestic demand composition and projected the quantity demanded in year 2000. In contrast to the other major upland crops, rice is mostly consumed in an unprocessed form or as milled rice. In Pakistan, Thailand and Vietnam, the proportion of direct human consumption of rice is around 95% (Table 5.2). However, China has very high percentage of rice used as feed (11.1%). The underlying reason is that there may be a large amount of low quality rice produced in China and that rice would be used mainly for animal feed.

Rice demand is expected to increase moderately in the middle term. The compound annual growth rate of China, India and Thailand is 0.7%, 2.4% and -0.0%, respectively. Pakistan and Vietnam expect relatively rapid increases of 6.2% and 4.1% per year, respectively. It is worth noting that the growth rates of rice demand are very much in line with trends of dietary pattern changes and the stage of economic growth. For instance, Thailand which has the highest per capita income among the five countries has zero growth rate of rice demand. Unfortunately the available data are not sufficient to make any further reference to the quality of rice consumed.

The total estimated demand of rice by the five countries in 2000 is 322.226 million tons. Since the total production of the five countries in 1994 is 342.867 million tons, the five countries as a whole will remain exporting countries in the near future.

## **5.5 Regional implications**

Due to the changing domestic food demand, demand projections for the four commodities yield different results. Maize and soybean are mainly demanded as feed or other processed forms in the countries studied. Therefore the demand for these two crops is expected to increase rapidly in the seven countries as a whole. In particular, the countries which have well developed livestock industries will expand the demand for these two commodities as feed ingredients. For the international market, China's supply and demand situation is particularly important due to its huge potential in both importing and exporting, which will have a significant impact on trade among the seven countries and on world trade. Although the country reports do not quantitatively analyze the supply aspects of the studied commodities, according to simple comparison with the production level in 1994, the projections may imply that the seven countries as a whole will turn into importing countries of maize and remain as importers of soybean.

At present the domestic demand for cassava is not very high, because the development level of domestic cassava-processing industries is limited in the four countries studied except for Thailand. In general moderate demand growth is expected. According to a simple comparison with the production level in 1994, the five countries as a whole will remain as a net exporter of cassava; however, Thailand, the biggest cassava exporter, expects a relatively high domestic demand increase of 4.5% annually due to the cassava-processing industry development in the country. At any rate, one should bear in mind that the world market for cassava starch is not expanding at a significant rate. Therefore, cassava exporting countries in the region may have to adjust their cassava production to avoid an excess supply of cassava.

As mentioned in Chapter 3, per capita cereal consumption is decreasing in almost all the participating countries. The demand for rice as a staple food is expected to grow moderately or stagnate in China and Thailand. The estimated demand in 2000 is lower than the quantity produced in 1994. Therefore the five countries studied as a whole will probably remain as exporting countries of rice. It is interesting to raise a question regarding the future scenario of the world rice market. For example, will there be an over supply in the world rice market? Will there be any significant change in the region's consumers' preference for the quality of rice?

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Although these questions could not be accurately answered from the results of these studies, the general discussion on dietary pattern changes indicates that income does determine changes in dietary patterns towards higher value food items. Thus, it is worth while placing more emphasis on the rice quality issue.

## **6. Marketing and Processing Systems of Major Upland Crops**

The marketing and processing systems of maize, soybean, cassava, and rice are assessed based on a rapid survey, observation, interview and discussion with country experts and concerned institutions during the interim mission of the project. Some information is also derived from the country reports. In order to further refine the assessment of the systems, the assessment of each crop was checked with the respective country expert. The results of the assessment are discussed under two criteria: (a) involvement of key participants in the marketing system, and (b) present development of the processing industry.

### **6.1 Involvement of key participants**

The roles of key marketing participants such as the private sector, cooperatives, government/parastatal agencies, and state-owned companies in the selected commodity marketing systems are appraised based on the available information and observation. Four criteria are applied in assessing the role of these key participants, i.e. (a) active; (b) moderate; (d) negligible and (e) non existing (Table 6.1).

#### *Maize*

Thailand, the Philippines, Pakistan and India are countries where the private sector is playing the dominant role in the marketing system rather than the public sector or cooperatives. Thailand is a maize exporting country. The active private sector handles both domestic and foreign trade of maize. By and large, the private sector has an active role in the maize marketing system in the Philippines while cooperatives, the government and state-owned companies have limited or negligible roles. Although the Philippines produces more than 3 million tons of maize per year, in which the government plays a certain role in the improvement of productivity, there is still a shortage of maize to meet the total domestic utilization requirement. Therefore, a certain amount of maize is imported into the Philippines under the control of the National Food Authority (NFA). In Pakistan the domestic production of maize is limited and the marketing system is mostly borne by the private sector. In India there is also limited involvement of the government and a negligible role of cooperatives and state-owned companies in the maize marketing system. Most (79%) of India's maize production is consumed in unprocessed form at the farm level. The marketable farm surplus of only 21% is mostly handled by the private sector for domestic use and export to neighboring countries in small quantity.

In contrast, the private sector of China plays only a negligible role in the marketing system although China exports a great quantity of maize. This is primarily due to the government policy on international trade of food grains, in which the central government still has significant control over the system. In the maize marketing system of China, the government /parastatal agency and state-owned companies are key participants. In Indonesia the government/parastatal agency and state-owned companies are also actively involved in the maize marketing system as compared to the private sector. These institutions regulate and handle the export and import of maize of which Indonesia is more or less a net importing country. However, at the farm level cooperatives in Indonesia are important marketing participants.

**Table 6.1 Involvement of key participants in marketing systems: maize, soybean, cassava and rice (1996).**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
<b>Maize</b>							
Private sector	C	B	B	A	A	A	C
Cooperative	B	E	A	E	D	D	D
Government/parastatal agency	A	C	A	E	D	D	D
State-owned company	A	E	B	E	D	D	E
<b>Soybean</b>							
Private sector	C	A	A	D	A	A	C
Cooperative	C	E	B	E	D	B	D
Government/parastatal agency	A	B	A	A	E	C	C
State-owned company	B	E	D	E	E	D	C
<b>Cassava</b>							
Private sector	ni	B	A	ni	B	A	B
Cooperative	ni	E	C	ni	D	D	E
Government/parastatal agency	ni	E	E	ni	E	B	E
State-owned company	ni	E	E	ni	E	E	E
<b>Rice</b>							
Private sector	C	A	B	A	ni	A	B
Cooperative	E	E	A	E	ni	A	E
Government/parastatal agency	A	B	A	B	ni	A	A
State-owned company	A	B	A	A	ni	D	A

Notes: A: active; B: moderate; C: limited; D: negligible; E: non-existent; ni: not included.

The maize export from Vietnam is mostly handled by the private sector; however, compared to other exporting countries, the activity of the private sector is still limited. This is probably due to the lack of marketing facilities and the backward transportation system in Vietnam.

### *Soybean*

Active participation of the government/parastatal agencies is observed in the soybean marketing system of China, Indonesia and Pakistan. China is the biggest trader (both exporting and importing) of soybean and soybean products in Asia; however, soybean is regarded as a food grain crop for which the state grain administrations still play a dominant role in the marketing system as well as the state-owned processing factories. In general, the soybean importation of Indonesia is regulated by the government, while active private traders are in the business of domestic trade of soybean and its products. In Indonesia cooperatives are also quite actively involved in soybean marketing in the production areas. In Pakistan the government has been promoting soybean production with limited success; however, the private sectors' involvement in the soybean marketing system is still comparatively limited. Pakistan imports soybean oil mostly from USA, and a small amount of soybean meal is imported from India.

In India, Thailand and the Philippines, the marketing system of soybean is principally borne by the private sector. Although the Indian government has contributed to the impressive increase of domestic soybean production through the introduction of yellow soybean and provision of related extension services partly by the government/parastatal agencies such as the National Agricultural Marketing Federation (NAMF), the private sector has a more active role in the system. In Thailand the private sector is the most active participant in the current soybean marketing system, while farmer cooperatives or groups have limited involvement. As for soybean products, Thailand imports a great amount of soybean meal. In order to promote domestic production, the Thai government set up an import surcharge on soybean meal. The Philippines is a net importer of soybean grain and meal products which used to be regulated by NFA and is recently being deregulated. Consequently at present the private sector is playing an active role in the soybean marketing system. In the Philippines a special variety of soybean has been introduced and promoted by a multinational food processing company through a contract

farming scheme. The scheme has experienced success and created mutual benefit to the parties concerned.

The soybean production of Vietnam has increased rapidly from 15.5 to 79.1 thousand tons from 1985 to 1995. Soybean is mostly used for domestic consumption with a small amount for export, which is handled by government/parastatal agencies. Therefore the private sector in Vietnam is more active in the domestic marketing system than in the external trade marketing system.

#### *Cassava*

In contrast to rice, cassava does not have a strong involvement of the public sector in its marketing system. In the two major producing countries: Thailand and Indonesia, the cassava marketing system is completely operated by the private sector. However, the government of Thailand does play a moderate role in the cassava marketing system due to the Voluntary Export Restraint Agreement (VER) with EU. The involvement of the public sector is almost entirely non-existing in India, Indonesia and Vietnam.

Cooperatives are also performing a limited role. Even in Indonesia where cooperatives have an quite important role in agriculture, the involvement of cooperatives is considered limited. Moreover, the involvement of cooperatives is assessed even less in Thailand and the Philippines is even less, while that in India and Vietnam is the almost non-existent.

#### *Rice*

The countries which have an active involvement of the private sector in the rice marketing system are India, Pakistan and Thailand. In India, rice is the most important food grain in terms of production and consumption. Therefore, government intervention in the rice trade is high for food security reasons. Nevertheless, the private sector is also very actively involved in the domestic rice marketing system and also increasingly active in the international trade of rice as India adopts an open economic policy. In Pakistan, active involvement of the private sector is seen in the rice trade while at least two government agencies, the Rice Export Corporation of Pakistan (RECP) and the Pakistan Agricultural Storage and Supply Corporation (PASSCO), have been involved in rice marketing. Since the rice export of Pakistan is no longer monopolized by the government, the state-owned companies are still expected to play an active role along side the private sector, whose role is becoming more important. Thailand, one of the biggest rice exporting countries in the world, has various active market participants. The government concerned agencies are very much involved in promoting and facilitating rice trade, although almost all the domestic and foreign trade of rice is handled by the private sector. The government agencies are often actively involved in attempts to find new export market for rice. However, state owned companies in Thailand have a negligible role at present.

In China and Vietnam the public sector is playing a very important role in rice marketing, in particular, in rice trade. Chinese government agencies and state-owned companies are more actively involved in the marketing system than the private sector, because rice is regarded as one of the major staple food grains. At present, in Vietnam, the government and state-owned companies are actively involved in the rice marketing system, while the private sector is still playing a moderate role in the system. However, one may expect that in the future the private sector's role in the rice marketing system will increase as the marketing system and infrastructure are developed.

**Table 6.2 Present development of processing industry (1996).**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
<b>Maize</b>							
General situation	A	B	B	B	B	A	C
- stable supply of quality raw material	B	B	C	D	C	C	C
- introduction of new technology	E	B	E	B	B	E	E
- packaging of processed products	E	C	B	B	B	B	C
- domestic demand promotion	B	B	B	B	C	B	C
- export	C	B	C	D	D	C	C
- financial availability	E	B	E	E	C	B	C
- market information accessibility	E	B	C	D	B	A	C
<b>Soybean</b>							
General situation	B	B	A	C	B	A	C
- stable supply of quality raw material	C	B	A	D	C	B	C
- introduction of new technology	C	B	C	C	C	A	C
- packaging of processed products	C	B	C	C	A	B	C
- domestic demand promotion	C	B	B	B	B	A	C
- export	B	A	C	D	D	C	C
- financial availability	E	B	E	E	C	B	E
- market information accessibility	E	B	B	C	C	B	E
<b>Cassava</b>							
General situation	ni	C	B	ni	B	A	C
- stable supply of quality raw material	ni	B	C	ni	C	A	C
- introduction of new technology	ni	B	B	ni	C	A	C
- packaging of processed products	ni	C	B	ni	B	A	C
- domestic demand promotion	ni	C	A	ni	D	A	C
- export	ni	D	C	ni	D	A	B
- financial availability	ni	C	E	ni	E	A	E
- market information accessibility	ni	C	C	ni	C	A	E
<b>Rice</b>							
General situation	A	A	B	B	ni	A	B
- stable supply of quality raw material	A	B	B	A	ni	A	B
- introduction of new technology	B	A	C	B	ni	A	B
- packaging of processed products	A	B	B	B	ni	A	B
- domestic demand promotion	A	B	B	B	ni	A	B
- export	B	A	C	B	ni	A	B
- financial availability	E	B	E	E	ni	A	B
- market information accessibility	B	B	B	B	ni	A	C

Notes: A: Developed; B: Semi-developed; C: Initial state of development; D: Not existing; E: Related information is not available; ni: Not included.

Indonesia experienced great success in increasing rice production through its rice self-sufficiency policy. Under this policy, government/parastatal agencies are the major key players in the domestic and international marketing system, while the private sector's role is comparatively moderate.

Cooperatives have been playing important roles in Thailand and Indonesia. In Thailand cooperatives have generally focused on production related activities, although some cooperatives are becoming more market oriented. On the other hand, the involvement of cooperatives is not seen in the cassava marketing systems of China, India, Pakistan or Vietnam.

## 6.2 Present development of the processing industry

The development of the processing industries of maize, soybean, cassava and rice is appraised based on available information and observation concerning seven general industrial criteria: (1) stability of supply of quality raw material; (2) introduction of new technology to the industry; (3) packaging of processed products; (4) domestic demand promotion; (5) export; (6) financial availability of credit for the industry; and (7) accessibility to market information. The

assessment of these seven criteria of the industry uses a rather qualitative scale in which A means developed, B means semi-developed, C means at the initial state of development, and D means not existing (Table 6.2). These scales are relative and comparative among the countries studied.

#### *Maize*

At present, the maize processing industry in China and Thailand is, in general, regarded as approaching the developed state. In particular, well developed accessibility to market information is seen in Thailand. Although China has a large maize processing industry such as the feed industry and the starch industry, detailed information regarding the maize processing industry in China is still insufficient and there is some indication that supply of quality material is still a problem, especially in the southern provinces of China.

The general situation of the maize processing industry development is assessed as “semi-developed” in India, Indonesia, Pakistan and the Philippines. In India the packaging of processed products seems to be backward compared to the other criteria. This is probably due to costly packaging materials. In Indonesia it is observed that at least three criteria in the table are still at the initial state of development, namely stability of supply of quality raw material, credit availability, and marketing information accessibility. In Pakistan, thanks to government promotion, the following criteria, introduction of new technology, packaging of processed products and domestic promotion, are appraised as “semi-developed”. The information available in the Philippines is insufficient for precise assessment; however, the overall development of the maize processing industry seems to be in line with that of Indonesia and Pakistan.

#### *Soybean*

Indonesia and Thailand are considered to have developed soybean processing industries. In Indonesia, the stable supply of quality material is assessed as developed, while such criteria as new technology introduction, packaging and export are considered to be at the initial state of development. In Thailand, the introduction of new technology and domestic demand promotion are relatively well developed.

The soybean processing industries of China, India and the Philippines are considered at the level of “semi-developed” in general. Similar to maize, China’s soybean processing industry must be huge, however, detailed information is not available. In spite of the fact that India exports a certain amount of soybean meal to its neighboring countries, all other criteria of soybean processing development are still rated at the semi-developed stage. Soybean production in the Philippines has been strongly promoted by a multi-national company for various processing activities including soybean milk, however the processing industry is at an initial stage of development with problems such as raw material supply, demand promotion and credit availability.

Pakistan and Vietnam share some similarity in their soybean processing industries, their production is limited and the development level of their processing industries is appraised as the initial state.

#### *Cassava*

The rating of the development state of the cassava processing industry more or less follows to the production level of the country. Thailand, the worlds biggest cassava exporter, has a very well developed domestic processing industry. The processing industry of Indonesia, the second biggest producer of cassava among the countries studied, is evaluated as “semi-developed”. In particular, since various cassava products are processed into foods which are consumed daily, the domestic demand promotion seems to be well developed. Since cassava is



still a minor crop in India, its processing is at the initial state. At present Vietnam's cassava processing is also considered at the initial state.

### *Rice*

In general the rice processing industry is well developed compared to the other major upland crops, because it is the most important staple food in the countries studied where rice is mostly consumed in the form of milled rice. All the six countries studied are rice exporting countries. Thailand, one of the biggest rice exporting countries in the world, has a very well developed processing industry and all the seven criteria are evaluated as developed, the same as its cassava processing industry. China and India, which are the world's biggest and second biggest rice producers, are also appraised to have a developed processing industry. In these two countries two to three out of the seven criteria are evaluated as developed, although they are not the same.

The rice processing industries of the remaining three countries: Indonesia, Pakistan and Vietnam, are evaluated as the state of "semi-developed". Vietnam and Pakistan are rice exporting countries and, probably for this reason, in these two countries the rice processing industry is evaluated as more developed than the processing industries of maize, soybean and cassava. Indonesia is not a net rice exporting country and the introduction of new technology for rice processing is considered to be still at the initial state of development.

## **6.3 General observations and issues**

The assessment of marketing and processing systems of maize, soybean, cassava and rice in the seven countries in terms of the involvement of key participants and the present development of the processing industry of the respective crop reveals some observations and issues which are discussed as follows:

- There is a general decreasing trend of government involvement as a key participant in the marketing system of the commodities studied. This is mostly due to the deregulation and privatization policies which are being adopted by most of the seven countries.
- The degree of deregulation and privatization is different from country to country and also varies within the country itself. Therefore, it is still not clear how to anticipate the end results of these policies. Particularly in China, the marketing system is still in a transition period from state control to a free enterprise economy.
- There is a tendency for the private sector to play a key role in the marketing systems of relatively well-established export commodities (e.g., Thailand's cassava and rice marketing systems). Moreover, government involvement is comparatively limited in the marketing systems of commodities which are still at an initial stage of development for domestic consumption, e.g., maize in Pakistan, soybean in India, the Philippines and Thailand.
- The stage of processing industry development of the four commodities is generally assessed based on the present situation of the mid-stream agro-industry such as soybean crushing industry, rice milling industry and cassava starch industry. There is still a lack of information regarding the down-stream agro-industry of these commodities, e.g., those regarding rice cracker/snack makers, cassava modified starch industry such as monosodium glutamate and saccharin. In fact the establishment of high value-added processing industry for the commodity will not only have price effects at the farm level but also serve as an indication of the sustainability of the respective commodity production.

## 7. Government Intervention in Major Upland Crops

In the real world, government intervention and policies have impacts on the development of a commodity and its processing industry. The discussions in Chapter 6 on the involvement of key participants and present development of the processing industry were based on observation and assessment of the selected commodities in the seven countries. Information on government intervention in the selected commodities was studied and reviewed so as to identify the existence or non-existence of intervention up to 1995.

By all means, this discussion is not detailed policy analysis. The interventions of all seven governments on maize, soybean, cassava and rice are summarized and discussed in here.

### 7.1 Maize

Government interventions on maize in the seven countries are summarized according to the marketing level: production, marketing and processing and external trade (Table 7.1).

#### *Production level*

At the production level, input subsidies are the most commonly implemented policy measures. Subsidies are given to fertilizer, except in the cases of Pakistan and Vietnam, while seed subsidies are given in Pakistan, the Philippines and Thailand. Cheap credits for inputs are provided in all the countries, except Indonesia.

Investment grants are not available in Thailand and Indonesia. Subsidies are available in farm machinery, irrigation systems and land development. Yet, production or acreage control or deficiency payment is not implemented in any country, while compulsory requisition of maize is only being carried out in China and a guaranteed price is adopted in China and India.

#### *Marketing and processing level*

Parastatal trading or marketing board systems are applied in all the countries except for Pakistan and Thailand. These two countries also show no price support programme or government intervention in buying as is also the case of Indonesia. Food subsidies to consumers are also not adopted by any country. Excise tax is only found in the Philippines, where it is applied to processed maize. Grants to industry such as investment incentive policies do not exist in most of the countries. However, in Indonesia and Vietnam there is no information about grants to industry.

#### *External trade level*

At the external trade level, an import tariff or surcharge on maize is generally applied in all countries, except for Indonesia. The second most popular trade policy is import and export quota and non-tariff barriers which are adopted in China, India, Pakistan and the Philippines, while only the export tax is adopted in Vietnam.

#### *Findings*

China and India show almost the same pattern of government intervention in maize. This may be due to the large proportion of maize utilized for human consumption in India and high animal feed requirement for maize in China. This similarity probably reflects the existing

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government policy concerning agriculture in general. On the contrary, Thailand shows the most market-oriented policy pattern among the countries. This phenomenon is probably related to the country's foreign trade policy which shows aggressive trade expansion of agricultural products.

**Table 7.1 Government intervention in production, marketing, processing and trade of maize, 1995.**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
<b>Production level</b>							
1. Input subsidies							
• fertilizer	+	+	+	-	+	+	-
• seed	-	-	-	+	+	+	-
• cheap credit for inputs	+	+	-	+	+	+	+
2. Investment grant							
• machinery	-	-	-	-	nm	-	-
• irrigation systems	+	+	-	+	+	-	+
• land development	+	+	-	+	nm	-	+
3. Production or acreage control	-	-	nm	-	-	-	-
4. Compulsory food requisition	+	-	nm	-	-	-	-
5. Production subsidy: a fixed or proportionate subsidy per unit of output	-	-	nm	-	-	-	-
6. Deficiency payment	-	-	-	-	-	-	-
7. Guaranteed price	+	+	-	-	-	-	-
<b>Marketing and processing level</b>							
1. Parastatal trading or marketing boards	+	+	+	-	+	-	nm
2. Intervention buying or price support programme	+	+	-	-	+	-	+
3. Food subsidies to consumers	-	-	-	-	-	-	-
4. Excise taxes	-	-	nm	-	+*	-	-
5. Grants to industry							
• investment grants	-	-	nm	-	-	-	nm
• special tax concession	+	-	nm	-	-	-	nm
<b>External trade</b>							
1. Import tariff or surcharge	+	+	-	+	+	+	+
2. Import or export quota	+	+	nm	+	-	-	+
3. Export subsidies or tax	-	-	-	-	-	-	+
4. Non-tariff barriers	+	+	-	+	+	-	nm
<b>Public investment</b>							
Research, training and extension	+	+	+	+	+	+	+

Note: \*: excise taxes on processing.  
nm: not mentioned.

## 7.2 Soybean

Government interventions on soybean are summarized according to the marketing level: production, marketing and processing and external trade (Table 7.2).

### *Production level*

Input subsidies for fertilizer are provided in all the countries except Pakistan and Vietnam. The policy of cheap credit for inputs is also adopted in all the countries except Indonesia and the Philippines. As compared to maize, investment grants are more often adopted due to the fact that most soybean is grown in irrigated areas. In contrast, compulsory requisition, production subsidy or deficiency payments are not adopted by any country. Compared to the case of maize, more countries adopt guaranteed price policies. This may be due to the fact that most of these countries are importing soybean, therefore a guaranteed price is implemented as a measure to increase domestic production.

*Marketing and processing level*

At the higher marketing level, China and India have parastatal trading or marketing boards and intervention buying or price support programs. These two countries also adopted policies of granting special tax concession to industry. Indonesia has parastatal or marketing boards for soybean but does not adopt any other policy related to marketing and processing of soybean. A food subsidy for consumers is not adopted in any country. Excise tax is not adopted except for the case of the Philippines.

*External trade*

All the countries have import tariffs or surcharges on soybean. China, India, Pakistan, Thailand and Vietnam have import or export quotas. It is noteworthy that the Vietnamese government has an export tax on soybean.

**Table 7.2 Government intervention in production, marketing, processing and trade of soybean, 1995.**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
<b>Production level</b>							
1. Input subsidies							
2. Fertilizer	+	+	+	-	+	+	-
3. Seed	-	-	-	+	-	+	-
4. Cheap credit for inputs	+	+	-	+	-	+	+
5. Investment grant							
6. Machinery	-	-	-	-	nm	-	-
7. Irrigation systems	+	+	-	+	-	+	+
8. Land development	+	+	-	+	nm	+	+
9. Production or acreage control	-	-	nm	-	-	-	-
10. Compulsory food requisition	-	-	nm	-	-	-	-
11. Production subsidy: a fixed or proportionate subsidy per unit of output	-	-	nm	-	-	-	-
12. Deficiency payment	-	-	-	-	-	-	-
13. Guaranteed price	+	+	-	+	-	+	-
<b>Marketing and processing level</b>							
1. Parastatal trading or marketing boards	+	+	+	-	-	-	nm
2. Intervention buying or price support programme	+	+	-	+	-	-	+
3. Food subsidies to consumers	-	-	-	-	-	-	-
4. Excise taxes	-	-	nm	-	+	-	-
5. Grants to industry							
• investment grants	-	-	nm	-	-	-	nm
• special tax concession	+	+	nm	-	-	-	nm
<b>External trade</b>							
1. Import tariff or surcharge	+	+	+	+	+	+	+
2. Import or export quota	+	+	nm	+	-	+	+
3. Export subsidies or tax	-	-	-	-	-	-	+
4. Non-tariff barriers	+	+	-	+	+	+	nm
<b>Public investment</b>							
Research, training and extension	+	+	+	+	+	+	+

Note: \*: excise taxes on processing.  
nm: not mentioned.

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### Findings

It is clear that all the seven countries have been implementing various degrees of protectionist policies on external trade of soybean, because not all these countries are importers of soybean. In addition, promotional policies such as input subsidies and guaranteed prices are being carried out in most of these countries to increase domestic soybean production. However, up to now most of these countries are not yet able to achieve self-sufficiency in soybean, and as indicated in the earlier chapter, there is a strong tendency for these countries to be importing countries for years to come, unless there is a significant breakthrough in soybean production technology and it is successfully adopted.

### 7.3 Cassava

Five countries, India, Indonesia, Philippines, Thailand and Vietnam, studied cassava as one of major upland crop products. Government interventions on cassava are summarized according to the marketing level: production, marketing and processing and external trade (Table 7.3).

**Table 7.3 Government intervention in production, marketing, processing and trade of cassava, 1995.**

	India	Indonesia	Philippines	Thailand	Vietnam
Production level					
1. Input subsidies					
• fertilizer	+	+	+	+	-
• seed	-	-	-	+	-
• cheap credit for inputs	+	-	-	+	+
2. Investment grant					
• machinery	-	-	nm	-	-
• irrigation systems	+	-	-	-	+
• land development	+	-	nm	-	+
3. Production or acreage control	-	nm	-	-	-
4. Compulsory food requisition	-	nm	-	-	-
5. Production subsidy: a fixed or proportionate subsidy per unit of output	-	nm	-	-	-
6. Deficiency payment	-	-	-	-	-
7. Guaranteed price	-	-	-	-	-
Marketing and processing level					
1. Parastatal trading or marketing boards	-	-	-	-	nm
2. Intervention buying or price support programme	-	-	-	-	-
3. Food subsidies to consumers	-	-	-	-	+
4. Excise taxes	-	nm	+	-	-
5. Grants to industry					
• investment grants	-	nm	-	-	nm
• special tax concession	-	nm	-	-	nm
External trade					
1. Import tariff or surcharge	+	-	-	-	+
2. Import or export quota	+	nm	-	+	+
3. Export subsidies or tax	-	-	-	+	+
4. Non-tariff barriers	+	-	+	-	nm
Public investment					
Research, training and extension	+	+	+	+	+

Note: \*: excise taxes on processing.

nm: not mentioned.

*Production level*

At the production level the Thai government provides all three major input subsidies to cassava cultivation as the country is the biggest exporter of cassava products. There are no investment grants in Thailand, Indonesia and the Philippines, because cassava is mostly grown under rainfed conditions. The investment grants reported in India and Vietnam may be due to the fact that some farmers grow cassava in irrigated areas.

*Marketing and processing level*

Parastatal trading or marketing boards of cassava are not adopted in the countries studied. Thailand, the biggest exporter of cassava products has almost no intervention in marketing and processing levels. This reflects the free market policy of the Thai economy.

*External trade*

India and Vietnam show significant intervention in external trade of cassava. This situation reflects the strong protectionist policy of these countries. In Thailand, intervention in the cassava trade is focused on the allocation of export quotas for cassava products for animal feed to the EU market in which the import limitation agreement has been signed by both parties.

*Findings*

Thailand, a major cassava producing and exporting country, has adopted export control measures because of the VER agreement with EU. However, it seems that Thailand has a free market policy in the domestic marketing system and adopts a promotional policy on cassava production.

## **7.4 Rice**

Six countries, China, India, Indonesia, Pakistan, Thailand and Vietnam, studied rice as one of the major upland crops. Government interventions on rice are summarized according to the marketing level: production, marketing and processing and external trade (Table 7.4).

*Production level*

Compared to other upland crops, rice is still viewed as a more important crop, as shown by the production subsidies provided in all the countries studied. More countries adopt policies on input subsidies, investment grants and guaranteed prices. Although these countries have abundant labor, there is limited use of machinery. It is expected that some mechanization in rice processing will be adopted as these countries have high national income growth rates. China and India have adopted compulsory requisition and guaranteed prices of rice. Guaranteed price is also adopted in Indonesia and Pakistan for different reasons. Indonesia's guaranteed price policy is aimed at achieving rice self-sufficiency which has been quite successful. Pakistan's guaranteed price scheme is more or less focused on promoting rice production for export so that the country can continue to be a big exporter of Basmati rice.

*Marketing and processing level*

Intervention buying or price support programs of rice are adopted by all the countries because of the product's importance in production (land use), consumption (staple food) and foreign exchange earning. These issues create reasons for governments to intervene in rice production, marketing and trade.

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**Table 7.4 Government intervention in production, marketing, processing and trade of rice, 1995.**

	China	India	Indonesia	Pakistan	Thailand	Vietnam
<b>Production level</b>						
1. Input subsidies						
• fertilizer	+	+	+	-	+	-
• seed	-	-	+	+	+	-
• cheap credit for inputs	+	+	+	+	+	+
2. Investment grant						
• machinery	-	-	-	-	-	-
• irrigation systems	+	+	+	+	+	+
• land development	+	+	+	+	+	+
3. Production or acreage control	-	-	nm	-	-	-
4. Compulsory food requisition	+	+	nm	-	-	-
5. Production subsidy: a fixed or proportionate subsidy per unit of output	-	-	nm	-	-	-
6. Deficiency payment	-	-	-	-	-	-
7. Guaranteed price	+	+	+	+	-	-
<b>Marketing and processing level</b>						
1. Parastatal trading or marketing boards	+	+	+	+	-	nm
2. Intervention buying or price support programme	+	+	+	+	+	+
3. Food subsidies to consumers	+	+	+	-	-	-
4. Excise taxes	-	-	nm	-	-	-
5. Grants to industry						
• investment grants	-	-	nm	-	-	nm
• special tax concession	+	-	nm	-	-	nm
<b>External trade</b>						
1. Import tariff or surcharge	+	+	+	+	-	nm
2. Import or export quota	+	+	nm	+	-	+
3. Export subsidies or tax	-	-	-	-	-	+
4. Non-tariff barriers	+	+	-	+	-	nm
<b>Public investment</b>						
Research, training and extension	+	+	+	+	+	+

Note: nm: not mentioned.

### External trade

Governments intervene in rice trade for different reasons. The governments of China and India intervene in rice trade to ensure food security while the government of Pakistan relates the intervention to protection of its Basmati rice export, and in Indonesia the intervention is primarily aimed at stabilizing the domestic price and ensuring self-sufficiency.

### Findings

Rice is a staple food for almost all these countries and plays an essential role in resource utilization and allocation within the economy. Therefore, all these countries have greater intervention in rice production, marketing and trade than for the other crops studied. In some cases, the government intervention has, to a great extent, a political basis rather than an economical justification. As a result, the government policy has often been biased towards rice, which has generated both direct and indirect impacts on other upland crops, especially concerning the allocation and utilization of production inputs such as capital, labor and land, at the level of production, marketing and trade.

## 7.5 Other commodities

Policy measures has been implemented for potato and sweet potato in China, potato in Pakistan and banana in the Philippines (Table 7.5).

Although potato and sweet potato are regarded as food grains in China, government intervention is much less compared to rice because of their lower importance in dietary patterns. The government intervention on potato in Pakistan is similar to that on rice. The only difference is the lack of parastatal trading or marketing boards. Since banana is an important export commodity for the Philippines, the government intervenes at the market and processing levels with subsidies in inputs and irrigation investment.

**Table 7.5 Government intervention in production, marketing, processing and trade of other studies commodities, 1995.**

Commodity	China	Pakistan	Philippines
	Potato and sweet potato	Potato	Banana
<b>Production level</b>			
1. Input subsidies			
• fertilizer	+	-	+
• seed	-	+	-
• cheap credit for inputs	+	+	-
2. Investment grant			
• machinery	-	-	nm
• irrigation systems	+	+	+
• land development	+	+	nm
3. Production or acreage control	-	-	-
4. Compulsory feed requisition	-	-	-
5. Production subsidy: a fixed or proportionate subsidy per unit of output	-	-	-
6. Deficiency payment	-	-	-
7. Guaranteed price	-	+	-
<b>Marketing and processing level</b>			
1. Parastatal trading or marketing boards	-	-	+
2. Intervention buying or price support programme	-	+	-
3. Food subsidies to consumers	-	-	-
4. Excise taxes	-	-	+*
5. Grants to industry			
• investment grants	-	-	-
• special tax concession	+	-	-
<b>External trade</b>			
1. Import tariff or surcharge	+	+	-
2. Import or export quota	+	+	-
3. Export subsidies or tax	-	-	-
4. Non-tariff barriers	+	+	+
<b>Public investment</b>			
Research, training and extension	+	+	+

Note: \*: excise taxes on processing.

nm: not mentioned.



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## 8. Market Survey of Emerging Products and Case Studies

There have been variable degrees of structural adjustment in the agricultural sectors of the participating countries due to economic growth and new policies directed towards free market oriented economies. Moreover, in response to population expansion and socio-economic changes such as urbanization, demand for fruit and vegetables, especially those of high quality, is increasing and creating new market opportunities in the both domestic and export markets.

In the process of agricultural adjustment to capture emerging market opportunities, there have been successful and failed cases of market promotion of agricultural products in each participating country. This chapter will try to identify common factors for success and failure as well as depict some commodity specific factors which have important implications.

### 8.1 New emerging products and their market orientation

According to their market orientation, cases of new emerging commodities studied are categorized into three groups, namely (i) commodities orientated towards the domestic market, (ii) commodities orientated towards the export market and (iii) commodities which have shown remarkable performance in both export and domestic markets, or for which market orientation is not clearly specified (Table 8.1). At least five common factors can be identified from the studies on new emerging products.

**Table 8.1 Summary of the market surveys on emerging products.**

Major market orientation	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
Domestic market	not studied	apple	not studied	canola	not studied	not studied	orange
Export market	fresh citrus canned fruit edible fungi canned vegetables including mushroom	onion	potato	mushroom	fresh young coconuts	longan durian	cashew
Domestic & export market	apple vegetable	mango grapes mango pulp mushroom	cabbage mango	strawberry	cut flowers ubi	mangosteen baby corn	cassava dry chips

First, only a few commodities with domestic market orientation were studied, while a large number of export commodities were selected. This may be due to the fact that most of the countries have been adopting export promotion policies for which the orientation is export demand driven. However, India's apple and Vietnam's orange are typical cases in response to the domestic market expansion. Pakistan's canola-type rapeseed is a case of an emerging brand new product for import substitution.

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Second, the commodities studied are mostly fruit or vegetables, which obviously reflects shifts in food consumption patterns at home and abroad. Studies on commodities other than fruit and vegetables are also consistent with the trend of food consumption changes such as the case of canola-type rapeseed in Pakistan and cassava dry chips in Vietnam.

Third, it is also interesting to touch upon the fact that simply processed products such as canned fruit and vegetables are often studied. This also obviously reflects the food consumption trend toward processed food in both domestic and export markets. Moreover, processing of farm products is being promoted to increase rural income in countries such as China where there is a general trend to commercialization of agriculture.

Fourth, mostly labor intensive products are produced in countries with relatively low labor costs, although this advantage may be temporary. This means that wage costs have increased significantly as the economy grows and the comparative advantage of low labor cost is rapidly disappearing.

Last, some traditional commodities resulting from indigenous production technology are emerging in the export-driven situation. The case in point is China where there is a remarkable expansion of production of edible fungi and vegetables which result from traditional technology. India's mango, the Philippines' coconut and ubi, and Thailand's durian are cases of traditional products emerging due to the export-driven market situation.

### 8.2 Successful cases

The findings of 21 successful market promotion attempts in the seven country reports are summarized in Table 8.2. This table provides information regarding the successful cases in terms of major market orientation, promoters and major participants, and major contributing factors which are further grouped into two categories, namely factors mainly concerned with production/processing aspects and those related to domestic and export marketing aspects. The following are the common factors drawn from the successful cases:

- government support in the basic infrastructure;
- increasing demand in both domestic and export markets;
- timely deregulation by the government;
- exploitation of natural resources such as suitable soil and climate environment, abundant labor force and indigenous technologies;
- active involvement of the private sector in initial investment, joint venture, technology transfer, contract farming and vertical integration; and
- appropriate policy implementation.

### 8.3 Failed cases

The lessons learned from study of failed cases of market promotion are presented in Table 8.3 in which the reasons of failure for each commodity with its major market orientation are summarized from the respective country report. The following issues are often found among these cases:

- lack of well established standardization measures by concerned authorities;
- lack of appropriate post-harvest technologies;
- inadequate marketing infrastructure;

- weak linkage between producers and processors;
- lack of effective plant quarantine system to meet the requirements of importing countries;
- lack of export oriented production and marketing;
- lack of coordination between private and public agencies;
- biased government policies toward self-sufficiency;
- lack of clear-cut policy direction;
- lack of promotion effort; and
- limited possibility of export market expansion.

**Table 8.2 Summary of case studies: successful cases of market promotion.**

	Market orientation	Promoter/major participants	Major contributing factors		Special issues
			production/processing aspects	domestic and export marketing aspects	
<b>China</b>					
Edible fungi	export	<ul style="list-style-type: none"> <li>• state-owned company</li> <li>• farmer</li> <li>• government</li> </ul>	<ul style="list-style-type: none"> <li>• deregulation on domestic production and marketing</li> <li>• technological breakthrough and extension of new varieties</li> </ul>	<ul style="list-style-type: none"> <li>• increasing export demand</li> <li>• low production cost</li> </ul>	<ul style="list-style-type: none"> <li>• labor cost with indigenous skill</li> </ul>
Vegetables	domestic	<ul style="list-style-type: none"> <li>• government</li> <li>• farmer</li> </ul>	<ul style="list-style-type: none"> <li>• deregulation</li> <li>• increased investment: green house</li> <li>• government support to farm inputs</li> </ul>	<ul style="list-style-type: none"> <li>• market infrastructure construction: central market</li> </ul>	<ul style="list-style-type: none"> <li>• vegetable basket project</li> </ul>
Processed vegetables and fruits	export	<ul style="list-style-type: none"> <li>• government</li> <li>• farmer</li> </ul>	<ul style="list-style-type: none"> <li>• deregulation</li> <li>• technology transfer</li> <li>• increased investment</li> </ul>	<ul style="list-style-type: none"> <li>• increasing export demand</li> <li>• low production cost</li> <li>• unique product</li> </ul>	
<b>India</b>					
Floriculture (cut flowers)	export	<ul style="list-style-type: none"> <li>• government</li> <li>• private company</li> <li>• joint venture</li> </ul>	<ul style="list-style-type: none"> <li>• government support to farm inputs</li> <li>• low production cost</li> </ul>	<ul style="list-style-type: none"> <li>• government support</li> <li>• increasing export demand</li> </ul>	<ul style="list-style-type: none"> <li>• climatic advantage</li> </ul>
Grapes	export	<ul style="list-style-type: none"> <li>• cooperative</li> <li>• government</li> </ul>	<ul style="list-style-type: none"> <li>• government support</li> </ul>	<ul style="list-style-type: none"> <li>• increasing export demand</li> <li>• improved infrastructure</li> <li>• specialized production for export</li> </ul>	<ul style="list-style-type: none"> <li>• specialized cooperatives: MAHAGRAPE, NAFED</li> </ul>
Onion	export	<ul style="list-style-type: none"> <li>• cooperative</li> </ul>	<ul style="list-style-type: none"> <li>• availability of storage facility</li> </ul>	<ul style="list-style-type: none"> <li>• effective marketing practice</li> <li>• efficient marketing system</li> <li>• improved marketing infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• NAFED</li> </ul>

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**Table 8.2 Summary of case studies: successful cases of market promotion (continued).**

<b>Indonesia</b>					
Cacao	export	<ul style="list-style-type: none"> <li>• government (local)</li> <li>• farmer</li> </ul>	<ul style="list-style-type: none"> <li>• technological breakthrough</li> <li>• low production cost</li> <li>• commodity's suiting nature for small farmers cultivating/processing practice</li> </ul>	<ul style="list-style-type: none"> <li>• increasing export and domestic demand</li> </ul>	<ul style="list-style-type: none"> <li>• unique case of local government leadership and initiative</li> </ul>
Palm oil	domestic	<ul style="list-style-type: none"> <li>• government</li> <li>• state-owned company</li> </ul>	<ul style="list-style-type: none"> <li>• suitable climate</li> <li>• increased investment</li> <li>• technological breakthrough</li> </ul>	<ul style="list-style-type: none"> <li>• efficient marketing system</li> </ul>	<ul style="list-style-type: none"> <li>• government program</li> </ul>
Canned pineapple	export	<ul style="list-style-type: none"> <li>• private company</li> </ul>	<ul style="list-style-type: none"> <li>• deregulation of land use</li> <li>• increased investment in processing</li> </ul>	<ul style="list-style-type: none"> <li>• vertically integrated large plantation</li> <li>• stable raw material supply</li> </ul>	<ul style="list-style-type: none"> <li>• private initiative</li> </ul>
<b>Pakistan</b>					
Mango	export	<ul style="list-style-type: none"> <li>• private company</li> </ul>	<ul style="list-style-type: none"> <li>• low production cost</li> <li>• suitable climate</li> <li>• long harvest period</li> </ul>	<ul style="list-style-type: none"> <li>• special cultivars</li> <li>• increasing demand</li> <li>• infrastructure improvement</li> <li>• government support to international transportation</li> </ul>	<ul style="list-style-type: none"> <li>• comparative advantage in the Middle East market</li> </ul>
Citrus	export	<ul style="list-style-type: none"> <li>• private company</li> </ul>	<ul style="list-style-type: none"> <li>• suitable climate</li> <li>• unique supply character</li> <li>• investment in processing</li> <li>• specialized production for export</li> </ul>	<ul style="list-style-type: none"> <li>• improved infrastructure</li> <li>• improved processing industry</li> <li>• increasing export demand</li> </ul>	
Molasses	export	<ul style="list-style-type: none"> <li>• private company</li> </ul>	<ul style="list-style-type: none"> <li>• existing large scale sugar industry</li> <li>• good quality</li> </ul>	<ul style="list-style-type: none"> <li>• less domestic demand</li> <li>• increased export demand</li> </ul>	<ul style="list-style-type: none"> <li>• demanded as feed in the European market</li> </ul>
<b>Philippines</b>					
Banana chips	export	<ul style="list-style-type: none"> <li>• private company</li> <li>• government</li> </ul>	<ul style="list-style-type: none"> <li>• unique product character</li> <li>• stable raw material supply</li> </ul>	<ul style="list-style-type: none"> <li>• government support</li> <li>• increasing demand tax reduction/exemption</li> </ul>	<ul style="list-style-type: none"> <li>• Philippines Food Exporters Association</li> </ul>
Processed mango	export	<ul style="list-style-type: none"> <li>• private company</li> <li>• government</li> </ul>	<ul style="list-style-type: none"> <li>• unique supply character</li> </ul>	<ul style="list-style-type: none"> <li>• increasing demand</li> </ul>	<ul style="list-style-type: none"> <li>• well established good reputation in fresh fruit market and abundant supply</li> </ul>
Soursop	not specified	<ul style="list-style-type: none"> <li>• private company</li> <li>• government</li> </ul>	<ul style="list-style-type: none"> <li>• government support to farm inputs</li> <li>• technological improvement</li> </ul>	<ul style="list-style-type: none"> <li>• increasing demand</li> </ul>	<ul style="list-style-type: none"> <li>• Technology and Livelihood Resource Center (TLRC)</li> </ul>

**Table 8.2 Summary of case studies: successful cases of market promotion (continued).**

<b>Thailand</b>					
Broiler industry	export and domestic	<ul style="list-style-type: none"> <li>private company</li> <li>joint venture</li> </ul>	<ul style="list-style-type: none"> <li>government support</li> <li>technological breakthrough</li> </ul>	<ul style="list-style-type: none"> <li>increasing export and domestic demand</li> <li>government support</li> </ul>	<ul style="list-style-type: none"> <li>government quarantine and vaccination services</li> <li>deregulation</li> <li>joint venture and technological transfer</li> </ul>
Processed tomato	export and domestic	<ul style="list-style-type: none"> <li>private company</li> </ul>	<ul style="list-style-type: none"> <li>government support</li> <li>technological breakthrough</li> </ul>	<ul style="list-style-type: none"> <li>contract farming</li> <li>increasing demand</li> </ul>	<ul style="list-style-type: none"> <li>import substitution and export expansion</li> </ul>
Onion	export and domestic	<ul style="list-style-type: none"> <li>cooperative</li> <li>government</li> </ul>	<ul style="list-style-type: none"> <li>production plan by seed import control</li> <li>technological breakthrough</li> <li>government support</li> </ul>	<ul style="list-style-type: none"> <li>government support</li> </ul>	<ul style="list-style-type: none"> <li>import substitution and export expansion</li> </ul>
<b>Vietnam</b>					
Coffee	export	<ul style="list-style-type: none"> <li>government</li> <li>farmers</li> </ul>	<ul style="list-style-type: none"> <li>government support</li> <li>suitable climate</li> <li>diligent farmers</li> <li>increased investment</li> </ul>	<ul style="list-style-type: none"> <li>increasing demand</li> </ul>	<ul style="list-style-type: none"> <li>government deregulation creating an initial stage of low cost comparative advantage in the world market</li> </ul>
Groundnut	export and domestic	<ul style="list-style-type: none"> <li>farmers</li> <li>state-owned company</li> </ul>	<ul style="list-style-type: none"> <li>suitable climate</li> </ul>	<ul style="list-style-type: none"> <li>increasing demand</li> <li>relatively efficient marketing system</li> </ul>	
Sugarcane	not specified	<ul style="list-style-type: none"> <li>state-owned company</li> <li>private company</li> <li>farmers</li> </ul>	<ul style="list-style-type: none"> <li>suitable climate</li> <li>government support</li> <li>diligent farmers</li> </ul>	<ul style="list-style-type: none"> <li>increasing demand</li> </ul>	

## 8.4 General observations and issues

It should be pointed out that lessons learned from the case studies on new emerging products as well as the successful and failed cases should be scrutinized closely, and attempts to replicate the successful cases should be avoided. For instance, canned pineapple in Indonesia was selected for case study in both successful and failed endeavors. Both cases shared similar characteristics such as private company ownership, export oriented industry, and contract farming. However, as is pointed out by the Indonesia country study, the key to success and failure of these two cases is the ability of the company to secure the raw material supply. The successful company is able to maintain a steady supply of pineapple through the contract

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farming system which is very well integrated with the local agricultural production and marketing system. On the contrary, the failed company could not obtain an adequate and steady supply because they were not in harmony with the local marketing system.

The Indonesian pineapple cases reveal a message that for the same enterprise success and failed can be very location specific. Of course, it does not imply that all the common factors for successful and failed cases cannot be applied to other location or countries. Nevertheless, all these common factors should be considered by both government and the private sector in pursuing successful agricultural development. So far as the government is concerned, in order to create and strengthen the environment for successful agricultural development, the government should provide the basic marketing infrastructure (e.g. construction of market, market information, etc.), timely deregulate and focus more on the facilitating role of the government, and strengthen the marketing linkages from farmers to the ultimate consumers. At the same time, the government should avoid adoption of biased policy and ambiguous policy directions.

**Table 8.3 Summary of case studies: failed cases of market promotion.**

	Market orientation	Reasons for failure	Notes
<b>China</b>			
Apples	export	<ul style="list-style-type: none"> <li>• inferior product quality</li> <li>• non strict grading standard</li> <li>• poor quality management</li> <li>• too simple and inadequate packaging</li> </ul>	<ul style="list-style-type: none"> <li>• lack of well established standardization measures by authorities concerned</li> </ul>
Citrus	export	<ul style="list-style-type: none"> <li>• low product quality</li> <li>• short period for harvesting</li> <li>• backward preservation techniques</li> <li>• limited transportation capacity</li> <li>• too simple and inadequate packaging</li> </ul>	<ul style="list-style-type: none"> <li>• lack of post-harvest technology</li> <li>• inadequate marketing infrastructure</li> </ul>
Cotton	domestic	<ul style="list-style-type: none"> <li>• failure in the reform of cotton purchase and marketing system</li> <li>• unstable government policy</li> <li>• relatively high production cost and low profitability to farmers</li> </ul>	<ul style="list-style-type: none"> <li>• lack of clear-cut policy direction</li> </ul>
<b>India</b>			
Apples	export	<ul style="list-style-type: none"> <li>• lack of varieties suitable for export</li> <li>• improper quality control</li> <li>• undeveloped cooperatives</li> <li>• existing large scale domestic demand</li> </ul>	<ul style="list-style-type: none"> <li>• lack of export oriented development in production and marketing</li> </ul>
Processed fruits & vegetables	export and domestic	<ul style="list-style-type: none"> <li>• lack of processing facilities</li> <li>• underdevelopment in processing industry</li> <li>• limited export market</li> <li>• lack of export promotion</li> <li>• high processing cost</li> </ul>	<ul style="list-style-type: none"> <li>• very early stage of processed fruit and vegetables development</li> </ul>

**Table 8.3 Summary of case studies: failed cases of market promotion (continued).**

<b>Indonesia</b>			
Canned pineapple	export	<ul style="list-style-type: none"> <li>insufficient raw material supply caused by farmers' risk avoiding behavior</li> <li>complicated marketing channel</li> <li>insufficient support to cooperatives</li> </ul>	<ul style="list-style-type: none"> <li>weak linkages between farmers and processors</li> <li>insufficient incentives to farmers</li> </ul>
Passion fruit	export	<ul style="list-style-type: none"> <li>unstable raw material supply to large scale plants</li> <li>excessive role of middlemen</li> <li>low productivity variety</li> <li>inconsistent implementation of reward and penalty system</li> <li>poor cultivation techniques</li> </ul>	<ul style="list-style-type: none"> <li>weak linkages among farmers and processors</li> <li>insufficient incentives to farmers</li> </ul>
Pepper	export	<ul style="list-style-type: none"> <li>undeveloped domestic processing industry</li> <li>fluctuating export price</li> </ul>	
<b>Pakistan</b>			
Apple	export	<ul style="list-style-type: none"> <li>lack of surplus to export</li> <li>low product quality</li> <li>poor transportation, storage and post-harvest facilities</li> <li>unmotivated farmers</li> <li>lack of coordinated private or public agencies</li> <li>poor grading and standardization</li> <li>government regulation on the onion export</li> <li>lack of production promotion</li> <li>poor harvest technology</li> </ul>	<ul style="list-style-type: none"> <li>initial stage of development</li> <li>not grown for export purpose</li> </ul>
Onion	export	<ul style="list-style-type: none"> <li>poor grading and standardization</li> <li>government regulation on the onion export</li> <li>lack of production promotion</li> <li>poor harvest technology</li> </ul>	<ul style="list-style-type: none"> <li>biased government policy to self-sufficiency of the product</li> </ul>
Tomato	export and domestic	<ul style="list-style-type: none"> <li>limited supply of quality seed</li> <li>lack of variety for export</li> <li>limited research and development</li> <li>poor post-harvest technology and transportation infrastructure</li> <li>inadequate grading and packaging</li> <li>undeveloped processing industry</li> </ul>	<ul style="list-style-type: none"> <li>initial stage of crop introduction</li> </ul>
<b>Philippines</b>			
Mango (fresh)	export to USA and Europe	<ul style="list-style-type: none"> <li>keen price competition</li> <li>vapor-heat treatment costs</li> <li>domestic transportation costs</li> </ul>	<ul style="list-style-type: none"> <li>keen price competition</li> </ul>
Papaya	export to Japan	<ul style="list-style-type: none"> <li>vapor-heat treatment costs</li> <li>import banning</li> <li>keen price competition</li> </ul>	<ul style="list-style-type: none"> <li>failure in establishing the effective plant quarantine system to fulfill the requirements of importing countries</li> </ul>
Passion fruit	domestic and export	<ul style="list-style-type: none"> <li>limited demand</li> <li>insufficient promotion efforts</li> </ul>	<ul style="list-style-type: none"> <li>early stage</li> </ul>



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**Table 8.3 Summary of case studies: failed cases of market promotion (continued).**

<b>Thailand</b>			
Mango	export to Japan	<ul style="list-style-type: none"> <li>• Japan's strict restriction on fruit fly</li> <li>• variety unpopular in Japan</li> <li>• vapor-heat treatment costs</li> <li>• incorrect post-harvest management</li> </ul>	<ul style="list-style-type: none"> <li>• lack of appropriate post-harvest technology</li> <li>• plant quarantine</li> </ul>
Cashew nut	not specified	<ul style="list-style-type: none"> <li>• unsuitable soil and climate conditions</li> <li>• insufficient capital</li> <li>• lack of cultivation experience</li> </ul>	<ul style="list-style-type: none"> <li>• inappropriate project preparation and management</li> </ul>
Cotton	domestic (import substitute)	<ul style="list-style-type: none"> <li>• discontinuation in price support</li> <li>• insufficient supply of quality seed</li> <li>• high production cost</li> <li>• world price fluctuation and importers' behavior</li> <li>• lack of efficient coordination for fair price formulation</li> </ul>	<ul style="list-style-type: none"> <li>• unrealistic import substitution policy on the commodity that does not have no competability</li> </ul>
<b>Vietnam</b>			
Potato	export	<ul style="list-style-type: none"> <li>• high production cost</li> <li>• undeveloped supply of quality seed potato</li> <li>• undeveloped marketing system</li> <li>• very poor post-harvest facilities</li> </ul>	<ul style="list-style-type: none"> <li>• dependency on one particular market</li> </ul>
Sweet potato	domestic	<ul style="list-style-type: none"> <li>• limited government support</li> <li>• undeveloped processing and export industry</li> <li>• insufficient fertilizer use</li> <li>• low yield</li> <li>• low quality variety</li> </ul>	<ul style="list-style-type: none"> <li>• internal production adjustment to relatively higher value crops such as rice</li> </ul>
Tomato	export	<ul style="list-style-type: none"> <li>• underdevelopment in processing industry</li> <li>• poor transportation infrastructure and post-harvest facilities</li> <li>• undeveloped marketing system</li> </ul>	<ul style="list-style-type: none"> <li>• early stage of development</li> </ul>

## **9. Policy Recommendation for Improving Market Potential and Issues for Further Research**

A number of policy recommendations are advocated in the seven country reports. They are summarized in Table 9.1, grouped into two categories. The first is those related to major upland crops, maize, soybean, cassava and rice, and the second is those related to vegetables, fruit and other commodities. In each group, policy measures are classified according to the marketing level, namely the production level, processing/marketing level and external trade. The Philippines, Thailand and Vietnam also provide some recommendations which should be considered in the general context of agricultural policy or economic policy.

Attempts have been made to identify the common policy recommendation from the seven countries. All seven country recommendations are first identified and grouped. Then all these were considered by the country experts and advisers to finalize the common recommendations. Then, a question legitimate was raised as to what agency was responsible? What should be the role of international agencies. Obviously, all the common recommendations can be implemented at the national level by governments, the private sector or jointly, as well as by joint efforts by relevant international agencies, while at the international level these can be carried out by joint efforts among multi-national institutions and concerned international agencies.

As for the question regarding the role of international research agencies, experience from implementing the study among the seven countries enables one to say that the role of the international research centre is very well recognized by all participating countries. The roles of these centres includes leadership, transfer of research technology and catalyst in fostering mutual understanding and sharing of information.

The list of common recommendations obtained from the aforementioned process is shown below. It should be pointed out that these common recommendations are not prioritized.

### **9.1 Common recommendations at the production level**

#### *Major upland crops*

- More investment in irrigation development.
- Strengthening of research and extension services.

#### *Vegetables and fruit*

- Strengthening of research and extension services.
- Improvement of quality seed and plant material supply.
- Promotion of large scale cultivation.
- Implementation of replantation programs.
- More support to development of agricultural cooperatives.
- Appropriate consideration to environmental/ecological issues.

## 9.2 Common recommendations at the processing and marketing level

### *Major upland crops*

- Improving market infrastructure.
- Technology development of post-harvest technology.
- Improving distribution systems of farm products.
- Strengthening linkages among marketing participants.
- Promoting investment in the processing industry.

### *Vegetables and fruit*

- Strengthening research and development on post-harvest technologies, marketing and product development.
- Establishing of linkages among marketing participants.
- Improving of marketing infrastructure: storage, transportation, port facility, central market, market information network, financial institutions etc.
- Establishment and proper implementation of product standardization systems, such as grading and packaging.
- Appropriate locating of processing facilities in production areas.

## 9.3 Common recommendations at the external trade level

### *Major upland crops*

- Proper deregulation.
- Simplifying of export procedures.
- Promoting of export.
- Strengthening of quality control and standardization.

### *Vegetables and fruit*

- Research and development on varieties suitable to export.
- Simplifying of export procedures.
- Export market diversification.
- Strengthening of export promotion efforts by both the private and public sectors.
- Strengthening of product standardization systems.
- Institutionalizing of plant pest and disease control and monitoring systems.

## 9.4 Suggested issues for future research

The following general issues were raised:

- More consideration to sustainability issues in major upland crop cultivation.
- Standardization of processed products of major upland crops.
- Marketing research in potential importing countries.

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CGPRT Centre  
Jalan Merdeka 145, Bogor 16111  
Indonesia  
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Printed in Indonesia

National Library: Cataloguing in Publication

Inoue, Sotaro

Integrated Report of The Project  
“Market Prospect of Upland Crop Products  
and Policy Analysis in Selected Asian Countries”/Sotaro Inoue  
Boonjit Titapiwatanakun -- Bogor: CGPRT Centre, 1997.  
xi, 60 pp. ; 25.5 cm. -- (Working paper series; No. 28)

ISBN 979-8059-80-8

I. Agricultural Products - Marketing  
II. Titapiwatanakun, Boonjit

I. Title

380.141

# Acknowledgements

First of all, we wish to express our deep gratitude to the seven national experts, Dr Cheng Guoqiang, Institute of Agricultural Economics, Chinese Academy of Agricultural Sciences; Dr Praduman Kumar, Indian Agricultural Research Institute; Dr Memed Gunawan, Director, Center for Investment Development and Environment Impact of Indonesia; Dr Muhammad Ramzan Akhtar, Social Sciences Institute, National Agricultural Research Center of Pakistan; Ms Josefina M. Lantican, Bureau of Agricultural Research, Department of Agriculture of the Philippines; Dr Kajonwan Itharattana, Office of Agricultural Economics, Ministry of Agriculture and Cooperatives of Thailand; Mr Dao Huy Chien, Root Crop Research Center, Vietnamese Agriculture Science Institute. Moreover, we are grateful to the governments of the seven participating countries for providing support to the project, in particular during our missions to these countries.

In the course of the project and preparing this integrated report, we relied upon the help of many people to whom we are indebted. First, we wish to express our sincerest thanks to Dr Haruo Inagaki, Director, CGPRT Centre, for continuously backing up our activities, and Dr Seiji Shindo, the former director of the CGPRT Centre. Mr Klaus Zambra worked for the project as an associate expert. Although he left the CGPRT Centre in the middle of project implementation, his contribution as a project member was very important. Many thanks to Mr Kunio Tsubota, Director, Research Information Division, Japan International Research Center for Agricultural Sciences, for assisting us in setting up this project. We have benefited from the support and guidance from Dr Kedi Suradisastra and Dr Mansur Lande, the present and former programme leaders of the Research and Development Programme, CGPRT Centre, as well as Dr J. W. Taco Bottema, Programme Leader of the Human Resources Development Programme. We express our thanks to Mr Douglas R. Stoltz for editing all the reports published under the project. Mr Deddy Subandi devoted many hours in front of computer to edit the drafts of the publications. Finally we wish to deeply thank Ms Rahajeng Pratiwi, the secretary of the project, for her earnest services and efficient work.

Sotaro Inoue, Project Expert  
Boonjit Titapiwatanakun, Regional Advisor

**Table 2.1 Overview of the socio-economic profiles.**

	Participating Countries							Other Countries		
	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam	Japan	Malaysia	Rep. of Korea
Population ('000, 1994)	1,190,918	913,600	189,907	126,284	66,188	58,718	72,500	124,782	19,498	44,563
Annual growth rate (% , 1985-1994)	1.4	2.0	1.6	2.8	2.1	1.6	2.1	0.4	2.5	1.0
GNP (million US \$, current price, 1994)	630,202	278,739	167,632	55,565	63,311	129,864	13,775	4,321,136	68,674	366,484
GNP per capita (US \$, current price, 1994)	530	310	880	440	960	2,210	190	34,630	3,520	8,220
Purchasing power parity (1994)	2,510	1,290	3,690	2,210	2,800	6,870	-	21,350	8,610	10,540
Real growth rate (% , 1985-1994)	6.9	2.9	6.0	1.6	1.8	8.2	-	3.2	5.7	7.8
Share of agriculture in GDP (% , 1994)	19	30	17	25	22	10	28	2	14	7
Illiteracy rate (% , 1990)	27	52	23	65	10	7	12	*	22	*
Life expectancy (year, 1993)	69	61	63	62	67	69	65	79	71	71
Child malnutrition (% underweight, 1985-1993)	24	63	46	40	33	13	42	-	21	-
Current account balance (US \$ million, 1991)	12,885	-3,477	-4,212	-2,171	-1,388	-7,609	N.A	84,740	-4,617	-8,553
Land area ('000 km <sup>2</sup> )	9,561	3,288	1,905	746	300	514	330	378	330	98
Arable land/capita (ha, 1992)	0.078	0.189	0.086	0.166	0.085	0.303	0.079	0.033	0.055	0.043

Source: (1) World Bank Atlas, 1996.

(2) The land area and arable land/capita are quoted from FAO Trade Book 1994.

**Table 3.2 Changes in cereal group consumption from the 1970s to the 1990s.**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
Item	food grains	total cereals	cereals	wheat + rice	cereals and cereals products	total cereals	rice and other cereals
Unit	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year
1971-1975		1972/73				1974-76	
year							
rural	n.a.	209.6	n.a.	n.a.	n.a.	n.a.	n.a.
urban	n.a.	138.3	n.a.	n.a.	n.a.	n.a.	n.a.
whole country	n.a.	195.3	n.a.	n.a.	n.a.	1,613.94	n.a.
1975-1980		1977/78		1979	1978	1979-81	
year	1978						
rural	247.8	192.6	n.a.	163.93	n.a.	n.a.	n.a.
urban	145.4	147.0	n.a.	127.08	n.a.	n.a.	n.a.
whole country	n.a.	182.5	n.a.	149.28	133.96	1,539.90	n.a.
1981-1985		1983		1985	1982	1982-84	
year	1985						
rural	257.5	180.1	n.a.	155.16	n.a.	n.a.	n.a.
urban	134.8	137.4	n.a.	117.24	n.a.	n.a.	n.a.
whole country	n.a.	169.4	n.a.	143.88	129.94	1,419.90	n.a.
1986-1990		1988/89	1987	1987	1987	1986-88	1987-89
Year	1989						
rural	262.0	177.1	1,295.07	154.20	n.a.	n.a.	168.19
urban	133.9	134.5	1,105.71	117.24	n.a.	n.a.	158.96
whole country		166.4	1,245.03	142.56	125.93	1,399.11	n.a.
1991-1995			1993	1993	1993		1992/93
year	1993						
rural	266.0	n.a.	1,278.42	150.00	131.77	n.a.	173.82
urban	97.8	n.a.	1,073.54	117.12	116.07	n.a.	141.09
whole country	n.a.	154	1,210.42	140.64	124.10	n.a.	n.a.

Note: n.a.: not available

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.



**Table 3.3 Changes in meat consumption from the 1970s to the 1990s.**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
Item	meat	meat, fish and eggs	meat	mutton, beef and chicken	meat and meat products, and poultry	meat and offal	meat
Unit	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year
1971-1975						1974-76	
year							
rural	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
urban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	n.a.	n.a.	66.94	n.a.
1975-1980							
year	1978	1977		1979	1978	1979-81	
rural	6.1	2.7	n.a.	5.52	n.a.	n.a.	n.a.
urban	20.5	4.8	n.a.	10.20	n.a.	n.a.	n.a.
whole country	n.a.	3.3	n.a.	7.44	10.95	85.98	n.a.
1981-1985							
year	1985			1985	1982	1982-84	
rural	11.90	n.a.	n.a.	6.00	n.a.	n.a.	n.a.
urban	21.90	n.a.	n.a.	10.68	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	7.32	15.33	78.95	n.a.
1986-1990							
year	1989	1988/89	1987	1987	1987	1986-88	1987-89
rural	12.4	3.3	12.88	6.48	n.a.	n.a.	5.00
urban	24.0	4.9	31.89	9.96	n.a.	n.a.	17.99
whole country	n.a.	4.5	17.91	7.56	16.79	n.a.	n.a.
1991-1995							
year	1993		1993	1993	1993		1992/93
rural	13.3	n.a.	15.29	6.48	11.68	n.a.	8.33
urban	24.5	n.a.	32.25	9.48	23.00	n.a.	14.75
whole country	n.a.	n.a.	20.91	7.32	17.52	n.a.	n.a.

Notes: n.a.: not available

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

**Table 3.4 Changes in dairy product consumption from the 1970s to the 1990s.**

Item	China not available	India milk or milk products	Indonesia eggs and milk	Pakistan milk (fresh and boiled)	Philippines milk and milk products	Thailand milk and milk products	Vietnam eggs and milk
Unit	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year
1971-1975							
year						1974-76	
rural	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
urban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	n.a.	n.a.	7.03	n.a.
1975-1980							
year		1977		1979	1978	1979-81	
rural	n.a.	24.6	n.a.	64.32	n.a.	n.a.	n.a.
urban	n.a.	39.7	n.a.	50.76	n.a.	n.a.	n.a.
whole country	n.a.	27.3	n.a.	59.04	15.33	9.09	n.a.
1981-1985							
year				1985	1982	1982-84	
rural	n.a.	n.a.	n.a.	76.44	n.a.	n.a.	n.a.
urban	n.a.	n.a.	n.a.	62.40	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	72.24	16.06	10.91	n.a.
1986-1990							
year		1987	1987	1987	1987	1986-88	1987-89
rural	n.a.	58.0	15.56	79.68	n.a.	n.a.	0.51
urban	n.a.	64.9	41.21	65.88	n.a.	n.a.	3.50
whole country	n.a.	59.8	22.35	75.36	15.70	n.a.	n.a.
1991-1995							
year			1993	1993	1993		1992/93
rural	n.a.	n.a.	18.00	93.96	8.76	n.a.	0.07
urban	n.a.	n.a.	47.49	70.08	23.36	n.a.	0.07
whole country	n.a.	n.a.	27.79	87.28	16.06	n.a.	n.a.

Notes: n.a.: not available

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

**Table 3.5 Changes in vegetable consumption from the 1980s to the 1990s.**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
Item	vegetables	vegetables	vegetables	vegetables	vegetables	fruits and vegetables	vegetables
Unit	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year
1971-1975							
year						1974-76	
rural	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
urban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	n.a.	n.a.	113.00	n.a.
1975-1980							
year	1978	1977		1979	1978	1979-81	
rural	142.0	24.7	n.a.	29.88	n.a.	n.a.	n.a.
urban	152.3	39.7	n.a.	34.32	n.a.	n.a.	n.a.
whole country	n.a.	28.3	n.a.	31.80	52.93	133.04	n.a.
1981-1985							
year	1985			1985	1982	1982-84	
rural	131.1	n.a.	n.a.	34.44	n.a.	n.a.	n.a.
urban	144.4	n.a.	n.a.	42.48	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	36.60	47.45	153.95	n.a.
1986-1990							
year	1989	1987	1987	1987	1987	1986-88	1987-89
rural	133.0	50.8	41.29	37.08	n.a.	n.a.	71.61
urban	144.6	66.4	37.60	43.92	n.a.	n.a.	54.86
whole country	n.a.	54.9	40.33	39.24	40.52	135.91	
1991-1995							
year	1993		1993	1993	1993		1992/93
rural	107.4	n.a.	39.49	64.20	41.25	n.a.	27.66
urban	120.6	n.a.	34.30	68.40	35.77	n.a.	32.51
whole country	n.a.	n.a.	37.75	65.40	38.69	n.a.	n.a.

Notes: n.a.: not available

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

**Table 3.6 Changes in fruit consumption from the 1970s to the 1990s.**

	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam
Item	not available	fruits	fruits	fruits	fruits	fruits and vegetables	fruits
Unit	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year	kg/capita/year	kcal/capita/day	kg/capita/year
1971-1975							
year						1974-76	
rural	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
urban	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	n.a.	n.a.	113.00	n.a.
1975-1980							
year		1977		1979	1978	1979-81	
rural	n.a.	2.6	n.a.	5.88	n.a.	n.a.	n.a.
urban	n.a.	5.9	n.a.	11.04	n.a.	n.a.	n.a.
whole country	n.a.	3.4	n.a.	7.80	37.96	133.04	n.a.
1981-1985							
year				1985	1982	1982-84	
rural	n.a.	n.a.	n.a.	8.40	n.a.	n.a.	n.a.
urban	n.a.	n.a.	n.a.	14.52	n.a.	n.a.	n.a.
whole country	n.a.	n.a.	n.a.	10.08	37.23	153.95	n.a.
1986-1990							
year		1987	1987	1987	1987	1986-88	1987-89
rural	n.a.	10.3	40.25	11.44	n.a.	n.a.	0.44
urban	n.a.	18.8	37.45	17.28	n.a.	n.a.	3.72
whole country	n.a.	12.5	39.49	13.32	39.06	135.91	n.a.
1991-1995							
year			1993	1993	1993		1992/93
rural	n.a.	n.a.	39.30	13.68	26.65	n.a.	16.66
urban	n.a.	n.a.	34.93	20.40	29.93	n.a.	46.25
whole country	n.a.	n.a.	37.83	15.72	28.12	n.a.	n.a.

Notes: n.a.: not available

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

Chapter 3

Table 3.7 Food consumption by income group.

	China		India		Indonesia		Pakistan	Philippines
Unit	kg/capita/year		kg/capita/year		kcal/capita/day		kg/capita/year	kg/capita/year
Year	1991		1987		1993		1993	1993
Cereal group	food grains		cereals		cereals		cereals	cereals and cereal product
	Rural	Urban	Rural	Urban	Rural	Urban		
Group I	257.85	122.32	144.5	120.5	1,148.57	1,073.44	141.00	125.20
Group II	258.36	128.59	169.2	135.7	1,346.67	1,099.44	139.32	127.02
Group III	259.01	133.54	183.5	141.2	1,387.99	1,078.29	139.80	121.18
Group IV	260.00	151.31	206.5	147.2	1,326.20	1,034.88	145.85	122.64
Meat group	meat		meat, fish and eggs		meat		meat & fish and chicken	meat & meat products and poultry
	Rural	Urban	Rural	Urban	Rural	Urban		
Group I	11.69	19.13	1.4	2.8	2.80	2.59	6.09	7.30
Group II	11.87	22.11	2.3	3.6	15.72	11.59	6.28	13.14
Group III	11.86	26.70	3.1	4.3	44.40	38.64	9.96	18.25
Group IV	14.50	30.10	5.4	7.3	80.15	73.55	14.40	32.12
Dairy product	milk		milk and milk products		eggs and milk		milk (fresh)	milk and milk product
			Rural	Urban	Rural	Urban		
Group I	na		10.2	15.6	5.39	7.20	76.49	5.48
Group II	na		22.3	32.0	17.90	23.20	84.84	10.95
Group III	na		44.0	38.4	49.18	59.15	95.53	17.52
Group IV	na		130.0	116.7	94.48	96.17	116.17	32.12
Vegetable	vegetables		vegetables		vegetables		vegetables	vegetables
	Rural	Urban	Rural	Urban	Rural	Urban		
Group I	125.52	105.97	33.3	35.4	33.89	22.88	59.80	37.60
Group II	129.47	108.32	41.4	48.2	40.98	30.53	66.60	37.96
Group III	135.80	118.62	50.4	65.3	49.64	36.64	62.36	37.96
Group IV	140.86	134.92	70.0	94.3	52.89	41.93	87.48	41.25
Fruit	fruits		fruits		fruits		fruits	fruits
			Rural	Urban	Rural	Urban		
Group I	na		3.0	5.0	25.50	13.37	10.90	23.36
Group II	na		5.2	9.0	42.87	24.92	14.45	23.00
Group III	na		8.7	14.9	65.79	38.23	21.31	27.38
Group IV	na		20.5	35.8	82.83	58.25	27.16	40.15
Note:	Income grouping is as follows :		Income grouping is as follows :		The monthly per capita expenditure of each group is as follows:		Income grouping is as follows :	The mean per capita income of each group is as follows:
	I	Lowest	I	Very poor	I	Rp 15,000 - 20,000	I	< Rs 2,500
	II	Low	II	Poor	II	Rp 30,000 - 40,000	II	Rs 2,501 to 4,000
	III	Medium	III	Non-poor	III	Rp 60,000 - 80,000	III	Rs 4,001 to 7,000
	IV	High	IV	Rich	IV	Rp 100,000 - 150,000	IV	Rs 7,001 and above
								IV 25,127.56 Pesos

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

**Table 4.1 Production (1994), yield and international trade (1993) of maize, soybean, cassava and rice.**

	World total	China	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam	Japan	Malaysia	Rep. of Korea	Total of the seven project countries	Total of ten countries
<b>Maize</b>													
Production	569,557	103,550	10,500	6,617	1,288	5,400	3,800	950	0	40	75	132,105 (23%)	132,220
Imports	68,721.7	5,466.3	0	494.5	0.9	0.6	9.3	0.6	16,862.7	1,796.9	6,207.1	5,972.2	30,838.9
Exports	68,630.6	11,097.6	12	60.8	0	0	212.9	70	0	4	0	11,453.3	11,457.3
Yield	4,330	5,033	1,750	2,177	1,450	1,722	3,167	1,792	2,485	1,905	4,167	-	-
<b>Soybean</b>													
Production	136,725	16,329	3,300	1,556	3	5	500	80	99	0	160	21,773 (16%)	22,032
Imports	28,166.86	2,534.33	0	723.86	0	61.57	44.69	0	5,031.15	494.94	1,088	3,364.45	9,978.54
Exports	28,727.72	373.19	0	0.75	0	0	0.47	4.2	0.06	16.7	0.01	378.61	395.38
Yield	2,182	1,589	835	1,051	559	1,184	1,429	825	1,622	333	1,481	-	-
<b>Cassava</b>													
Production	152,473	3,503	5,340	15,000	0	1,850	19,091	2,631	0	442	0	47,415 (31%)	47,857
Imports	29,903	2,187	0	468	5	128	0	0	1,035	186	2,747	2,788	6,756
Exports	30,534	960	80	3,600	0	291	24,798	86	0	13	0	29,815	29,828
Yield	9,639	15,197	22,773	11,587	na	8,726	13,807	9,230	na	10,442	na	-	-
<b>Rice</b>													
Production	534,701	178,251	118,400	46,245	5,269	10,150	18,447	22,500	14,976	2,040	7,056	399,262 (75%)	423,334
Imports	15,362.02	99.75	108	24.32	0.32	201.61	0	0.75	107.86	389.19	0.89	434.75	932.69
Exports	16,332.1	1,506.99	628	350.61	1,032.13	0	4,989.22	1,764.5	0.05	0	1.44	10,271.45	10,272.94
Yield	3,651	5,869	2,817	4,344	2,501	3,030	2,175	3,462	6,770	3,068	6,780	-	-

Source: FAO Year Book, Production, Vol. 48, 1994; FAO Year Book, Trade, Vol. 47, 1993.

Note: \*The export and import data for cassava are based on FAO Balance Sheets for 1994.

\* Percentage in the parenthesis under production of the seven countries is the share in the world production.

\* Units: production, imports and exports in '000 tons; yield in kg/ha.

**Table 5.1 Domestic demand composition: maize, soybean, cassava and rice (million tons).**

	China		India		Indonesia		Pakistan		Philippines		Thailand		Vietnam	
<b>Maize</b>														
Demand composition														
year	1994		1992		1995		1994/1995		1989-1993		1994		1996	
		(%)		(%)		(%)		(%)		(%)		(%)		(%)
Total demand	99.280	100.0	9.076	100.0	8.093	100.0	1.243	100.0	5.406	100.0	3.708	100.0	1.130	100.0
1. Direct human consumption	20.000	20.0	7.168	79.0	1.098	13.6	0.817	66.7	0.975	18.0	n.a	-	1.112* <sub>21</sub>	98.4
2. Feed	65.000	64.0	0.173	1.9	n.a	-	0.366* <sup>10</sup>	29.4	3.900	72.1	3.679* <sup>16</sup>	99.2	n.a	-
3. Industrial use	14.280* <sup>1</sup>	16.0	1.735* <sup>3</sup>	19.1	6.995* <sup>7</sup>	86.4	n.a	-	0.460	8.5	n.a	-	n.a	-
4. Seed and wastage	n.a	-	n.a	-	n.a	-	0.060	4.8	0.071	1.3	0.029	0.8	0.017	1.5
<b>Soybean</b>														
Demand composition														
year	1992		1992		1995		1996/1997		1989-1993		1996		1996	
		(%)		(%)		(%)		(%)		(%)		(%)		(%)
Total demand	9.510	100.0	1.229	100.0	2.462	100.0	0.102	100.0	0.052	100.0	1.459	100.0	0.177	100.0
1. Direct human consumption	4.950	52.1	0.644* <sub>4</sub>	52.4	0.020	0.8	n.a	-	n.a	-	0.114	7.8	0.173* <sub>22</sub>	97.7
2. Soybean meal	3.120	32.8	0.227	18.5	n.a	-	0.100* <sup>11</sup>	98.0	0.001* <sup>14</sup>	1.9	1.209	82.9	n.a	-
3. Soybean oil	0.640	6.7	0.358	29.1	2.442* <sup>8</sup>	99.2	0.001	1.0	0.048* <sup>15</sup>	92.3	0.096	6.6	n.a	-
4. Seed and wastage	0.800	8.4	n.a	-	n.a	-	0.001* <sup>12</sup>	1.0	0.003	5.8	0.040	2.7	0.004	2.3
<b>Cassava</b>														
Demand composition														
year	1992		1992		1995		1989-1993		1993		1996		1996	
		(%)		(%)		(%)		(%)		(%)		(%)		(%)
Total demand	n.a	n.a	5.322	100.0	14.945	100.0	n.a	n.a	1.816	100.0	3.019	100.0	2.344	100.0
1. Direct human consumption	n.a	n.a	2.132	40.1	3.475	25.1	n.a	n.a	0.288	15.9	0.694* <sup>17</sup>	23.0	n.a	-
2. Feed	n.a	n.a	0.484	9.1	n.a	-	n.a	n.a	0.109	6.0	n.a	-	n.a	-
3. Industrial use	n.a	n.a	2.343	44.0	11.200* <sup>9</sup>	74.9	n.a	n.a	1.419	78.1	2.325	77.0	n.a	-
4. Wastage	n.a	n.a	0.363	6.8	n.a	-	n.a	n.a	n.a	-	n.a	-	n.a	-
<b>Rice</b>														
Demand composition														
year	1993		1992		1996		1996		1996		1996		1996	
		(%)		(%)		(%)		(%)		(%)		(%)		(%)
Total demand	179.900	100.0	73.266	100.0	n.a	n.a	2.412	100.0	n.a	n.a	14.332	100.0	22.926	100.0
1. Direct human consumption	143.000	79.5	63.537	86.7	n.a	n.a	2.267	94.0	n.a	n.a	13.725* <sup>18</sup>	95.8	22.092* <sup>23</sup>	96.4
2. Feed	20.000	11.1	0.352	0.5	n.a	n.a	n.a	-	n.a	n.a	n.a	-	n.a	-
3. Industrial use	n.a	-	n.a	-	n.a	n.a	0.145* <sup>13</sup>	6.0	n.a	n.a	n.a	-	n.a	-
4. Seed and wastage	16.900* <sup>2</sup>	9.4	9.377* <sup>5</sup>	12.8	n.a	n.a	n.a	-	n.a	n.a	0.607* <sup>19</sup>	4.2	0.834	3.6

Source: Kumar 1996; Itharattana 1996; Lantican 1997; Akhtar 1997; Guoqiang 1997; Gunawan 1997; Chien 1997.

n.a.: not available

Note: 1) Including seed and wastage. 2) Including other uses. 3) Including seed and wastage. 4) Including seed and wastage. 5) Including other uses. 6) Figures of Indonesia are projections. 7), 8) and 9) All the demand except for direct human consumption. 10) Including industrial use. 11) Soybean meal and imported soybean meal. 12) Seed plus wastage. 13) Other uses. 14) Feed. 15) Processing. 16) Demand from the feed industry. 17) Household consumption. 18) Rice and rice products. 19) Seed. 20) Figures of Vietnam are projections. 21) Maize and maize products. 22) Soybean and soybean products. 23) Rice and rice products.

*Domestic Demand Composition and Projections for Major Upland Crops*

**Table 5.2 Domestic demand projection for the year 2000: maize, soybean, cassava and rice in million tons.**

	China		India		Indonesia		Pakistan		Philippines		Thailand		Vietnam		Total
<b>Maize</b>															
Applied approach	demand growth rate approach		demand growth rate approach		demand growth rate approach		time trend approach		time trend approach		demand growth rate approach		time trend approach		
Compound annual growth rate from the base year to 2000 (%)	6.7		1.4		2.6		2.6		1.4		0.4		7.9		
Total demand	146.26	100.0	10.142	100.0	9.192	100.0	1.414	100.0	5.975	100.0	3.799	100.0	1.534	100.0	178.316
1. Direct human consumption	19.040	13.0	7.998	78.9	1.175	12.8	0.841	59.5	1.202	20.1	n.a	-	1.513* <sup>19</sup>	98.6	
2. Feed	103.820	71.0	0.205	2.0	n.a	-	0.508* <sup>9</sup>	35.9	4.081	68.3	3.769* <sup>15</sup>	99.2	n.a	-	
3. Industrial use	23.400*	16.0	1.939* <sup>3</sup>	19.1	8.017* <sup>6</sup>	87.2	n.a	-	0.616	10.3	n.a	-	n.a	-	
4. Seed and wastage	n.a	-	n.a	-	n.a	-	0.065	4.6	0.076	1.3	0.030	0.8	0.021	1.37	
<b>Soybean</b>															
Applied approach	demand growth rate approach		demand growth rate approach		demand growth rate approach		time trend approach		time trend approach		demand growth rate approach		time trend approach		
Compound annual growth rate from the base year to 2000 (%)	6.7		4.7		2.0		7.1		14.4		6.8		10.2		
Total demand	16.02	100.0	1.771	100.0	2.721	100.0	0.123	100.0	0.133	100.0	1.897	100.0	0.261	100.0	22.926
1. Direct human consumption	6.570	41.0	0.914* <sup>4</sup>	51.6	0.021	0.8	n.a	-	n.a	-	0.127	6.7	0.256* <sup>20</sup>	98.1	
2. Soybean meal	6.900	43.1	0.348	19.6	n.a	-	0.121* <sup>10</sup>	98.4	0.029* <sup>13</sup>	21.8	1.607	84.7	n.a	-	
3. Soybean oil	1.250	7.8	0.509	28.7	2.700* <sup>7</sup>	99.2	0.001	0.8	0.101* <sup>14</sup>	75.9	0.122	6.4	n.a	-	
4. Seed and wastage	1.300	8.1	n.a	-	n.a	-	0.001* <sup>11</sup>	0.8	0.003	2.3	0.041	2.2	0.005	1.9	
<b>Cassava</b>															
Applied approach	not included		demand growth rate approach		demand growth rate approach		not included		time trend approach		demand growth rate approach		time trend approach		
Compound annual growth rate from the base year to 2000 (%)	-		0.2		2.4		-		1.6		4.5		-1.3		
Total demand	-	-	5.402	100.0	16.821	100.0	-	-	2.035	100.0	4.105	100.0	2.221	100.0	30.584
1. Direct human consumption	-	-	2.379	44.0	4.030	24.8	-	-	0.466	22.9	0.789* <sup>16</sup>	19.2	n.a	-	
2. Feed	-	-	0.464	8.6	n.a	-	-	-	0.056	2.8	n.a	-	n.a	-	
3. Industrial use	-	-	2.191	40.6	12.251* <sup>8</sup>	75.2	-	-	1.513	74.3	3.316	80.8	n.a	-	
4. Wastage	-	-	0.368	6.8	n.a	-	-	-	n.a	-	n.a	-	n.a	-	
<b>Rice</b>															
Applied approach	demand growth rate approach		demand growth rate approach		not included		demand growth rate approach		not included		demand growth rate approach		time trend approach		
Compound annual growth rate from the base year to 2000 (%)	0.7		2.4		-		6.2		-		-0.0		4.1		
Total demand	189.040	100.0	88.847	100.0	-	-	3.065	100.0	-	-	14.328	100.0	26.946	100.0	322.226
1. Direct human consumption	145.32	76.9	76.977	86.6	-	-	2.881	94.0	-	-	13.732* <sup>17</sup>	95.8	26.045* <sup>21</sup>	96.7	
2. Feed	25.950	13.7	0.498	0.6	-	-	n.a	-	-	-	n.a	-	n.a	-	
3. Industrial use	n.a	-	n.a	-	-	-	0.184* <sup>12</sup>	6.0	-	-	n.a	-	n.a	-	
4. Seed and wastage	17.770* <sup>2</sup>	9.4	11.372* <sup>5</sup>	12.8	-	-	n.a	-	-	-	0.596* <sup>17</sup>	4.2	0.901	3.3	

Source: each country report.

n.a: not available

Note: 1) Including seed and wastage. 2) Including other uses. 3) Including seed and wastage. 4) Including seed and wastage. 5) Including other uses. 6), 7) and 8) All the demand except for direct human consumption. 9) Including industrial use. 10) Soybean meal and imported soybean meal. 11) Seed plus wastage. 12) Other uses. 13) Feed. 14) Processing. 15) Demand from the feed industry. 16) Household consumption. 17) Rice and rice products. 18) Seed. 19) Maize and maize products. 20) Soybean and soybean products. 21) Rice and rice products.



**Table 9.1 Policy implications and recommendations derived from the seven country reports.**

	Major upland crops: maize, soybean, cassava, rice and potato and sweet potato	Vegetables and other products
<b>China</b>		
Production	<ul style="list-style-type: none"> <li>• increase irrigation investment</li> <li>• increase research and extension</li> </ul>	<ul style="list-style-type: none"> <li>• plan production and stabilize cultivation area of cotton</li> <li>• improve cotton yield</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• improve research and extension for processing</li> <li>• promotion for feed industry</li> <li>• increase infrastructure investment</li> <li>• improve research and extension</li> <li>• reform food distribution system</li> <li>• stop regional agricultural protectionism</li> <li>• improve marketing system</li> </ul>	<ul style="list-style-type: none"> <li>• technically improve for processing and fresh preservation</li> <li>• construct markets</li> <li>• strengthen marketing system</li> <li>• establish market information network</li> <li>• utilize advanced communication media</li> <li>• improve storage and transportation facilities for post-harvest loss reduction</li> <li>• strengthen administration of quality control and monitoring</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• increase livestock product import</li> </ul>	<ul style="list-style-type: none"> <li>• improve packing</li> </ul>
<b>India</b>		
Production	<ul style="list-style-type: none"> <li>• develop irrigation for maize in dry land</li> <li>• increase research and extension</li> </ul>	<ul style="list-style-type: none"> <li>• plan development of horticulture</li> <li>• induce large scale cultivation</li> <li>• improve cultural and intensive management practices</li> <li>• rejuvenate orchards</li> <li>• promote off-season vegetables</li> <li>• improve rate of multiplication and distribution of good quality seeds and planting materials</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• strengthen linkages among production, processing and exports</li> </ul>	<ul style="list-style-type: none"> <li>• stimulate direct contract between farmers and processing factories</li> <li>• facilitate development of processing centers in production areas</li> <li>• ensure adequate marketing support: cheap and efficient transportation and storage facilities</li> <li>• increase availability of institutional credit</li> <li>• actively involve cooperatives</li> <li>• establish special facilities and quick handling for perishable fresh produce</li> <li>• package properly</li> <li>• reduce post-harvest losses by various measures</li> <li>• grade and sort at the production site to avoid possible damage by repeated handling</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• abolish export quotas and minimum export prices</li> </ul>	<ul style="list-style-type: none"> <li>• support research and development to develop varieties suitable for the export market and processing</li> <li>• support proper branding</li> <li>• expand the export mix</li> <li>• diversify the export markets to the European and the ASEAN markets</li> <li>• strengthen the export promotion effort by the private sector</li> </ul>

**Table 9.1 Policy implications and recommendations derived from the seven country reports (continued).**

	Major upland crops: maize, soybean, cassava, rice and potato and sweet potato	Vegetables and other products
<b>Indonesia</b>		
Production	<ul style="list-style-type: none"> <li>• support production promotion</li> <li>• increase yield augmentation by government investment for improving seed quality and cultivation methods</li> </ul>	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• support processing techniques</li> <li>• create mutually beneficial and long term relationships between farmers as raw material producers and processing factories</li> <li>• improve market structure, especially facilitating direct transactions between farmers and processing industries</li> <li>• encourage competitive marketing and good contract system</li> </ul>	<ul style="list-style-type: none"> <li>• improve economic incentives to farmers</li> <li>• strengthen linkages between farmers and processing and marketing companies</li> <li>• promote strong vertical coordination</li> <li>• eliminate long marketing channels and domination of particular market participants</li> <li>• consistently implement penalty and reward system for quality improvement</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>
<b>Pakistan</b>		
Production	<ul style="list-style-type: none"> <li>• increase the productivity through greater investment in infrastructure, research, development and extension</li> <li>• increase investment to improve the maize yield</li> <li>• provide improved seed of export quality potato</li> </ul>	<ul style="list-style-type: none"> <li>• increase productivity through greater investment in infrastructure, research, development and extension</li> <li>• provide of high quality seed and planting material</li> <li>• support strong extension services to promote post-harvest technology</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• widely promote soybean planting</li> <li>• strengthen the linkages between production, procurement and processing</li> <li>• more involve private sector for soybean</li> <li>• improve potato yield estimation</li> <li>• increase private investment for infrastructure facilities</li> <li>• improve milling technology for rice quality improvement</li> <li>• provide of proper post-harvest technology</li> </ul>	<ul style="list-style-type: none"> <li>• support market oriented research, especially on increasing shelf life</li> <li>• support cost effective technology and storage management</li> <li>• develop wholesale market infrastructure</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• simplify rice export procedure</li> <li>• support exhibitions and fairs abroad by the Export Promotion Bureau and involvement of growers</li> </ul>	<ul style="list-style-type: none"> <li>• promote export efforts</li> <li>• support grow-for-export policy</li> <li>• support government back-up for private exporters</li> <li>• support one window export zone</li> <li>• improve grading, packing and procurement system</li> <li>• improve airport and seaport facilities</li> <li>• support appropriate measures to maintain the quality of the produce such as cold storage and refrigerated ships</li> <li>• establish agricultural export commodity zones</li> <li>• support exhibitions and fairs abroad by the Export Promotion Bureau and involvement of growers</li> <li>• provide of financial incentive by government to exporters</li> </ul>

**Table 9.1 Policy implications and recommendations derived from the seven country reports (continued).**

	Major upland crops: maize, soybean, cassava, rice and potato and sweet potato	Vegetables and other products
<b>Philippines</b>		
Production	<ul style="list-style-type: none"> <li>• increase productivity</li> </ul>	<ul style="list-style-type: none"> <li>• increase productivity</li> <li>• support the development of agricultural cooperatives</li> <li>• provide more monetary support to research and development</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• improve market information system</li> </ul>	<ul style="list-style-type: none"> <li>• increase vapor heat treatment facilities and locating them in strategic places</li> <li>• improve marketing system</li> <li>• operate port facilities efficiently</li> <li>• improve telecommunication facilities</li> <li>• support the development of agricultural cooperatives</li> <li>• provide more monetary support to market information</li> <li>• ensure more public investment in transportation infrastructure</li> <li>• allocate sufficient amount of sugar for domestic use</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>	<ul style="list-style-type: none"> <li>• institute constant pest monitoring</li> <li>• increase research on the control of plant pests and diseases</li> <li>• review tariff restrictions on the import of input components such as sugar and packaging materials</li> <li>• provide more monetary support to trade promotion</li> </ul>
General recommendations	<ul style="list-style-type: none"> <li>• reform monetary and fiscal system</li> <li>• correct the distortion of the value added tax law</li> <li>• stabilize the foreign exchange rate and reverse the peso appreciation</li> <li>• increase public investment in transportation infrastructure: farm to market roads and port facilities</li> </ul>	
<b>Thailand</b>		
Production	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>	<ul style="list-style-type: none"> <li>• promote of investment in processing</li> <li>• increase quality control and standardization</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• improve quality control and standardization</li> </ul>	<ul style="list-style-type: none"> <li>• diversify export commodity mix by technological breakthroughs</li> <li>• adopt appropriate technology</li> <li>• support effective marketing campaigns</li> </ul>
General recommendation	<ul style="list-style-type: none"> <li>• undertake a detailed study to formulate production and marketing plans</li> </ul>	

**Table 9.1 Policy implications and recommendations derived from the seven country reports (continued).**

	Major upland crops: maize, soybean, cassava, rice and potato and sweet potato	Vegetables and other products
<b>Vietnam</b>		
Production	<ul style="list-style-type: none"> <li>• increase production of maize and soybean to meet the growing demand from the feed industry</li> <li>• establish seed potato supply system</li> <li>• develop a sweet potato variety suitable for processing</li> </ul>	<ul style="list-style-type: none"> <li>• improve orange quality by varietal development and improved orange extension</li> <li>• consider environment in coffee development</li> <li>• invest more for varietal development of groundnut</li> </ul>
Processing/marketing	<ul style="list-style-type: none"> <li>• invest more in the rice processing</li> <li>• invest in the cassava processing industry in the North</li> </ul>	<ul style="list-style-type: none"> <li>• invest more in the refined coffee processing</li> <li>• increase investment in tomato processing and marketing</li> <li>• investigate the sugar and sugar cane market more</li> </ul>
External trade	<ul style="list-style-type: none"> <li>• (not mentioned)</li> </ul>	<ul style="list-style-type: none"> <li>• develop a suitable policy for cashew development</li> </ul>
General recommendations	<ul style="list-style-type: none"> <li>• increase investment in the processing and marketing of upland crop products</li> </ul>	

- Working Paper No. 17 *CGPRT Crops in Pakistan: A Statistical Profile*  
by Naseer Alam Khan, Anver Javed and Sultan Ali Tariq
- Working Paper No. 18 *CGPRT Crops in Indonesia: A Statistical Profile*  
by Muhamad Arif, Hasrat Madiadipura and Harry Zulfikar
- Working Paper No. 19 *Gender Issues in Upland Agriculture*  
by Nico L. Kana
- Working Paper No. 20 *Market Prospects for Upland Crops in India*  
by Praduman Kumar
- Working Paper No. 21 *Market Prospects for Upland Crops in Thailand*  
by Kajonwan Itharattana
- Working Paper No. 22 *Market Prospects for Upland Crops in the Philippines*  
by Josefina M. Lantican
- Working Paper No. 23 *Market Prospects for Upland Crops in Pakistan*  
by Muhammad Ramzan Akhtar
- Working Paper No. 24 *Market Prospects for Upland Crops in China*  
by Cheng Guoqiang
- Working Paper No. 25 *Market Prospects for Upland Crops in Indonesia*  
by Memed Gunawan
- Working Paper No. 26 *Market Prospects for Upland Crops in Vietnam*  
by Dao Huy Chien
- Working Paper No. 27 *Market Prospects for Pulses in South Asia: International and Domestic Trade*  
by Hla Kyi, Mruthyunjaya, Naseer Alam Khan, Rupasena Liyanapathirana and J.W.T. Bottema

This series is published by the CGPRT Centre, Bogor. The series contains research papers, statistical profiles and bibliographies. Editor for the series is J.W. Taco Bottema, Agricultural Economist. For further information, please contact:

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Publication Section  
CGPRT Centre  
Jl. Merdeka 145  
Bogor 16111  
Indonesia

**CGPRT CENTRE**  
**Publication Section**

Editor: Douglas R. Stoltz

Production: Deddy Subandi M.  
S. Tayanih (Yayan)

Distribution: Fetty Prihastini/Deddy Subandi M.

Printer: SMT. Grafika Desa Putera

ISBN 979-8059-80-8

