

**COMPETITIVENESS OF FOOD PROCESSING IN
VIETNAM: A STUDY OF THE RICE, COFFEE, SEAFOOD,
AND FRUIT AND VEGETABLES SUBSECTORS**

—Appendix I of the Industrial Competitiveness Review—

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1. INTRODUCTION

This report examines the competitiveness of the food processing sector in Viet Nam, focusing on four subsectors: rice milling, coffee processing, seafood processing, and fruits and vegetables. The rationale for the study is that Viet Nam, as a member of the Association of South East Asian Nations (ASEAN), is obliged to follow the trade liberalization schedule defined by the ASEAN Free Trade Agreement (AFTA). Under this agreement, Viet Nam will have to reduce the import tariffs on almost all goods imported from ASEAN members to less than 5 percent by 2003. An important question for the government is how trade liberalization is likely to affect the food processing sector and what steps can be taken to make the transition a successful one.

This chapter provides an overview of the food processing sector in general and a brief outline of its size and structure in Viet Nam. Chapters 2 through 5 examine each of the four selected subsectors. In each chapter, production, marketing, processing, domestic demand, and export demand are described. There is also a discussion of the prospects and main policy issues for the sector. Chapter 6 provides the conclusions of the study, including recommendations for the sector as well as for the four selected subsectors.

1.1. International Patterns In Food Processing

Food processing can be defined as the transformation of agricultural commodities as part of their preparation for human consumption. This definition encompasses relatively simple activities such as cleaning, grading, and storage as well as more involved transformations such as milling, canning, and freezing.

The food processing sector is best understood as one link in the marketing channel between the farmer (or fisherman) and the ultimate consumer. On the one hand, the characteristics of the raw material have a strong influence on the way the food processing sector is organized. For example, the processing of goods that are bulky but highly perishable, such as sugarcane, normally takes place close to the producing areas. On the other hand, changes in the food processing sector are often driven by shifts in consumer preferences. For example, rising incomes tend to increase the demand for convenience foods and hence for food processing.

1.1.1. Role of food processing in development

Food processing plays an important role in economic development. Food processing can provide new outlets for agricultural output, raising the income of farmers, who tend to be poorer than the non-farmers. This sector is sometimes involved in providing credit, seed, and technical assistance to producers in order to obtain a higher-value crop. Furthermore, food processing generates employment, more so than many other manufacturing sectors because it is relatively labor-intensive. Furthermore, since food processing plants are often located in rural areas, they create jobs for rural households, where poverty is often concentrated. Finally, the food processing sector can play a role in improving nutrition through fortification and the supply of foods with longer shelf-life (Austin, 1996).

On the other hand, food processing should not be seen as a panacea. Food processors may prefer to purchase raw materials from larger, well-endowed farmers rather than the poorest farmers. The employment created by the food processing sector is usually relatively low-paying, at least compared to other manufacturing sectors. And processed foods are usually more important in the consumption patterns of high income than low-income households. Nonetheless, a healthy and dynamic food processing sector is an important component in the process of economic development and industrialization.

1.1.2. Distinctive characteristics of food processing

Food processing differs from other manufacturing sectors in several important respects, mainly related to the raw material. First, the supply of the raw material for food processing is often highly seasonal. For larger capital-intensive food processing activities, this creates a strong incentive to store the commodity for off-season processing when possible. When storage is not possible, food processors often attempt to stagger production to reduce its seasonality. Alternatively, food processors may seek other commodities to process in the off-season. In spite of these strategies, food processing plants are sometimes idle during part of the year. Thus, excess capacity is not necessarily a sign of poor management, although it does raise the unit processing costs.

Second, the supply of the raw material is difficult to predict and often varies significantly from one year to the next. As a result, prices and profitability may fluctuate. This complicates the procurement of the raw material and can result various types of risk

reducing or risk shifting behavior such as fixed-price contracts with suppliers. Skills and flexibility in procurement are critical to the success of food processing enterprises.

Third, the quality of the raw material used by food processors is quite variable, in large part due to its perishability. This would not be a problem if quality could be observed without cost, but it is often difficult for buyers for food processors to assess the quality of the raw material. This leads to the establishment of grading systems and price differences between different grades. The unavoidable subjectivity in the grading process often leads to conflicts between producers and processors.

Fourth, as mentioned above, the raw material for food processors tends to be “bulky” in the sense that the value per kilogram is low. This means that food processors tend to locate their plants in or near producing areas, particularly when the commodity is more perishable or more costly to transport in its unprocessed form than in its processed form.

Fifth, the cost of raw materials accounts for a relatively large share of the total cost of food processors, typically 50-80 percent in developing countries. The implication is that procurement of high-quality raw materials at low prices is even more important in food processing than in other manufacturing sectors.

Sixth, food processors are subject to special attention by the government because of the importance of the final product in social well-being. Food processors face health and safety regulations to protect the consumer. This is another consequence of the difficulty in observing quality. In addition, they may face political pressure and/or government controls to pay “fair” prices to farmers or to charge “reasonable” prices to consumers.

1.1.3. Trends in food consumption

The development of the food processing industry in most countries reflects the changes in food consumption patterns as incomes rise. Engle’s Law, one of the most universal patterns of economics, is that as income rises, the budget share allocated to food declines. More precisely, the total expenditure on food continues to rise, but it does so more slowly than total expenditure.

In addition, the composition of food expenditure changes with higher incomes.

There is a shift from staple foods, which are generally the least expensive source of calories, to foods that are more expensive on a per calorie basis. Fruit and vegetable consumption rises more quickly than staple consumption, and meat, fish, and dairy consumption rises the fastest.

As part of this process of diversification of diets, households begin to purchase more processed foods. Some processed foods are easier and quicker to prepare, such as instant soup packages or canned beans. Higher-income households are willing to pay extra for semi-prepared foods because it saves them time, whether they use that extra time for work or leisure. In a sense, with higher incomes, households can afford to "hire" food processors to assist with food preparation. Other processed foods have the advantage of allowing consumption of a greater variety of foods than are possible from fresh products alone. Canned and frozen goods can be consumed thousands of kilometers from where they were produced.

Another trend is that as per capita income rises, households begin to put greater priority on food quality and safety. This may take the form of buying goods with trusted brand labels rather than buying in bulk, since the reputation behind the label serves as an assurance of quality. Another example is trend toward "organic" or "clean" fruits and vegetables, responding to the fact that high-income consumers are willing to pay a premium for produce grown without the use of agricultural chemicals. In addition, these households are willing to pay extra for packaging that makes shopping or consumption more convenient. Examples include beverages that are sold in one-portion containers rather than 1-2 liter containers and canned goods with easy-to-open lids.

1.1.4. Trends in food processing

The trends in food consumption have important implications for the evolution of the food processing sector. Initially, when the market consists primarily of low-income consumers, the food processing sector concentrates on the minimum transformation necessary to make the commodity edible. Furthermore, the processing is often done on a small scale if technology permits. The drying of fish and fruits, grain milling, and cassava processing are examples.

Later, processing responds to the demand for variety in the diet, becoming larger and more diverse. As wage rates rise and markets expand, the scale and capital intensity

of food processing gradually increase. It is worth noting that automation and capital intensity are not the cause of development but rather the consequence. In other words, development and higher wages make it profitable to purchase machinery that replaces labor. In a low-wage economy, a modern capital-intensive processing plant may be less profitable than a more labor-intensive one. In some cases, automated processes are necessary to achieve export-level quality, but technical efficiency (in terms of conversion ratios or canning rate) does not guarantee economic efficiency in the sense of profitability.

As the complexity of food processing increases, a larger share of consumer food spending goes to marketing and processing. As a result, the proportion of consumer spending reaching the farmer declines. Finally, there is a paradoxical pattern regarding the size of the food processing sector. Although it tends to grow in absolute terms, since consumers are purchasing more processed foods, it tends to shrink as a proportion of the manufacturing sector. This is a consequence of Engle's Law - as incomes rise, a larger share of household budgets are allocated to non-food items, creating the demand for larger industrial and services sector. Once again, it is the trend of rising income that causes the expansion of the industrial sector, rather than the reverse.

1.2. Food Processing In Viet Nam

1.2.1. Role of food processing in Vietnamese economy

The food processing sector is a large and rapidly growing industry in the Vietnamese economy. In 1997, the value added in the food processing sector is estimated to be about US\$ 2.0 billion¹. As shown in Table 1.1, this represents about 8.8 percent of GDP and 35.5 percent of industrial value added. Furthermore, the contribution of food processing to GDP appears to be growing. In 1991, food processing represented just 6.7 percent of GDP, but over the period 1991-1997, value added in food processing has grown 14.0 percent annually, while GDP has grown only 8.9 percent annually. Furthermore, the growth in the food processing has even outpaced, by a small margin, the industrial sector in general.

¹ This is based on the food processing value added of 4600 million dong in 1989 prices (see Table 1.1), a GDP deflator of 0.117 for 1997, and an exchange rate of 13,000 dong/US\$.

Food processing also plays an important role in Viet Nam's exports, as shown in Table 1.2. Agricultural, fishery, and forest products, almost all of which are processed in some way before being exported, account for US\$ 3.2 billion in exports, or 36.8 percent of total exports. In spite of the 19.7 percent annual rate of growth in exports of agricultural, fishery, and forestry exports, its share in total exports has declined somewhat due to even more rapid growth in other exports such as oil and manufactured goods.

The four subsectors that are the focus of this study, rice, coffee, seafood, and fruits and vegetables, account for 25.3 percent of all exports, though this figure has varied between 25 and 33 percent in recent years. The value of exports of these four commodities has grown at 23.2 percent annually, almost as fast as the growth in the total value of exports (26.9 percent). As will be shown later, seafood and rice are the most important exports among the four, followed by coffee. Fruit and vegetable exports are relatively small.

1.2.2. Characteristics of the food processing sector

A picture of the structure of the food processing sector can be obtained from the 1995 Economic Census, carried out by the General Statistics Office. The Economic Census covered 2 million enterprises and 6.7 million workers². This Census identified 163 thousand food processing enterprises employing 505 thousand workers. Thus, the food processing sector represents about 8 percent of the enterprises and a similar percentage of the employment in the enterprise sector (see Table 1.3). In other words, employment per enterprises is roughly the same in food processing and other sectors. Enterprises with less than 10 workers account for the vast majority of food processing enterprises (98 percent) and most of the food processing employment (62 percent). Just one quarter of the food processing sector workers are in enterprises with more than 100 workers.

Foreign-invested enterprises account for 6.2 percent of the employment in the food processing sector (see Table 1.4). This percentage is somewhat higher than for enterprises in general (4.8 percent), suggesting that the food processing industry attracts foreign investment more than the average of other sectors.

² The 1995 Economic Census included state, private, and foreign-invested companies, but excluded farmers, who probably number 22-24 million. It is likely that the Census also omitted many self-employed individuals, based on the average enterprise size (3.1) is large by international standards.

Tables 1.5 reveals that food processing enterprises have less capital (fixed and operating) than enterprises in other sectors, on average. Almost 84 percent of food processing enterprises have less than 1 billion dong (US\$ 91 thousand) in fixed capital, compared to just 76 percent of all Vietnamese enterprises. A similar pattern holds if we examine total capital, as shown in Table 1.6. Capital intensity can be measured by the value of capital per worker. Although the available data from the 1995 Economic Census do not allow the calculation of the capital intensity (capital per worker), the data do suggest that food processing is less capital intensive than other sectors. This conclusion is based on the fact that food processing enterprises have the same number of workers as other enterprises (see Table 1.3), but have less fixed and total capital (see Tables 1.5 and 1.6).

Table 1.7 indicates that over three quarters (78 percent) of food processing enterprises have gross revenues below 1 billion dong, compared to just 59 percent of all enterprises. Once again, this suggests that food processing enterprises are, in general, somewhat smaller than enterprises in other sectors.

The 1995 Economic Census also attempted to identify enterprises that were making profits and those that were making losses. Although the results should be interpreted with caution due to the difficulty in getting reliable data on profits, the results in Table 1.8 suggest that 9 percent of food processing enterprises make losses, compared to 11 percent of all enterprises. To extent that these figures can be trusted, they suggest that food processing companies, although they are smaller and less capital intensive than others, are no less likely to be profitable.

State enterprises dominate the food processing sector. According to Table 1.9, state enterprises represent over half the value of fixed assets and 64 percent of the revenue in the food processing sector. Foreign and joint stock enterprises follow with 42 percent of the fixed assets and 29 percent of the revenue.

In summary, food processing enterprises are relatively small. Not only do they have less fixed capital and smaller revenues than other enterprises in Viet Nam, but 62 percent of them employ less than 10 workers. Second, food processing enterprises tend to be less capital intensive than other enterprises in Viet Nam, probably reflecting simpler technology. Third, the food processing sector is linked to a sector, agriculture, that is declining as a percentage of gross domestic product.

These factors might lead one to believe that food processing is a "backward" sector with low profits and poor growth prospects. In fact, however, the food processing sector is large, profitable, and growing, with a demonstrated ability to attract foreign investment. This example illustrates some of the risks in assessing the potential of an economic sector based on its level of technology or capital-intensity.

Table 1.1 Contribution of food processing to Gross Domestic Product

| Year | Gross Domestic Product | Industrial value added | Food processing value added | Food processing as pct of GDP | Food processing as pct of industry |
|---------------|-------------------------------|------------------------|-----------------------------|-------------------------------|------------------------------------|
| | (billion dong at 1989 prices) | | | (percent) | (percent) |
| 1991 | 31,286 | 6,042 | 2,100 | 6.7% | 34.8% |
| 1992 | 33,991 | 6,921 | 2,346 | 6.9% | 33.9% |
| 1993 | 36,735 | 7,766 | 2,602 | 7.1% | 33.5% |
| 1994 | 39,982 | 8,771 | 2,994 | 7.5% | 34.1% |
| 1995 | 43,797 | 9,998 | 3,460 | 7.9% | 34.6% |
| 1996 | 47,888 | 11,448 | 4,000 | 8.4% | 34.9% |
| 1997 | 52,198 | 12,960 | 4,600 | 8.8% | 35.5% |
| Annual growth | 8.9% | 13.6% | 14.0% | | |

Source: Data provided by DSI, Ministry of Planning and Investment.

Table 1.2 Contribution of agriculture, forestry, and fisheries to exports

| Year | Total exports | Export of agricultural, forestry, and fisheries products | | Export of rice, coffee, seafood, fruits, and vegetables | |
|---------------|----------------|--|----------------------|---|----------------------|
| | (million US\$) | (million US\$) | (% of total exports) | (million US\$) | (% of total exports) |
| 1991 | 2,087 | 1,090 | 52.2% | 629 | 30.1% |
| 1992 | 2,581 | 1,276 | 49.4% | 849 | 32.9% |
| 1993 | 2,985 | 1,444 | 48.4% | 923 | 30.9% |
| 1994 | 4,054 | 1,905 | 47.0% | 1,327 | 32.7% |
| 1995 | 5,449 | 2,521 | 46.3% | 1,806 | 33.1% |
| 1996 | 7,260 | 3,051 | 42.0% | 1,954 | 26.9% |
| 1997 | 8,700 | 3,200 | 36.8% | 2,204 | 25.3% |
| Annual growth | 26.9% | 19.7% | | 23.2% | |

Source: Data provided by DSI, Ministry of Planning and Investment.

Table 1.3 Size of food processing enterprises

| Number of workers | Food processing enterprises | Percent | Food processing workers | Percent | Workers per enterprise |
|---|-----------------------------|---------|-------------------------|---------|------------------------|
| 1-10 | 160,238 | 98.1% | 311,823 | 61.7% | 1.9 |
| 11-100 | 2,645 | 1.6% | 63,278 | 12.5% | 23.9 |
| 101-500 | 325 | 0.2% | 72,533 | 14.3% | 223.2 |
| 501-1000 | 47 | 0.0% | 30,655 | 6.1% | 652.2 |
| 1001-2000 | 19 | 0.0% | 24,969 | 4.9% | 1,314.2 |
| More than 2000 | 1 | 0.0% | 2,460 | 0.5% | 2,460.0 |
| Total | 163,275 | 100.0% | 505,718 | 100.0% | 3.1 |
| Food processing as pct of all enterprises | 8.0% | | 7.9% | | |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 182-183.

Table 1.4 Employment in food processing sector by type of ownership

| Number of workers | Food processing employment | Percent | Enterprise employment | Percent |
|-------------------|----------------------------|---------|-----------------------|---------|
| Domestic invested | 173,009 | 93.8% | 1,937,023 | 95.2% |
| Foreign invested | 11,366 | 6.2% | 97,832 | 4.8% |
| Total | 184,375 | 100.0% | 2,034,855 | 100.0% |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 365.

Note: Figures appear to be based on a subsample of enterprises.

Table 1.5 Value of fixed assets of food processing enterprises

| Value of fixed assets | Food processing enterprises | Percent | All enterprises | Percent |
|-----------------------|-----------------------------|---------|-----------------|---------|
| 0-1 billion VND | 2,683 | 83.8% | 18,094 | 76.3% |
| 1-5 billion VND | 319 | 10.0% | 3,548 | 15.0% |
| 5-10 billion VND | 79 | 2.5% | 927 | 3.9% |
| Over 10 billion VND | 119 | 3.7% | 1,139 | 4.8% |
| Total | 3,200 | 100.0% | 23,708 | 100.0% |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 375.

Note: Figures appear to be based on a subsample of enterprises.

Table 1.6 Value of capital of food processing enterprises

| Value of fixed assets | Food processing enterprises | Percent | All enterprises | Percent |
|-----------------------|-----------------------------|---------|-----------------|---------|
| Less than 1 bill. VND | 2,621 | 81.9% | 16,673 | 70.3% |
| 1-5 billion VND | 346 | 10.8% | 4,183 | 17.6% |
| 5-10 billion VND | 82 | 2.6% | 1,083 | 4.6% |
| Over 10 billion VND | 151 | 4.7% | 1,769 | 7.5% |
| Total | 3,200 | 100.0% | 23,708 | 100.0% |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 381.

Note: Figures appear to be based on a subsample of enterprises.

Table 1.7 Gross revenue of food processing enterprises

| Gross revenue | Food processing enterprises | Percent | All enterprises | Percent |
|----------------------|-----------------------------|---------|-----------------|---------|
| Less than 1 bil. VND | 2,488 | 77.8% | 14,004 | 59.1% |
| 1-5 billion VND | 362 | 11.3% | 5,454 | 23.0% |
| 5-10 billion VND | 118 | 3.7% | 1,478 | 6.2% |
| Over 10 billion VND | 232 | 7.3% | 2,772 | 11.7% |
| Total | 3,200 | 100.0% | 23,708 | 100.0% |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 387.

Note: Figures appear to be based on a subsample of enterprises.

Table 1.8 Food processing enterprises with profits and with losses

| Type of enterprise | Food processing enterprises | Percent | All enterprises | Percent |
|--------------------|-----------------------------|---------|-----------------|---------|
| With profits | 2,664 | 91.2% | 17,606 | 89.0% |
| With losses | 256 | 8.8% | 2,172 | 11.0% |
| Total | 2,920 | 100.0% | 19,778 | 100.0% |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 393

Note: Figures appear to be based on a subsample of enterprises.

Table 1.9 Fixed assets and revenue of food processing enterprises

| Type of enterprise | Value of fixed assets | Percent | Revenue | Percent | Contribution to state budget | Percent |
|--------------------|-----------------------|---------|---------|---------|------------------------------|---------|
| State-owned | 2,263 | 54.6% | 12,581 | 64.2% | 1,680 | 68.3% |
| Collective | 13 | 0.3% | 103 | 0.5% | 1 | 0.0% |
| Private | 137 | 3.3% | 1,261 | 6.4% | 40 | 1.6% |
| Joint stock | 622 | 15.0% | 2,907 | 14.8% | 96 | 3.9% |
| Foreign | 1,107 | 26.7% | 2,736 | 14.0% | 642 | 26.1% |
| Total | 4,142 | 100.0% | 19,588 | 100.0% | 2,459 | 100.0% |

Source: 1995 Economic Census. Cited in GSO, 1998, p. 398, 403, 408, 413, 419.

Note: Figures appear to be based on a subsample of enterprises.

2. RICE MILLING

For decades, Viet Nam was a consistent importer of rice. This was understandable during the war, but the inability of the country to meet its own food requirements even after reunification and peace in 1975 was a key factor in raising doubts about the efficiency of agricultural collectives and central planning. A series of partial reforms carried out in the 1980s, yielded limited but encouraging successes. As part of the *doi moi* (renovation) policies starting in 1986, more dramatic reforms were introduced including the allocation of collective land to farm households, market liberalization, and depreciation of the exchange rate to a realistic market level. In 1989, Viet Nam became one of the three largest rice exporter in the world, a position it has maintained ever since.

The rice milling sector is still responding to the expansion in rice production, the new orientation toward exports, and the liberalization of rice markets. This section describes the rice milling industry in the context of the rice sector. A number of policy issues are raised and the impact of alternative policies is discussed.

2.1 Background

Rice has been the dominant staple in Viet Nam for several thousand years. Wet rice cultivation is thought to have been practiced in the Red River Delta as early as 2000 BC. The organization required to build and maintain dykes and irrigation systems was an important motivation for the development of centralized authority in northern Viet Nam. Furthermore, the surpluses generated by intensive rice cultivation allowed high population densities in the Red River Delta and facilitated the the expansion of the Vietnamese nation toward the south over the period 1200-1800.

Intensive cultivation of the Mekong Delta is more recent, having been initiated by the French colonial administration around the turn of the century. Tenant farmers in the Mekong Delta produced surpluses allowing Viet Nam to export 1-2 million tons from the 1920s until the end of World War II. These exports coincided with periods of deprivation and even famine within the country, contributing the sensitivity of policymakers today to the food security implications of rice exports.

In the 1960s, the north was self-sufficient and the south became a consistent rice

importer, due to the effect of economic and military aid on the exchange rate. After reunification in 1975, the government attempted to organize farmers into collectives which were obliged to sell their surplus to the government at fixed prices. The repeated failure of the country to stimulate rice production under this system was a key factors leading to various experiments giving more autonomy and incentives to farm households. The process of decollectivization, market liberalization, and exchange rate adjustment in 1989 created an impressive response from farmers: after years of rice imports, Viet Nam became the third largest rice exporter in 1989. Rice exports have climbed from around 2 million tons in the early 1990s to 3.6 million tons in 1997.

Rice export policy is politically sensitive, and the decision to liberalize exports was not an easy one. Policymakers are concerned about the impact of exports on domestic availability and prices. This is understandable given that rice accounts for 75 percent of the caloric intake of the average Vietnamese household (World Bank, 1996). Thus far, however, rice export growth has not been achieved at the expense of domestic consumption. In fact, per capita rice consumption has risen since the late 1980s.

2.2. Rice Production And Marketing

2.2.1. Crop characteristics

Rice (*oryza sativa*) is an annual grass that grows from 70 cm to more than 2 meters. It is the only grain that can germinate in submerged soil and produces the highest yield when grown under these conditions. The growing period varies from four to six months.

Although there are over 6000 varieties of rice, most of them can be classified into two types. *Indica* rice is grown in tropical areas such as south and southeast Asia and southern China. *Japonica* is grown in temperate regions such as Korea, Japan, Europe, the United States, and Australia.

Both lowland and upland cultivation methods are used to grow rice. Most of world production is lowland rice, in which irrigation is used to keep the rice field submerged during most of the growing period. The water level is generally 5-15 cm, but it may be over one meter in the case of deepwater rice. The yields average around 2 tons/ha in developing countries and around 5 tons/ha in Japan and the United States. Upland rice is grown in areas where irrigation is not possible, although the rainfall must be relatively high. The yields are much lower than for lowland rice, averaging 1 ton/ha or less

(Brown, 1991).

2.2.2. Production trends

Between 1985 and 1995, rice production expanded by 57 percent, representing an average annual rate of 4.6 percent. This growth occurred in spite of a small reduction in the area of land cultivated with rice. The expansion was due to increases in cropping intensity and yield. Cropping intensity (the average number of rice crops produced in a year) has increased from 1.3 in 1985 to 1.6 in 1995, or 2.0 percent per year. Much of this change has been the result of improved irrigation and drainage infrastructure in the Mekong River Delta, converting single-cropped areas into double-cropped areas. In addition, the average yield has increased from 2.78 tons/ha in 1985 to 3.69 tons/ha in 1995, or 2.9 percent per year. Yield growth is the result of greater use of fertilizer, better water control, and the adoption of higher-yielding varieties of rice. Thus, yield growth contributed somewhat more than half of the increase in output over this time, while increased cropping intensity accounted for the remainder.

2.2.3. Geographic patterns

The Mekong River Delta in the south and the Red River Delta in the north are the "rice baskets" of the country, accounting for 51 and 18 percent of total production (see Table 2.3). The importance of the rice production in these two delta does not stem from their overall size: they represent barely 15 percent of the national territory. Rather it is due to the fact that, as river deltas, over half of their area can be farmed and over three quarters of their agricultural land is used for rice production. Thus, these two regions account for 60 percent of the cultivated rice area and 63 percent of the sown rice area³ in Viet Nam. In addition, better water control in these two regions allows yields of over 4 tons of paddy per hectare, compared to an average of less than 3.5 tons/ha in the rest of the country.

Between the two, the Red River Delta is more intensively cultivated in terms of cropping intensity, the degree of specialization in rice, and average yield. Nonetheless, the Mekong River Delta accounts for a much larger share of national rice production

³ Cultivated rice area refers to land which has rice during at least one cropping season during the year. Sown rice area refers to the sum of areas planted with rice over the different cropping seasons.

because its cultivated rice area is over three times that of the Red River Delta.

The Northern Uplands and the Central Highlands are both rice deficit regions, importing rice from the deltas. The yields and cropping intensity are lower, largely because irrigation is less prevalent. Upland rice production (including “slash and burn” cultivation) is practiced on a relatively large area of the remote parts of these regions, but production is limited.

The North and South Central Coast are also rice deficit regions. Irrigated rice production takes place in the small river valleys along the coast, while less intensive production occurs in the mountainous areas away from the coast. The Southeast produces rice, but crop mix is more diversified than in other regions due to the demand for fruits, vegetables, and other specialty crops by Ho Chi Minh City.

2.2.4. Seasonal patterns

The concept of crop seasons is somewhat artificial since rice is harvested somewhere in Viet Nam every month of the year. Nonetheless, the Ministry of Agriculture and Rural Development (MARD) classify production into three growing seasons.

Since most of the rain falls in the second half of the year, the *winter-spring* season is the dry season. In the Mekong River Delta, the winter-spring crop is planted in November-December and harvested in February-March. In the Red River Delta, the winter-spring crop is planted in February and harvested in May-June. In both areas, the winter-spring rice crop is often part of a double-rice cropping rotation.

In the Mekong River Delta, the *summer-autumn* rice crop is planted in April-May and harvested in August-September. Rice is generally not grown during this season in the Red River Delta, the North Mountain and Midlands, and in the Central Highlands.

The *rainy* season (or monsoon) rice crop is planted in June-July and harvested in October-January. Almost all rainfed rice production occurs during this season. With irrigation, however, a rainy season crop can be part of a double-rice cropping system, as is commonly done in the Red River Delta.

2.2.5. Marketing channels

Throughout the country, the paddy harvest is accomplished by hand, using a sickle. Threshing may be done by manual rotating threshers or (particularly in the south) threshing machines that are brought to the fields. Typically farmers dry paddy under the sun on flat surfaces such as farm yards or roadsides, using cement and brick yards, plastic sheets, or bamboo mats.

Much of the paddy never enters the marketing system. Farmers pay small mills to convert their harvest into rice to be stored and consumed at home. The proportion retained for own consumption varies from more than two thirds in the rice deficit areas to just one quarter in the Mekong River Delta.

The channels by which rice moves from the farmer to the consumer are complex and vary according to region. A survey of rice farmers, traders, millers, and state-owned enterprises carried out by the International Food Policy Research Institute sheds some light on these patterns (IFPRI, 1996). Because the two deltas account for almost 70 percent of Vietnamese rice production, the focus of our description is on these two regions.

The marketing system in the Mekong River Delta handles an enormous volume of rice. Mekong farmers produce about 7.1 million tons of rice⁴, of which an estimated 5.1 million tons pass through the marketing system. As in other regions, over 96 percent of the farmers report selling to a private assembler⁵. Two-third of the volume handled by assemblers is sold in paddy form to millers, predominantly medium and large millers. Over half of the sales of rice millers goes to state-owned enterprises (SOEs) who, in turn, export rice and ship it to the deficit regions within Viet Nam. Although this assembler-miller-SOE route is the most important marketing channel, no more than one third of all marketed rice follows this path. Assemblers also have paddy milled on a contract basis and sell rice to wholesalers and, to a lesser extent, state-owned enterprises and retailers.

⁴ This is based on 1995 output of 12.8 million tons of paddy, a milling ratio of 66 percent, and estimated losses of 14.5 percent.

⁵ Much of the description of rice marketing channels is based on a national survey carried out by the International Food Policy Research Institute in 1995-96. The sample included 850 farmers, 853 millers, 850 traders, and 30 state-owned enterprises.

Millers also sell rice to wholesalers who supply other wholesalers (including those in other regions), state-owned enterprises, and retailers.

In the Red River Delta, the marketing channels are somewhat different. As in the Mekong Delta, farmers sell the vast majority of their surplus to private traders. But unlike their Mekong counterparts, assemblers in the Red River Delta generally have the paddy milled into rice on a contract basis before selling the rice to wholesalers. Over 90 percent of assembler sales are in the form of rice rather than paddy. Almost two thirds of the rice sold by wholesalers goes to other wholesalers. Much of this trade may be from rural wholesalers to their counterparts in Hanoi. Wholesalers also sell rice to retailers, who in turn sell to consumers. Unlike in the Mekong River Delta, neither assemblers nor millers nor wholesalers report significant sales to state-owned enterprises.

In the other five regions of Viet Nam, the most distinctive aspect of the rice marketing system is large inflows of rice. Production is about 4.2 million tons of rice, but consumption is roughly 6.3 million tons, implying an inflow of over 2 million tons. As in the Red River Delta, assemblers buy paddy from farmers have it milled on a contract basis. About two-thirds of assemblers' rice sales go to wholesalers, who in turn sell it to other wholesalers and to retailers. The flows of locally produced rice are supplemented by inflows from the Mekong Delta and, to a much smaller extent, from the Red River Delta. Part of the inter-regional trade is carried out by state-owned enterprises. However, the infrequency with which traders report purchases from state-owned enterprises indicates that a significant proportion of this trade is undertaken by wholesalers.

2.3. Rice Milling Industry

2.3.1. Technical aspects of rice milling

Harvested paddy consists of the rice grain, germ, and bran, covered with a shell or hull. Its moisture content is generally 18-25 percent. Broadly defined, rice milling consists of five steps: drying, cleaning, removing the hull, removing the bran layers, polishing, and sizing. Each step is described as follows:

- Paddy is dried to 12-14 percent to avoid deterioration and improve milling efficiency. This may be accomplished by spreading the paddy out in the sun, by using a

mechanical drier, or by some combination of the two.

- Cleaning to remove stones, dirt, and other foreign material serves to increase the value of the final product and avoid damage to milling equipment. This is accomplished with a variety of vibrating screens that separate by size and density.
- The rice hull can be removed by hand pounding, but more commonly it is accomplished with a hulling (or shelling) machine. These machines use rotating disks, steel rollers, or rubber rollers to separate the hull and part of the germ.
- The next step is milling (narrowly defined), which is removing the outer bran layers using machines that create abrasion. The degree of milling is variable. Less milled rice has more bran, making it more nutritious. At the same time, less milled rice is chewier, darker, takes longer to cook, and has a shorter shelf-life. As a result, white rice is generally preferred by consumers. The conversion ratio between paddy and rice ranges 60 to 70 percent if we include broken grains, or 40 to 62 percent of whole grains (Brown, 1991).
- Polishing is the removal of the innermost layer of bran (also called polish). This stage is optional, depending on consumer preferences and willingness to pay for whiter rice.
- Grains may be separated according to size using two machines. Rough sizing can be done with vibrating screens with different sized holes, similar to those used for other grains. Finer sizing can be done with screens with thousands of small indentations to pick up individual kernels. As the screen is tilted to become vertical, the longest grains are the first to fall out.

Not all rice mills carry out all of these processing activities. Smaller mills usually focus on either shelling or milling (bran removal). Medium-size mills may clean, shell, and mill, but do not polish or grade by size. Only the largest mills typically perform all of these tasks.

2.3.2. Structure of the rice milling sector

Vietnamese statistics on the number of mills include everything from large miller-

polishers that produce export quality rice to small shellers that can be moved from one field to another. The number of rice mills (under this broad definition) has grown rapidly over the last ten years, from less than 16 thousand in 1985 to almost 80 thousand in 1995, as shown in Table 2.5⁶. This represents a 17.7 percent annual growth rate. The growth rate was relatively slow (7.3 percent) from 1985 to 1989, but following trade liberalization and exchange rate depreciation in 1989, the growth in rice mills accelerated to 25 percent.

The growth in the number of rice mills exceeds the growth in rice production, which was 4.6 percent annually over the same period. In other words, the ratio of rice production to rice mills has actually declined from 562 to 173 tons/mill. At the same time, we know that the dramatic expansion of rice production and exports in Viet Nam has stimulated investment to modernize the rice milling sector and build new large-scale rice mills, particularly in the Mekong Delta.

Two explanations can be offered for these apparently contradictory trends. First, the rapid growth in the number of rice mills is primarily outside of the Mekong Delta. In the Mekong Delta, the number of rice mills grew just 3.1 percent per year, while rice production in this region expanded at 6.4 percent annually over the same period. In other words, the volume of rice per rice mill has increased in the Mekong Delta, as large mills have been installed to process rice for export. The other regions have seen a proliferation of privately-owned mini-rice mills (including shellers), which are eroding the market share of larger state-owned rice mills.

The second explanation is that there is a trend toward the use of mini-rice mills located near the production zones to carry out rough processing, removing the hull and some of the bran. The brown rice is then transported to the cities and towns where large-scale rice mills process the rice further, either for local consumption or for export. Since two mills process the same rice under this system, the implication is that the ratio of rice production to rice mills underestimates the average throughput of rice mills⁷.

⁶ It is likely that this is an underestimate of the number of rice mills in the country. The 1994 Agricultural Census collected information on agricultural machinery owned by rural households and counted 106,000 rice mills. Presumably, this estimate excludes the larger state and private rice mills.

⁷ In the extreme, if all rice were processed by two mills, then the average throughput of rice mills would be twice the ratio of rice production to rice mills.

The geographic distribution of rice mills, shown in Table 2.6, highlights the differences in the rice milling sector across regions. If we assume that the proportion of rice milled by two mills is the same across regions, then the average size of rice mills in the Mekong River Delta is approximately ten times the average size of rice mills in other regions. This is a reflection of the importance of the rice export market in the Mekong River Delta which requires more sophisticated milling equipment.

Rice mills can be classified by size. Small mills handle less than 1 ton/day. They are almost always privately-owned and located in rural areas near production zones. Typically, these mills remove the husk and part of the bran, but do not have facilities for cleaning, drying, sizing, or polishing. Medium mills process 1-10 tons/day. Many of these are privately owned and some are managed by local authorities. They are generally able to mill and may have equipment to carry out other tasks. Large mills have capacities of over 10 tons/day. These mills are likely to have a wider range of equipment for drying, cleaning, milling, and sizing. In addition, there are specialized polishers that reprocessed milled rice for export. Finally, a few of the largest millers are miller-polishers, able to process paddy into export-quality rice.

In the Mekong River Delta, there are at least 68 rice mills operated by central and provincial state-owned enterprises. Most of these mills are large, with capacities of 30 tons/day or more. These mills are usually fully integrated, carrying out the full range of processing activities from shelling to polishing. In addition, there are 112 rice mills managed by district authorities. These mills tend to be smaller than the central and provincial mills, and only some of them have polishing equipment (IFPRI, 1996, p. 362).

The privately owned rice mills in the Mekong Delta probably number around 6000. Almost all of these are small mills. They generally produce rice for domestic consumption, although an increasing number are supplying brown rice or roughly milled white rice to large millers that reprocess for export. There is also a small but growing number of medium and large private rice millers.

In the Red River Delta, there are 22 large rice millers with capacities of over 15 tons/day. The four largest of these can process 60 tons/day. Another 57 rice mills have capacities of around 5 tons/day, making them medium-sized (IFPRI, 1996, p 361). As

shown in Table 2.6, there are around 20 thousand mills owned by Red River Delta households, almost all of which are presumably small mills. Most of the large and medium rice mills are managed by state-owned enterprises, while almost all of the small mills are privately owned.

Furthermore, the number of rice mills continues to expand. For example, in February and March of this year, the Sinco Machinery Company of Ho Chi Minh City signed 19 contracts to supply rice milling machines for companies in the south. The owner had thought that the demand for rice mills was saturated, but the recent increase in the pace of rice production and exports stimulated more investment (Saigon Daily Times, 26 March 1998).

2.4. Rice Consumption

2.4.1. Domestic demand for rice

Virtually every Vietnamese household consumes rice. According to the 1994 Household Survey covering 91,000 households, the average consumption was 153 kg of rice per capita⁸. This is equivalent to 11.8 million tons of total rice consumption or roughly 70 percent of the 1997 rice harvest.

As shown in Table 2.6, rice consumption patterns vary according to both income level and region. Across income groups, rice consumption tends to rise initially and then decline. Part of this pattern is due to the fact that urban households eat less rice than rural ones do, and the higher income groups contain more urban households than lower income groups. However, even within urban and rural areas, this pattern can be found.

Across regions, rice consumption also varies. Per capita rice consumption is above 160 kg in the Red River Delta and the Northern Uplands, compared to just 133 in the Southeast. The low level of rice consumption in the Southeast is presumably due to the large urban population with relatively high incomes in Ho Chi Minh City. The two delta regions together account for almost 44 percent of total rice demand in Viet Nam.

⁸ The 1992-93 Viet Nam Living Standards Survey, with a sample of 4800 households, found a similar figure: 156 kg per capita.

A rough idea of the historical trends can be obtained by calculating *apparent rice consumption*, defined as production (adjusted for milling and losses) minus exports divided by the population. This is an approximate measure because it does not take into account changes in stocks, smuggling, and changes in milling efficiency. Table 2.8 reveals that apparent rice consumption was around 145 kg per capita in the late 1980s. When rice exports first began in 1989-1990, apparent rice consumption fell to around 135 kg per capita. Since then, apparent rice consumption has risen steadily, surpassing 170 kg per capita in recent years. The implication is that, except for the first two years, Viet Nam's dramatic appearance on world markets as a leading rice exporter has not occurred at the expense of domestic consumers. In fact, consumers have benefits from the rapid rate of growth in rice production facilitated by the liberalization of agricultural and export markets.

2.4.2. Rice export markets

World rice production has grown at an average rate of 2.7 percent per year since 1961, surpassing 500 million tons of paddy in the early 1990s. Most of this expansion has been the result of yield growth of around 2 percent per year. In recent years (since 1990), production and yield growth have slowed somewhat, but the growth in the traded volume has increased. This is partly due to supply factors, namely the emergence of India and Viet Nam as major rice exporters. In addition, demand factors have played a role, as countries such as Indonesia and the Philippines have largely abandoned their attempts to achieve rice self-sufficiency through import controls. As a result of these trends, the traded volume of rice has recently risen from 12 million tons in 1990 to over 20 million tons in recent years. The largest exporters are Thailand, Viet Nam, the United States, India, Pakistan, and Burma. These six countries account for over 80 percent of the exported volumes of rice on the world market.

Thailand exports around 5 million tons of rice annually, giving it a 20-25 percent share in world rice trade. The marketing and milling industry in Thailand is very sophisticated and responsive, allowing it to compete with the United States for the long-grain high-quality market and with India and Viet Nam in the lower-quality markets.

After several years as the third largest exporter, Viet Nam became the second largest exporter in 1997. Although it was considered a low-quality and an unreliable exporter in the early 1990s, investments in milling and infrastructure, along with

increased experience in dealing with importers, have improve both quality and reliability. Nonetheless, remaining problems contribute to a discount for Vietnamese rice compared to similar grades of Thai rice.

The United States is often the second largest exporter, serving the high-quality end of the market. It has a reputation both for very high quality control and flexibility in the grade, variety, and packaging. These attributes give rice from the United States a US\$ 30-50 premium over the same grade of rice from Thailand.

India was for many years a food deficit country, exporting only small quantities of high-value aromatic rice such as Basmati. In 1995, after a series of good harvests during which the government accumulated stocks, India suddenly exported to 3.0 million tons. It is expected to remain among the world's leading exporters for some years, although the quality of its exports is low.

Pakistan exports both long-grained high-value aromatic rice to the Middle East and medium-grain rice to south and southeast Asia. The rice sector in Burma is less developed than in Viet Nam, so it tends to supply low-quality rice to the world market.

Importers are usually divided into consistent importers and occasional importers. Consistent importers include the Middle East, Latin America (particularly Brazil, Peru, Cuba, and Mexico), Europe, Africa (particularly Senegal, Cote d'Ivoire, and Nigeria), and parts of Asia (Hong Kong and Malaysia).

Occasional importers enter the markets when there are shortfalls in domestic production. These include Indonesia, the Philippines, and China. The occasional demand for imports by these countries is a major source of price instability in world rice markets.

Importers can also be distinguished according to the types of rice that they tend to import, based on preferences and purchasing power. For example, Canada, Western Europe, Saudi Arabia, and South Africa generally import high-quality long-grain rice. Latin America, the Caribbean, and the rest of the Middle-East are more price-sensitive, switching between high- and medium-quality depending on prices and domestic conditions.

Perhaps the most distinctive characteristics of world rice markets is that it is

unstable in the sense that the volumes and directions of flows vary from year to year. Rice prices also tend to be somewhat more volatile than the prices of other grains. There are several reasons for this.

- First, 90 percent of rice production is in Asia, so that weather-related supply shocks tend to be positively correlated across rice producing countries. In other words, a poor rice harvest in Thailand is likely to coincide with a poor harvest in Viet Nam, exacerbating the shortfall.
- Second, only a small percentage (4-5 percent) of world rice production is traded. Thus, a small percentage change in production can result in a large percentage change in traded volume. Combined with “friction” in international trade, this contributes to instability in world prices.
- Third, because of the importance of rice as a basic staple, Asian governments have traditionally tended to shield domestic consumers and producers from international price fluctuations. By making traded volumes less sensitive to price changes, policies to stabilize internal prices have the unintended effect of exacerbating international price instability. The General Agreement on Trade and Tariffs (GATT) and the trend toward less interventionist trade policies have reduced this third effect, but it still plays a role in world rice markets.

This instability in rice flows is reflecting in the list of major importers of Vietnamese rice. Table 2.9 shows the largest buyers of rice from Viet Nam in 1995, but the list changes every year. In fact, nine different countries have appeared among the top four importers over the four year period 1992-95. This fact highlights the dynamic nature of world rice markets and the importance of closely monitoring changes in international markets and responding quickly to those trends.

2.5. Prospects And Policy Issues

2.5.1. Prospects for production growth

According to most of the standard methods for forecasting production, Viet Nam must be reaching its capacity in terms of rice production. Over half of all the agricultural land and the vast majority of irrigated land in Viet Nam is cultivated with rice. The area

available for rice production is shrinking in the Red River Delta due to urbanization and agricultural diversification. In the Mekong Delta, the area for expansion is considered very limited. Furthermore, the cropping intensity in the two deltas is already high: 1.8 in the Red River Delta and 1.6 in the Mekong Delta. Finally, yields are higher than in any other major rice producing developing country, with the exception of China.

Before accepting this pessimism, it is important to recognize that a number of international organizations have expressed doubts about the potential for further growth in rice production, only to be contradicted by continued expansion. A 1993 World Bank study examined trends in production, consumption, and world prices, concluding that exports would reach 1.4 million tons in 1997 and would then slip to 1.1 million tons in 2000 (World Bank, 1993). Similarly, an analyst at the United State Department of Agriculture prepared a report in 1995 suggesting that production constraints and growing local demand would prevent export growth beyond then-current levels of 2 million tons (Valdecanas, 1995). Finally, researchers from the International Rice Research Institute published a paper identifying various production constraints, concluding that exports above 2.0 million tons would be difficult to achieve (Pingali *et al*, 1998). In fact, exports reached 3.6 million tons in 1997 and appear likely to attain a similar level in 1998.

On the demand side, these studies have overestimated the growth in demand by not recognizing the slowing of population growth and the fact that per capita demand is reaching a saturation point, as discussed below. On the supply side, Viet Nam has surpassed the expectations of most observers primarily in yield growth. Yield growth is accounting for an increasing share of the overall rice production growth. For example, since 1995 yield growth has accounted for over 80 percent of the increase in output, compared to 62 percent for the period 1985-1995 (see Table 2.2). The critical role of yield growth in maintaining rice production growth highlights the key role of agricultural research and extension in the rice sector.

2.5.2. Prospects for domestic rice markets

The prospects for continued growth depend, in part, on changes in the domestic demand. Since 70-75 percent of the demand for Vietnamese rice is from Vietnamese consumers, even small changes in the domestic demand can have relatively large effects on the exportable surplus.

The most important determinants of long-term changes in rice demand are population growth, urbanization, and income growth. The trends in each of these variables and its likely impact on rice demand is discussed below.

- With regard to population growth, projections by the World Bank and the United Nations indicate that the population growth rate will fall to between 1.2 and 1.6 percent for the period 2005-2010 and 1.2 percent for 2015-2020.
- Econometric analysis of household budget data from the Viet Nam Living Standards Survey indicate that the income elasticity of rice demand is approximately 0.35, implying that per capita rice demand should rise at one third the rate of per capita income, other things being equal. Based on the consumption trends discussed earlier, we can expect per capita rice consumption to continue rising slowly for a number of years, to stabilize, and then eventually to decline with further increases in income. This pattern is not unique to Viet Nam. Countries such as Japan, South Korea, and Taiwan have already reached the point where rice consumption has declined substantially. For example, per capita rice consumption in Japan peaked at 141 kg in the 1930s and had declined to 71 kg by 1988 (Tsutsumi, 1991).
- Urbanization tends to reduce per capita rice demand since urban households tend to have more diversified diets, consuming less rice than rural households. Huang and David (1993) argue that urbanization is a major factor in the decline in per capita rice consumption in Asia. Nonetheless, the impact of urbanization on rice demand in Viet Nam has probably not been very large. Although per capita rice consumption is lower in Vietnamese cities than in the rural areas, the increase in the share of the population living in urban areas has been relatively slow.

As a result of trends in all three of these factors, we can expect the growth in rice demand to slow and possibly stabilize over the coming decade. Since apparent rice consumption is already over 170 kg per capita, one of the highest levels in the world, we expect per capita demand to peak within the next 5-10 years.

2.5.3. Prospects for rice export markets

In the short term, the biggest factors affecting Viet Nam's rice export markets are 1) the Asian currency crisis and the devaluation of the Thai baht in particular and 2) the weather effects of El Nino. The devaluation of the baht should, other things being equal, have a dampening effect on world rice prices. In theory, the devaluation means that Thai farmers get a higher baht return for each ton of rice they export, encouraging them to expand production and exports which puts downward pressure on world rice prices. In fact, the baht price of rice in Thailand rose 27 percent between 1996 and 1997. Thai export volume, however, grew by only 2 percent, so the effect on world prices has been negligible. Given the lags in agricultural supply response, it is possible that the full effect of the devaluation has not yet taken place.

Any effect of devaluation on rice prices has been more than offset by El Nino, which has adversely affected Indonesian rice harvests. The resulting shortfall is being met through rice imports, putting upward pressure on world rice prices.

A number of trends will affect Viet Nam's rice export markets in the longer run. First, under the General Agreement on Tariffs and Trade (GATT), Korea and Japan are obliged to begin opening their rice markets. Both countries have had self-sufficiency policies that involved essentially banning rice imports and maintaining domestic prices far above international prices. The most immediate beneficiaries will be the United States and Thailand, because they are the only countries that can meet the quality requirements of consumers in these countries. Because the schedule for opening their rice markets is quite gradual, Viet Nam may have time to upgrade its processing and milling capacity to meet this demand. Even if it does not, however, Viet Nam should benefit indirectly because of the overall increase in rice demand.

Normalization of the international trade of Iraq would also benefit Viet Nam. Viet Nam has exported to Iraq through government-to-government contracts under the United Nations sponsored food-for-oil program. Further normalization would create a new large market for Vietnamese rice.

Another trend with consequence for Viet Nam is the growth in rice demand within the United States associated with the image of rice as healthier than many substitute foods. Rising demand for rice within the United States erodes its ability to export. Since

the United States only exports high-quality rice, the main beneficiary of this trend is Thailand, but Viet Nam and other rice exporters benefit indirectly.

2.5.4. Quality issues

Rice quality is a function of several variables. Perhaps the most important factor is the percentage of broken rice grains. Rice that is 5 or 10 percent broken is considered high quality, while 35 percent broken is poor quality. In addition, the length of the grain is important. Long-grained rice is considered preferable in most countries. The aroma and color are considered important quality criteria, with highly aromatic varieties such as basmati commanding a premium.

As a result of investments in rice milling, including a rapid expansion of the private milling sector, the quality of Vietnamese rice exports has improved dramatically. The proportion of high quality rice (10 percent broken or less) has risen from less than 2 percent in 1989 to 55 percent in 1995. Over the same period, the proportion of low quality rice (35 percent broken or more) has fallen from 88 percent to less than 4 percent (IFPRI, 1996, p. 241).

Further improvement is possible, however. The 100% B grade exported by Thailand is 100 percent whole grain or 0 percent broken. Achieving this level of quality economically would require varietal purity, more even drying, and improved milling. Varietal purity refers to having an entire batch of rice of the same variety, a standard that is difficult to achieve when millers are receiving rice from numerous small farmers.

In addition, broken percentage is not the only quality criteria. For example, only a handful of the largest rice mills in Viet Nam have color sorters that would allow exporters to ensure that off-color rice grains are excluded. Similarly, machinery to sort rice by size is not common in Vietnamese mills. It is important to recognize that the constraint is not just having more modern machinery. For example, to become a major exporter of long-grained rice, it would be necessary to make complementary investments in agricultural research to select appropriate long-grain varieties for local conditions and improve the grading system. The current grading system in Viet Nam only distinguishes between rice of different broken percentage. Contracts between importers and exporters often specify other quality characteristics, but without a well-defined and administered grading system to codify these characteristics, enforcement is difficult. In contrast, the

Thai grading system distinguishes incorporates grain length, broken percentage, and other quality characteristics.

2.5.5. Size of the export quota

Rice exports have been controlled by a quota system since Viet Nam began exporting rice. The concern was that excessive exports would leave the country with insufficient supplies to meet domestic demand. In a well-functioning market, this would be avoided automatically since domestic shortfalls would push up the domestic price and eventually eliminate the profitability of exports. Nonetheless, policymakers were unfamiliar with market mechanisms and, perhaps correctly, suspected that the market might not function smoothly initially.

The rice export quota remained in the range of 1.5 to 2.0 million tons in the early 1990s. However, the quota policy came under criticism for reducing the farm-gate prices of rice growers. A study by the International Food Policy Research Institute (1996) estimated that in 1995, the export quota was equivalent to a 23 percent tax on exports. The results, first presented in October 1995, suggested that the food security impact of quota removal would be neutral or mildly positive, since 90 percent of the poor live in rural areas and many of these would benefit from higher paddy prices. Change in the quota policy was further catalyzed by concern over the low level of Mekong paddy prices. The quota was raised to 3.1 million tons in 1996, 3.5 million tons in 1997, and 4.0 million tons in 1998. Some market observers believe that Viet Nam will not be able to export 4.0 million tons this year, implying that the export quota is non-binding.

A binding export quota has two adverse effects. One is to reduce the price that farmers get for their rice. Although there are some benefits for consumers, particularly those in urban areas, the costs to farmers exceed the benefits to consumers (IFPRI, 1996).

The other is to restrict competition in the export sector. State enterprises, which may or may not be the most efficient or experienced exporters, are guaranteed a portion of the rice export business.

2.5.6. Allocation of export quotas

Another aspect of export policy is the allocation of the export quotas. In 1989-90, any state-owned enterprise could export provided certain procedures were followed. Inexperience with international trade led some of them to sign disadvantageous contracts with low prices, some of which were abrogated by government or SOE decision. This gave Viet Nam a reputation as an unreliable exporter, a reputation which lingers today to a lesser extent. This experience also convinced the government that excessive competition among exporters resulted in lower export prices. In response to this perceived problem, the government allocated the bulk of the export quota to VINAFOOD 2, the general food corporation in the south. In 1997 and 1998, this policy was reversed, allocating a majority of the export quota to rice surplus provinces in the Mekong Delta. Table 2.10 shows the allocation of 3.6 million tons of export quota for the first nine months of 1998.

Fears that a large number of exporters will reduce the FOB export price appear to be mistaken. If exporters contract to sell rice at a low price, it is the result of inexperience and not an excessive number of exporters. Furthermore, the losses they make from such transactions will be a strong incentive to avoid them in the future.

2.5.7. Role of state-owned enterprises

Since Viet Nam began to export in 1989, only state-owned enterprises have been allowed to export rice. When the quota is binding (as has generally been the case), the quotas are valuable and the SOEs have been the favored beneficiaries. For example, the IFPRI study estimated that, in 1995, the quotas may have been worth US\$ 64 per ton. Even when the quota is not binding (as may be the case in 1998), the reservation of a portion of the export business for these enterprises constitutes a restriction on the degree of competition among exporters. This restriction is likely to reduce the prices that farmers receive for their rice.

The SOE monopoly on rice exports is defended by arguing that the private millers are too small and too inexperienced to be able to export. Allowing them to export, the argument goes, would reduce the export price received by the country and damage the country's reputation for reliability and quality. However, the state-owned enterprises have experienced some of these same problems. In 1989, when Viet Nam was first

entering the world markets, a number of SOEs made unprofitable contracts and/or abrogated contracts. Furthermore, the expansion in the number of provincial SOEs authorized to export resulted in a number of inexperienced SOEs losing money on contracts by offering a price too low.

Many private millers are indeed too small to participate in exports, but a number of private millers are large and have developed contacts among importers. In many cases, they arrange the export contract with the importer and the SOE is only brought in as the “formal” exporter. Furthermore, private enterprises have an even stronger incentive to avoid loss-making contracts since they cannot resort to budget support to cover their losses.

A strength of private enterprises, mentioned frequently in interviews by both private and state enterprises, is that they can respond more quickly to opportunities and problems. Without the need to justify their decisions and obtain approval from political authorities, they are able to make decisions more quickly. Given the unstable nature of the world rice markets discussed above, this responsiveness is a valuable trait.

Finally, competition with the private exporters would probably improve the performance and efficiency of the state-owned enterprises. Experience in other countries has shown that external market discipline from competition, combined with restructuring of internal incentive systems, is the key to reforming commercial state-owned enterprises (Muir and Saba, 1995).

Perhaps in response to some of these arguments, the government announced in January 1998 that private millers would be allocated 10 percent of the 4.0 million ton rice quota for 1998. When the 3.6 million tons of quota for the January-September period were allocated, however, all the recipients were state-owned enterprises. One of the private millers being considered for direct export rights believes that his application may be approved later this year.

2.5.8. Port infrastructure

Port infrastructure has an obvious effect on the cost of loading and unloading. Data collected by IFPRI (1996) indicate that the port fees, loading costs, and other related costs for Saigon port (which handles most of Viet Nam's rice exports) are about US\$

40,000 for a ship with a capacity of 10,000 tons. By contrast, the comparable cost in Bangkok is about one half of this amount. In addition to the port charges, the loading rates are low: about 1000 tons/day compared to 6000 tons/day in Bangkok. Delays in docking and loading are typically charged US\$ 6000 per day.

Although these charges are nominally paid by importers, they are indirectly "paid" by the Vietnamese economy, and rice farmers in particular, in the form of a lower FOB price. Given identical rice quality and FOB price, importers would rather buy from Thailand because of the lower port costs. Thus, importers are not willing to buy from Viet Nam unless the Vietnamese FOB price is lower than the Thai FOB price in order to compensate them for the higher port and demurrage costs.

One important opportunity to improve rice exports is the development of the port facilities in Can Tho. Can Tho is located in the heart of the Mekong Delta where virtually all the export rice is grown. There is a port in Can Tho but the river is shallow, allowing only smaller ships (under 5000 tons) to load there. After long consideration, the government has decided to proceed with the expansion of the Can Tho port, including the dredging of the Mekong River. Transporting rice from Mekong rice farmers to Can Tho would cost US\$ 6-10 per ton less than transporting rice to Saigon Port. Since (in the absence of an export quota) domestic prices are largely determined by world prices minus the cost of transportation to the port, the development of the Can Tho port could eventually raise the producer price of rice by US\$ 6-10 per ton.

2.5.9. Market coordination

In early 1998, the Ministry of Trade announced that it was developing plans to create a Rice Export Transaction Center. According to the Viet Nam News (17 March 1998), the Center will:

be in charge of promoting and signing rice export contracts between Vietnamese and overseas enterprises... be responsible for guaranteeing fair competition between rice exporters... will organize rice export transactions in the form of bidding and allow selected rice exporters to sign specific contracts with foreign customers.

It is difficult to evaluate the plan without having more details, but the proposal is

much less innocuous than it may appear. The concept of a central clearinghouse for rice transactions sounds reasonable and the description of bidding and a “trading floor” sounds modern. However, it is worrisome that, unlike a commodity trading board, it does not appear to be voluntary. Importers and exporters would be obliged to use the center whether or not it was found to be useful. The fact that the center would “allow selected rice exporters to sign specific contracts” implies that the center would not just facilitate contracts but actually approve them. This could be cumbersome at best and an invitation to irregular transactions at worst.

The concept of a commodity market with anonymous buyers and sellers works only when the quality of the product can be very precisely defined and the contracts are easily enforceable. Under these circumstances, buyers and sellers do not need to worry about the capacity or reputation of the other party; only the price and the terms of the contract matter. Rice commodity markets have never developed in the United States or elsewhere largely because rice is too heterogeneous. In Viet Nam, the additional problem of enforcing contracts means that the reputation of the exporter is even more important. In rice markets, importers have good reason to care who they are buying from and are not likely to accept a system in which their suppliers are selected by government officials.

On the other hand, there is a need for a more transparent system for rice exports. Under the current system, market participants (including the government) do not know the volumes that have been committed for export until they are loaded on the ship. This makes it difficult for the government and market participants to know the pace of exports commitments. To deal with this problem, the United States Department of Agriculture publishes an agricultural export report which provides a weekly accounting of export commitments. All exporters are obliged to report on a weekly basis the volumes contracted and are entitled to receive a copy of the publication. By improving the flow of information, such a publication can make the market function more smoothly and allow the government to make policy on the basis of better information.

2.5.10. Effect of trade liberalization

Trade liberalization under the ASEAN Free Trade Agreement (AFTA) will almost certainly have a positive effect on the Vietnamese rice sector, including the rice milling industry. Significant imports of rice are impossible because of the strong comparative advantage of Viet Nam in rice. At the same time, the AFTA, to the extent that opens the

doors of neighboring southeast Asian nations to Vietnamese rice, should benefit the sector. In particular, AFTA will make it more difficult for importers such as Indonesia, Malaysia, and the Philippines to restrict Vietnamese rice imports. Their interest in doing so is based on the idea that they can develop their rice production sector by protecting it from competition for lower-cost producers such as Viet Nam.

Because rice milling is a bulk-reducing process, transportation costs are minimized by locating processing facilities as close to production zones as possible. Unlike some manufacturing processes, where different stages of production can be located in different countries, rice milling must be located in or very near the production zones. As a result, there is no risk of AFTA resulting in the loss of rice milling competitiveness.

In the longer run, the reduction in import barriers to rice trade under AFTA and the GATT will also have the effect of reducing the volatility of rice prices. As mentioned earlier, when countries use trade policy to stabilize domestic prices relative to international prices, they prevent the price signals from reaching domestic consumers and producers. As a result, those producers and consumers do not respond as fully to price changes, making exports from or imports to that country less responsive than it would be under freer trade. The cumulative effect of making traded volumes less responsive to price changes is that larger price changes are needed to adjust to a given shock. For example, the increase in Indonesian demand due to El Nino would result in a larger price increase if other countries do not allow the full price increase to be transmitted to their domestic producers and consumers.

2.5.11. Effect of the exchange rate

The exchange rate and export policy probably have a larger effect on the returns to rice production and processing than does AFTA. Even though most rice is marketed domestically, the price of rice (particularly in the south) is determined by the world price of rice and the amount that the government allows to be exported. The effect of devaluation (or depreciation⁹) of the Vietnamese dong on the rice milling industry depends on the rice export policy.

⁹ Devaluation refers to a government decision to increase the value of foreign currency in terms of local currency, when the rate is fixed by the government. Depreciation refers to a market-driven increase in the value of foreign currency in terms of local currency, when the exchange rate is determined by market forces.

- If a binding quota is in place, then devaluation would have little effect on rice farmers and rice millers. Devaluation would, however, widen the gap between the world price of rice and the domestic price of rice, making the value of the quota higher and creating windfall profits for those companies who hold quota rights. It would also increase the incentives for smuggling rice out of the country.
- If a binding quota were not in place, then a devaluation of the dong would raise the dong price of rice within the country, thus stimulating rice supply and suppressing rice demand. The combined effect would be to increase the exportable surplus in the next crop cycle. The rice milling industry would benefit from an increase in throughput as a result of the policy. This benefit would be partially offset by the higher cost of fuel and imported machinery. The effect would be more adverse for the larger rice millers who tend to use more sophisticated imported milling machinery. By increasing the incentives to purchase local machinery, however, it would favor domestic manufacturers of milling equipment.

2.6 Summary And Conclusions

The most important constraint on the growth of the rice processing subsector is the sustainability of rice export growth. Vietnamese rice exports have expanded rapidly as a result of decollectivization of agriculture and the improved incentives to use fertilizer and modern seed varieties. However, it is very unlikely that rice export volume can continue to grow at the same pace that it has over the past decade.

An increasing share of rice production growth is due to yield growth. The cultivated area of rice lands has not increased since the mid-1980s. Production growth has been due to rising cropping intensity and higher yields. Further increases in cropping intensity are probably limited, as evidenced by slowing growth in recent years. Thus, yield growth is becoming the only avenue for expanding rice output.

The government should strengthen its support for rice research. The rate of return on investment in agricultural research is probably high, particularly given the importance of continuing to raise rice yields. This investment could be in the form of better salaries

and more funds for equipment and operating costs.

Raising the unit value of rice exports requires improvements in port facilities, reliability, and rice quality. This conclusion generates several recommendations for government action:

The government should improve Saigon Port facilities, focusing on reducing the delays in loading which depress the FOB price. Furthermore, developing the Can Tho port would reduce the cost of moving rice to the port, thus raising the producer price.

The government should avoid policies that result in exporters abrogating existing rice export contracts. The costs of such policies are not visible, but by damaging the reputation of Viet Nam as a reliable exporter, they reduce the FOB price that the country will receive in the future.

The government should implement a system for reporting rice export commitments. This would allow policymakers to limit the volume of rice exports for food security reasons without causing exporters to abrogate their contracts. It would also generate information useful for monitoring rice markets.

The government should allow private rice millers to participate in rice exports. A more competitive export sector will benefit farmers without reducing the price Viet Nam receives for its rice exports. In addition, based on international experience and the experience of other food processing sectors in Viet Nam, private exporter are more likely to seek out and exploit market niches for specialty rices.

Table 2.1 Trends in rice production in Viet Nam

| Year | Sown area (thousand hectares) | Yield (tons of paddy per hectare) | Production (million tons of paddy) |
|-------------|----------------------------------|---|---------------------------------------|
| 1985 | 5,704 | 2.8 | 15,875 |
| 1986 | 5,689 | 2.8 | 16,003 |
| 1987 | 5,588 | 2.7 | 15,103 |
| 1988 | 5,726 | 3.0 | 17,000 |
| 1989 | 5,896 | 3.2 | 18,966 |
| 1990 | 6,028 | 3.2 | 19,225 |
| 1991 | 6,303 | 3.1 | 19,622 |
| 1992 | 6,475 | 3.3 | 21,590 |
| 1993 | 6,559 | 3.5 | 22,837 |
| 1994 | 6,598 | 3.6 | 23,528 |
| 1995 | 6,766 | 3.7 | 24,964 |
| 1996 | 6,924 | 4.2 | 29,100 |
| 1997 (est.) | 7,000 | 4.4 | 30,600 |

Source: General Statistics Office, 1996, p. 61 for data up to 1995.

Viet Nam News, 27 December 1997, for 1996 and 1997.

Table 2.2 Contribution of area, yield, and intensity to rice production growth

| Component | Level | | Annual growth 1985-95 | Contribution of each factor |
|----------------------------|--------|--------|--------------------------|--------------------------------|
| | 1985 | 1995 | | |
| Cultivated area (1000 ha) | 4,297 | 4,204 | -0.2% | -4.7% |
| Cropping intensity (ratio) | 1.32 | 1.61 | 2.0% | 43.3% |
| Yield (tons/ha/crop) | 2.78 | 3.69 | 2.9% | 62.0% |
| Interaction | | | 0.0% | -0.6% |
| Production (1000 tons) | 15,874 | 24,964 | 4.6% | 100.0% |

Source: Calculated from data in General Statistical Office, 1996.

Table 2.3 Geographic distribution of rice production

| Region | Total area (1000 ha) | Sown paddy area (1000 ha) | Paddy yield (tons/ha) | Paddy production | |
|---------------------|-------------------------|------------------------------|--------------------------|------------------|----------------------------|
| | | | | (1000 tons) | (% of national production) |
| North Uplands | 10,297 | 808 | 2.79 | 2,254 | 9.0 |
| Red River Delta | 1,258 | 1,042 | 4.44 | 4,623 | 18.5 |
| North Central Coast | 5,118 | 682 | 3.14 | 2,141 | 8.6 |
| South Central Coast | 4,518 | 518 | 3.38 | 1,749 | 7.0 |
| Central Highlands | 5,618 | 173 | 2.48 | 430 | 1.7 |
| Southeast | 2,339 | 352 | 2.66 | 935 | 3.7 |
| Mekong River Delta | 3,956 | 3,191 | 4.02 | 12,832 | 51.4 |
| Viet Nam | 33,104 | 6,766 | 3.69 | 24,964 | 100.0 |

Source: General Statistical Office, 1996: 14-15, 18-19, 62-67.

Table 2.4 Geographic patterns in rice surplus (1996)

| Region | Rice production (mill. tons) | Consumption per capita (kg/person/yr) | Population (millions) | Consumption (mill. tons) | Apparent rice surplus (mill. tons) |
|------------------|---------------------------------|--|--------------------------|-----------------------------|---------------------------------------|
| Northern Uplands | 2.11 | 170.5 | 13.1 | 2.23 | (0.13) |
| Red River Delta | 2.31 | 177.7 | 15.4 | 2.74 | (0.43) |
| N. C. Coast | 1.38 | 160.1 | 10.8 | 1.73 | (0.35) |
| S. C. Coast | 1.13 | 144.5 | 8.5 | 1.23 | (0.10) |
| Cen. Highlands | 0.27 | 171.8 | 3.1 | 0.53 | (0.26) |
| Southeast | 0.59 | 140.9 | 9.2 | 1.30 | (0.70) |
| Mekong Delta | 8.26 | 160.9 | 16.9 | 2.72 | 5.55 |
| Total | 16.08 | 162.0 | 77.0 | 12.47 | 3.60 |

Source: Rice production calculated from paddy production in 1996 from GSO (1997) assuming 65% milling ratio and 15% disappearance in seed, feed, and losses. Per capita consumption from the 1994 Household Survey (GSO, 1998), with amounts scaled up by 5.9 percent to reflect consumption growth and make totals balance. Total consumption calculated as per capita consumption multiplied by population. Apparent surplus calculated as rice production minus rice consumption.

Table 2.5 Trend in the number and size of rice mills

| Year | Rice mills (thousands) | Paddy production (1000 tons) | Rice production (1000 tons) | Rice production per mill (tons/mill) |
|------------------|---------------------------|---------------------------------|--------------------------------|--|
| 1985 | 15.6 | 15,875 | 8,771 | 562 |
| 1986 | 16.9 | 16,003 | 8,842 | 523 |
| 1987 | 18.4 | 15,103 | 8,344 | 454 |
| 1988 | 19.2 | 17,000 | 9,393 | 489 |
| 1989 | 20.7 | 18,966 | 10,479 | 506 |
| 1990 | 25.4 | 19,225 | 10,622 | 418 |
| 1991 | 33.0 | 19,622 | 10,841 | 329 |
| 1992 | 35.5 | 21,590 | 11,928 | 336 |
| 1993 | 52.1 | 22,837 | 12,617 | 242 |
| 1994 | 76.3 | 23,528 | 12,999 | 170 |
| 1995 | 79.9 | 24,964 | 13,793 | 173 |
| Annual growth | 17.7% | 4.6% | 4.6% | -11.1% |

Source: GSO, 1996, p. 40-41.

Table 2.6 Geographic pattern in the number and size of rice mills (1995)

| Region | Rice mills | Paddy production (thousand tons) | Rice production (thousand tons) | Rice production per mill (tons/mill) |
|-------------------|------------|--|------------------------------------|---|
| Northern Uplands | 20,091 | 2,254 | 1,245 | 62 |
| Red River Delta | 20,688 | 4,623 | 2,554 | 123 |
| N. C. Coast | 12,718 | 2,141 | 1,183 | 93 |
| S. C. Coast | 9,605 | 1,749 | 966 | 101 |
| Central Highlands | 7,383 | 429 | 237 | 32 |
| Southeast | 3,280 | 935 | 517 | 157 |
| Mekong Delta | 6,173 | 12,831 | 7,089 | 1,148 |
| Total | 79,938 | 24,962 | 13,792 | 173 |

Source: GSO, 1996, p. 40-41 and 66-67.

Table 2.7 Trends in production, consumption, and export

| Year | Paddy production (000 tons) | Rice production (000 tons) | Rice export (000 tons) | Apparent consumption (000 tons) | Population (millions) | Apparent consumption per capita (kg/person/yr) |
|---------------|-----------------------------|----------------------------|------------------------|---------------------------------|-----------------------|--|
| 1985 | 15,875 | 8,771 | | 8,771 | 59.9 | 146.4 |
| 1986 | 16,003 | 8,842 | | 8,842 | 61.1 | 144.7 |
| 1987 | 15,103 | 8,344 | | 8,344 | 62.5 | 133.5 |
| 1988 | 17,000 | 9,393 | | 9,393 | 63.7 | 147.4 |
| 1989 | 18,966 | 10,479 | 1,420 | 9,059 | 64.8 | 139.8 |
| 1990 | 19,225 | 10,622 | 1,624 | 8,998 | 66.2 | 135.9 |
| 1991 | 19,622 | 10,841 | 1,033 | 9,808 | 67.8 | 144.7 |
| 1992 | 21,590 | 11,928 | 1,946 | 9,982 | 69.4 | 143.8 |
| 1993 | 22,837 | 12,617 | 1,722 | 10,895 | 71.0 | 153.5 |
| 1994 | 23,528 | 12,999 | 1,893 | 11,106 | 72.5 | 153.2 |
| 1995 | 24,964 | 13,793 | 1,998 | 11,795 | 74.0 | 159.4 |
| 1996 | 29,100 | 16,078 | 3,003 | 13,075 | 75.5 | 173.2 |
| 1997 | 30,600 | 16,907 | 3,600 | 13,307 | 77.0 | 172.8 |
| Annual growth | 5.6% | 5.6% | 12.3% | 3.5% | 2.1% | 1.4% |

Source: Paddy output from GSO (1996). Rice output assuming 65% conversion and 15% losses. Exports from GSO(1996). Apparent consumption calculated as rice output minus exports. Population from GSO (1995).

Table 2.8 Domestic demand for rice

| Household type | Per capita rice consumption (kg/person/yr) | Population in 1997 (million) | Total rice consumption (million tons/year) | Percent of national demand |
|--------------------|--|------------------------------|--|----------------------------|
| Average | 153.1 | 77.0 | 11.8 | 100.0 |
| Income group | | | | |
| Poorest 20 % | 143.5 | 15.4 | 2.2 | 18.7 |
| 2 | 158.9 | 15.4 | 2.4 | 20.8 |
| 3 | 160.8 | 15.4 | 2.5 | 21.0 |
| 4 | 157.2 | 15.4 | 2.4 | 20.5 |
| Richest 20% | 145.2 | 15.4 | 2.2 | 19.0 |
| Region | | | | |
| Northern Uplands | 161.0 | 13.1 | 2.1 | 17.9 |
| Red River Delta | 167.8 | 15.4 | 2.6 | 21.9 |
| N. C. Coast | 151.2 | 10.8 | 1.6 | 13.8 |
| S. C. Coast | 136.4 | 8.5 | 1.2 | 9.8 |
| Central Highlands | 162.2 | 3.1 | 0.5 | 4.2 |
| Southeast | 133.1 | 9.2 | 1.2 | 10.4 |
| Mekong River Delta | 151.9 | 16.9 | 2.6 | 21.8 |

Source: 1994 Household Survey, cited in GSO, 1998, p. 847-850.

Table 2.9 Trend in rice exports

| Year | Rice exports (000 tons) | Rice exports (million US\$) | Total exports (million US\$) | Value of rice exports as a percentage of total exports |
|---------------|----------------------------|--------------------------------|---------------------------------|---|
| 1991 | 1,033 | 234.5 | 2,087 | 11.2% |
| 1992 | 1,946 | 417.7 | 2,581 | 16.2% |
| 1993 | 1,722 | 361.9 | 2,985 | 12.1% |
| 1994 | 1,893 | 424.4 | 4,054 | 10.5% |
| 1995 | 1,998 | 530.0 | 5,449 | 9.7% |
| 1996 | 3,003 | 856.0 | 7,256 | 11.8% |
| 1997 | 3,600 | 885.0 | 8,700 | 10.2% |
| Annual growth | 23.1% | 24.8% | 26.9% | |

Source: General Statistics Office.

Table 2.10 Rice exports by destinations (1995)

| Country | Volume (000 tons) | Percentage of total |
|-------------|----------------------|---------------------|
| Indonesia | 511.9 | 25.6% |
| China | 463.8 | 23.2% |
| Cuba | 200.1 | 10.0% |
| Malaysia | 147.8 | 7.4% |
| Philippines | 104.5 | 5.2% |
| Others | 571.9 | 28.6% |
| Total | 2,000.0 | 100.0% |

Source: Calculated from Ministry of Trade data.

Table 2.11 Allocation of 1997 rice export quota

| Exporter | Quota (000 tons) | Percentage of total |
|------------------------------|---------------------|---------------------|
| An Giang province | 450 | 12.5% |
| Can Tho province | 330 | 9.2% |
| Dong Thap province | 330 | 9.2% |
| Long An province | 210 | 5.8% |
| Vinh Long province | 250 | 6.9% |
| Kien Giang province | 130 | 3.6% |
| Tien Giang province | 270 | 7.5% |
| Tra Vinh province | 150 | 4.2% |
| Soc Trang province | 120 | 3.3% |
| Bac Lieu province | 70 | 1.9% |
| Ca Mau province | 30 | 0.8% |
| Ben Tre province | 20 | 0.6% |
| Thai Binh province | 40 | 1.1% |
| Ho Chi Minh City | 120 | 3.3% |
| Sub-total for provinces | 2,520 | 70.0% |
| Southern Food Corp. | 620 | 17.2% |
| Northern Food Corp. | 300 | 8.3% |
| Gedosico Imp.-Exp. Co. | 100 | 2.8% |
| Central Agri. Material Corp. | 30 | 0.8% |
| Grain Imp.-Exp. Co. | 30 | 0.8% |
| Sub-total for central SOEs | 1,080 | 30.0% |
| Total | 3,600 | 100.0% |

Source: Circular No. 01/1998 TM/XNK dated 14 February 1998 by Ministry of Trade. Cited in Vietnam Business 8 (6) 16-31 Mar. 1998.

Note: The 3.6 million ton quota is for the period January-September 1998. Another 0.4 million tons is to be allocated for the final three months of the year, pending information on the size of the harvest.

3. COFFEE PROCESSING

3.1 Background

Coffee was introduced into Viet Nam by French missionaries in 1857. Coffee plantations were established in the North Midlands in the late 1800s and in the North Central Coast in the early 20th century. In the 1920s, suitable coffee growing areas were discovered in the Central Highland region. By 1945, Viet Nam had about 10 thousand hectares of coffee, most of which was in the central region. Because of the low yields (around 0.5 tons/ha), production was just 4500 tons, most of which was exported to France (DSI, 1998).

During the period when Viet Nam was divided (1954-1975), the north took over French plantations and formed 24 state cooperatives. Production reached close to 5000 tons in 1968, but declined subsequently. In the South, coffee production reached a similar level in 1973. Following reunification and peace, coffee production more than doubled to reach 12 thousand tons in 1980 (DSI, 1998). This expansion was facilitated by policies to relocate people from the densely populated north and coastal areas toward the thinly populated Central Highlands. Although ethnic minorities predominated in the region, almost all of the immigrants and most of the new coffee farmers were ethnic Vietnamese (*kinh*). The government has tried to redress some of the resentment resulting from this immigration by establishing coffee schemes for ethnic minority households in the Central Highlands.

Between 1980 and 1985, coffee area and production were stagnant and yields were low (around 1 tons/ha). For reasons discussed below, coffee production has expanded dramatically since 1986. Coffee exports now account for 6-12 percent of the total value of exports, making it the second most important export crop after rice.

3.2. Coffee Production

3.2.1. Crop characteristics

Coffee is a perennial tree that grows in the tropics (between 25° N and 25° S) where the temperature ranges from 20 to 25° C. Coffee trees takes three to five years to begin producing. The lifespan is around 40 years, but maximum yield occurs in trees

between five and fifteen years old.

The two main types of coffee are arabica and robusta. Arabica coffee is grown at higher altitudes (1200 to 2000 meters), has a milder flavor, and fetches higher prices on world markets. Robusta is normally grown at lower altitude (below 1200 meters) and is easier to process than arabica (Brown, 1991).

The flowering of the coffee tree is generally triggered by rainfall, and the tree produces coffee cherries 6-9 months after flowering. The cherries ripen at different rates in the same field and even in the same tree. Harvesting is done by hand and is quite labor-intensive. *Strip-picking* involves removing all the cherries from the tree at one time. This method of harvesting is more common with the lower-priced robusta coffee. *Selective picking* involves selecting the ripe cherries for harvesting over the course of several picking sessions. This method is more often used with arabica coffee, particular when the wet processing method is used (see section 3.3.1).

3.2.2. Production trends

Starting in 1986, the *doi moi* reforms allocated cooperative land to farm households, legalized private ownership of productive assets, deregulated agricultural marketing and prices, and devalued the exchange rate. These reforms resulted in better farm-level prices for coffee and stimulated private farmers to expand coffee cultivation. At the same time, many of the state coffee farms began allocating plots to workers, converting them from members of a cooperative to tenants or renters who were responsible for the production of a given parcel of land. These two trends reduced the proportion of coffee area under state farm management from 75 percent to perhaps 10-20 percent today.

The results of these policy changes have been dramatic. Over the period 1986-96, coffee producing area grew at 21 percent annually, while yields have grown almost 6 percent annually. As a result, coffee production has expanded 12 fold. Coffee exports have come to account for 6-12 percent of the total value of Vietnamese exports (see Table 3.1). On the world market, Viet Nam has become the fourth largest coffee exporter.

3.2.3. Geographic and seasonal patterns

The coffee harvest takes place between November and February. Because the harvest occurs during the dry season, the cherries can be dried outside by spreading them out on the ground. As will be discussed later, this method is inexpensive but results in lower quality coffee.

Coffee production is concentrated in the Central Highlands (80 percent) and the Southeast (16 percent). The province of Dac Lac alone produces about 58 percent of national coffee output, with Dong Nai and Lam Dong contributing 13-16 percent each (see Table 3.2). The average yield is 1.8 to 2.0 tons per hectare. There is some regional variation in yield, with the most important coffee producing regions having higher yields than the rest of the country. For example, the yields in the Central Highlands and the Southeast are around 1.9 tons/ha compared to less than 1.1 tons/ha in the other regions.

Over 90 percent of the coffee produced in Viet Nam is robusta. However, the government is promoting the expansion of arabica areas, particularly in the North Uplands region. The French development assistance agency is helping to expand arabica area by 40,000 hectares in the north.

3.2.4. Production systems

Coffee is grown under a wide range of production systems, including small farms of less than one hectare and state farms with more than 1000 hectares. Around 85-90 percent of the coffee area is cultivated by small farmers¹⁰. These farm households may receive credit or fertilizer from a buyer, but they own their own land and operate it as an independent business. A survey of coffee farmers in the Central Highlands revealed that the average coffee farmer had 1.2 hectares of land, of which just 0.7 hectares was planted with coffee. If we accept these figures as representative, then there are around 300 thousand households growing coffee. Furthermore, the survey indicates that these households obtained over 90 percent of their income from coffee. The average income of these coffee farmers was about US\$ 225 per capita (Binh, 1997). This is about 25 percent higher than the national average income and 50 percent higher than the rural average income, according to the Survey on Households of 1994 (GSO, 1998: 823).

¹⁰ The exact figure is difficult to obtain, partly due to different definitions of coffee area (planted vs. harvested) and partly because state farms have allocated plots to households, blurring the line between the two production systems.

At the other extreme are state farms, accounting for 10-15 percent of coffee area. This includes state farms managed by the Viet Nam Coffee Corporation (VINACAFE) and state farms under provincial control. VINACAFE has state farms with 22 thousand hectares of coffee, accounting for about 10 percent of the 1996 planted area. Seven of these farms are in Dak Lak province, operating under the name Viet Duc. In addition, the government is promoting arabica coffee production by establishing state farms in the North Mountain and Midlands region with the idea of eventually allocating plots to farmers. In addition, there are a number of state farms under provincial management. For example, Dak Lak has at least five such state farms (see Table 3.4).

Some of the state farms were originally private coffee plantations that were abandoned during the war and converted into state farms soon after the war. Others were started in the 1980s to fulfill the export agreements with the east bloc countries. And a third group have been formed since the *doi moi* reforms as a way to promote coffee production and to generate revenue for the province or the central government. As part of the *doi moi* reforms, most of the land has been divided into plots for cultivation by individual farm households. The state farm retains ownership of the land and the trees and provides a variety of inputs and services to the farmer: irrigation, fertilizer, credit, and so on. In some cases, the households are similar to tenant farmers, paying a proportion of their output to the state farm management for the use of the land and trees, as well as for fertilizer, water, and services provided by the management. In other cases, the household are renters, paying a fixed amount each year for the use of the land, the trees, and any additional inputs provided by the state farm. Some state farms split the cost and profits of coffee production in a joint-venture-like arrangement. Most farms use a combination of these different organizational forms. For example, the Phuoc An State Farm in Dak Lak has 2000 ha of centrally managed coffee and 1000 ha produced in "joint-venture" with farm households. The Thang Loi State Farm, also in Dak Lak, 700 ha of centrally managed coffee land and 1300 ha in two different types of joint venture arrangements.

3.3. Coffee Processing And Marketing

3.3.1. Technical aspects

Coffee processing can be divided into two parts. Primary processing involves the

conversion of harvested coffee cherries into green coffee beans¹¹ and is always done in the producing country. Secondary processing involves the transformation of green coffee beans into final consumer products such as roasted beans, ground coffee, and soluble (instant) coffee. Secondary processing is almost always carried out in the consuming country for reasons discussed later. Thus, the vast bulk of international trade in coffee is in the form of green coffee beans.

There are two types of primary processing, known as the dry method and the wet method. The first, the dry method, is generally used with robusta coffee. It involves harvesting the coffee cherries and drying them to reduce the moisture content from 25-60 percent to 10-15 percent. The drying may be done by spreading the cherries out in the sun for 5-10 days, by mechanical drying, or by some combination of the two. The purpose of drying is to loosen the inner green bean from its husk. After drying, hulling machines are used to removing the husk, leaving the green bean. The huller usually involves a large, helically pitched screw that turns inside a matching concave chamber. The friction among the beans causes the husk to be rubbed off. The quality of the green bean can be further improved by cleaning, sorting, and grading. Particles of different size are separated using a stack of three to five screens with different sized holes that is made to vibrate. Particles of different density are separated using either a vibrating slanted surface or jets of air that come up through many tiny holes in a table. Finally, particles of different color can be separated using a color sorter, which uses an electronic “eye” to sense the color of each bean passing through a set of parallel shoots. The device is connected to a mechanical switch that diverts off-color beans to another channel. Color sorters are the most expensive and sophisticated elements of coffee processors and are only found in a handful of processing plants in Viet Nam. A series of bucket elevators and conveyor belts move the beans from one machine to the next.

The second type of primary processing, the wet method, is generally used for arabica coffee. First, the coffee cherries are fed into a pulping machine that removes the soft outer layer, leaving the green bean and a sticky covering. The beans are then put in

¹¹ The terminology is somewhat confusing, particularly since the Vietnamese term for coffee cherries translates as “green coffee”.

tanks of water for 6-72 hours. During this time, the sticky covering ferments, allowing it to be removed by repeated washing. Finally, the green beans are dried, cleaned, and sorted as in the dry method.

Secondary processing includes decaffeination, blending, roasting, grinding, and transformation into soluble (instant) coffee. Decaffeination is a five-part procedure involving the use of chemical solvents to remove caffeine and the use of steam to remove the solvents. Blending involves mixing different coffee varieties (often arabica and robusta varieties) to achieve a mild, consistent flavor. Roasting involves cooking the beans using hot air for a period of 5 to 20 minutes. Grinding converts the roasted beans into a powder for use with various types of filter coffee machines. Producing soluble (instant) is a complex and capital-intensive procedure involving the extraction of soluble solids, filtering, and spray- or freeze-drying. Robusta coffee is preferred for making soluble coffee because it retains more of its original flavor in the process (Brown, 1991).

3.3.2. Marketing channels

In the past, almost all coffee in Viet Nam was robusta and most of it was grown on state farms. The harvested cherries were dried and delivered to the state farm processing plant. State farms processing plants generally have capacities of around 3000 tons, making them appropriate for farms of around 1000 to 1500 hectares. The green beans would then be delivered to the port for export under a government-to-government contract.

Since *doi moi*, the marketing channels have become much more complex. Farmers associated with a state farm generally sell their output to the state-farm processing plant, though they have the option of selling some outside provided fulfill their financial responsibilities to the state farm. This option has created problems for some state farms, because farmers can more easily avoid repaying debts to the farm management.

Independent farmers may sell the dry cherries to a private trader, to an agent of a processing plant, or directly to a processing plant. An increasingly common pattern, however, is for the farmer to pay a small coffee processor to hull the dry cherries, retaining ownership of the green beans. These small processors are privately-owned locally-made hullers with capacities of less than 1000 tons/year. Many of them are mobile, allowing them to be moved from one production area to another during the

harvest season. The resulting green beans are not very clean and need to be reprocessed for export. On the other hand, the beans (unlike the dry cherries) can be stored for up to two years, giving the farmer the option of holding the coffee in expectation of a high price. In addition, these small processors reduce the weight of the coffee by 40-44 percent, reducing the cost of transporting the coffee to a larger processing facility. One researcher estimates that about one half of all coffee is processed in this way.

The green bean are eventually sold to a trader or an agent of a larger processing plant. State-owned enterprises with processing plants, including both state farms and specialized processor-exporters, are allowed to export directly. Until March of this year, private processing plants, even large ones, did not have the right to export directly. Instead, they were forced to export through state enterprises, most often the specialized processor-exporters.

A small portion (perhaps 18,000 tons or 8 percent of 1996 production) of the green coffee beans are consumed within the country. Most of this is sold to consumers as roasted beans. One VINACAFE factory in Bien Hoa (Dong Nai province) makes ground coffee and soluble (instant) coffee. The volume is quite small: the use of green coffee beans is 600 tons/year, from which less than 150 tons of soluble coffee and 50 tons of ground coffee are produced.

3.3.3. Structure of coffee processing and export sector

Official statistics on the processing capacity or volumes of coffee processors do not appear to be available. This section uses information collected from interviews in Dak Lak, which represents about 60 percent of national production.

As is generally the case, the smallest processors are the most numerous. The number of small first-stage coffee processors in Dak Lak is estimated to be several hundred, with an average capacity of less than 1000 tons. As mentioned above, these plants may process half of the output, but the resulting beans cannot be exported without further processing.

In addition, it is estimated that Dak Lak has 10-15 private processors in the range of 1000 to 2000 tons per year. These plants have not exported directly, partly because as private enterprises they were not allowed to. But there is some question as to whether

they are large enough to establish and maintain contacts with importers and achieve the quality needed for direct export.

The processing plants on state-farms are usually medium sized with capacities of 3000 tons per year. There are about 14 processing plants associated with state farms in Dak Lak. VINACAFE has seven processing plants in Dak Lak which are supplied by the seven state farms that are part of the Viet Duc Coffee Company. In addition, there are processing plants on the provincially-managed state farms such as Thang Loi, Phuoc An, and the Thang 10 (October) Coffee Farm in Dak Lak.

The larger processing plants (those with capacities of at least 5000 tons) tend to be owned by companies that specialize in processing and export. Most of the processing plants this size are owned by state enterprises. Some of the largest processor-exporters make use of several processing plants. For example, INEXIM has three plants with capacities of 5000, 7000, and 10,000 tons per year. The largest single processing plant is the one of Dak-Man, a joint venture between DALIMEXCO (a Dak Lak state enterprise) and E.D.& F. Mann, a German company. This plant has a capacity of 15-20 thousand tons.

There are three private companies that have capacities of 5000 tons or more in Dak Lak. The largest is Hiep Phuc Trading Company, which processes around 8000 tons. Since private exporters have not been allowed to export, Hiep Phuc exports through SIMEXCO. Lien Phat Coffee Company and Doan Ket Coffee Company each process about 5000 tons per year. These companies report exporting through SIMEXCO, INEXIM, and others.

The structure of exports is more concentrated than processing, though the number of exporters is large and increasing. There are currently around 100 companies that export Vietnamese coffee, almost all of which are also coffee processors. The exports of the 15 largest companies account for 60 percent of the total. The remaining companies export less than 2000 tons each, with some exporting only a few hundred tons. The number of exporters will probably increase as private processors are allowed to export, although it is unclear how many of them will have the resources and expertise to export directly.

3.3.4. Costs and competition

The costs of coffee processing are difficult to specify, partly because of the variety of marketing channels, the different sizes and locations of the coffee plants, and seasonal variation. Because of the growing importance of two-stage processing, involving a small huller near the farm and a larger reprocessor, Table 3.5 presents the approximate costs for this type of marketing channel.

The most striking aspect of this table is the small size of the margins between the farm-gate and the FOB price¹². The cost of hulling is \$ 36 per ton of green beans, the cost of reprocessing is about US\$ 30 per ton, compared to an FOB price of close to US\$ 1800. Transportation costs from the farm to the plant and from the plant to Ho Chi Minh City add another US\$ 20 per ton. Overall, the cost of transportation, hulling, and processing account for less than 5 percent of the FOB value. This tight margin highlights the importance of buying good quality cherries or green beans at a good price. Since the FOB price is largely outside of the control of the processor-exporter, small errors in buying can have large consequences on the profit margin.

Another interesting aspect of the table is that the labor costs are only US\$ 5 per ton. This figure should be interpreted in context however. For a plant that processes 5000 tons per year, this would imply a payroll of roughly US\$ 25,000. Given that the average monthly wage for workers is about 700,000 VND or US\$ 54, this implies that the plant generates about 460 person months of employment per year.

The opinions of processors was quite consistent in recognizing that the increase in the number of traders and processors had increased the level of competition to buy the farmers' product. Several interviewees noted that farmers now have a good idea of the daily changes in the price of coffee on the London commodity exchanges. Many of the

¹² Note that all prices are expressed in terms of the value per ton of processed green bean. The farmgate price of dry coffee cherries per tons of dry cherries would be about 56 percent of the figure in the table, based on the conversion ratio between the two forms.

coffee buyers subscribe to Reuter's wire service, giving them up-to-date information on the prices which they use in negotiation with farmers. In addition, the London coffee prices are broadcast on local television news shows.

Because the margin is so small, it is even possible for the green coffee bean buying price to exceed the FOB price. This is possible because the buying price is also affected by expectations of changes in coffee prices and the exchange rate over the next month or two. If traders or processors expect prices to rise or the exchange rate to depreciate, they will be willing to buy at prices above the FOB price. Indeed, some processors argued that this was currently the case (as of April 1998).

Virtually all processors recognized that extending direct export rights to private coffee processors would further increase the competition, giving farmers better prices. Some of the state enterprises expressed the view that inexperienced processors would try to export low-quality coffee, thus damaging the reputation of Vietnamese coffee in general. However, some of the private processors, such as Hiep Phuc and Doan Ket, noted that they have already developed contacts among importers and have developed a reputation for quality as a result of their indirect export contracts.

3.4. Coffee Consumption

3.4.1. Domestic coffee consumption

Viet Nam is traditionally a tea-drinking country. Coffee consumption is quite modest in per capita terms, according to different sources. In recent years, apparent consumption¹³ of green coffee is about 20 thousand tons, or 9 percent of production. Most of this is purchased in the form of roasted coffee, either as beans or ground, rather than soluble (instant) coffee. There are several brands of roasted coffee, all of them Vietnamese, and VINACAFE appears to dominate this market. However, it is likely that most roasted coffee is purchased in bulk without packaging or brand, particularly outside the major cities.

¹³ Apparent consumption is calculated as production minus exports. Because of stocks held over from one year to the next, apparent consumption fluctuates from year to year so this figure is based on the average over recent years.

The Bien Hoa coffee factory in Dong Nai, owned by VINACAFE, produces about 150 tons of soluble coffee per year, equivalent to about 400 tons of green coffee. Instant coffee produced by Vinacafe is under strong competitive pressure from brands from Singapore and Indonesia, including Nescafe, MacCoffee, and Eagle King. Casual inspection of retail outlets suggests that Vinacafe has a minority position in the domestic instant coffee market.

Analysis of the patterns in coffee consumption across income categories using the VLSS suggests that coffee consumption will rise at approximately the rate of income growth. If this pattern holds over time and Viet Nam continues to maintain its current pace of economic growth, we would expect per capita coffee demand to rise by 6 to 8 percent per year.

3.4.2. International coffee market and consumption

Every year, over 4 million tons of green (unroasted) coffee is traded. The largest coffee importers are the United States, Germany, and Japan, followed by other European countries. Thus, it is not surprising that the largest markets for Vietnamese coffee are the United States (24 percent) and Germany (17 percent). Seven other European countries and Japan make up the ten largest importers of coffee from Viet Nam. This pattern is relatively new, however. Until recently, the embargo on Vietnamese exports meant that most Vietnamese coffee was exported to Singapore where it was reprocessed and exported.

The largest coffee exporters are Brazil and Colombia. Brazil produces medium to low-quality coffee in a production system that includes many large-scale coffee plantations. In contrast, Colombia produces high-quality arabica coffee, due largely to the fact that Colombian coffee is grown by small farmers who invest more labor in selective harvesting and other quality-control measures (see Box 3.1). The high quality and good reputation of Colombian coffee results in a higher price in world markets.

Coffee producers in Asia and West Africa generally grow robusta coffee rather than arabica because robusta is easier to process and it grows better in warm climates. Robusta coffee receives a lower price on world markets than arabica because it is less mild and less aromatic than arabica. On the other hand, robusta coffee beans are more resistant to the percolation and dehydration involved in making soluble coffee. Thus,

robusta is used for instant coffee and for blending with higher price arabica.

The international coffee market tends to go through “boom and bust” cycles as a result of two factors: 1) the largest coffee exporter, Brazil, has occasional frosts and 2) there is a lag in the supply response to coffee price changes. A significant part of Brazil’s production area is far enough south to experience coffee-damaging frosts every ten years or so. Any reduction in Brazilian exports (or indeed the expectation of reduced supply) pushes coffee prices up on the world market. Coffee farmers elsewhere respond to the higher price by planting new coffee trees. There is a 3-5 year period between planting new trees and harvesting them, so it takes several years for the supply of beans to respond to the higher price. During this time, farmers continue to plant new trees. When the newly planted trees begin to produce, the price returns to normal. But for several years new trees continue coming into production, pushing coffee prices below the long-term average. When this happens, farmers in marginal areas may neglect coffee trees, decline to harvest them, or actually uproot trees. Eventually, the market stabilizes until the next frost in Brazil.

In 1962, the International Coffee Organization was formed to support and stabilize world coffee prices. Under the ICO, a series of International Coffee Agreements were signed establishing export quotas, buffer stocks, and “trigger prices”. The ICAs did not succeed in eliminating the boom and bust cycles, however. In 1975 and again in 1985, Brazilian frosts drove world coffee prices up, only to have then collapse later. Like any cartel, the ICA created strong incentives to “cheat” (to export more than the quota amount), particularly for exporters with foreign exchange shortages. Increasing hostility to international commodity agreements by the United States and other importers led to the demise of the system in the early 1990s.

Box 3.1: Coffee Industry in Colombia

Coffee was introduced to Colombia in 1732 by Spanish Jesuit missionaries. Commercial production and exports began in the mid-19th century and by the 1890, coffee represented 70 percent of Colombian exports. Coffee production continued to expand in the 20th century, although its share of total exports has declined as the economy has diversified and industrialized. In recent decades, coffee exports have grown from 240 thousand tons in 1960 to 840 thousand tons in 1995, all of which is arabica coffee. In the past several years, exports have fallen to 600 thousand tons, but Colombia remains the second largest coffee exporter in the world after Brazil.

Coffee is grown by 300 thousand small and medium-sized farmers with an average of 3 hectares each. The production areas are on the slopes of the Andes Mountains at 1200 to 1600 meters above sea-level. These areas are characterized by rich volcanic soil, cool temperatures all year (17-22° C), and enough rainfall (1500-2500 mm per year) to make irrigation unnecessary.

Coffee farmers in Colombia practice selective picking, in which only the ripe coffee cherries are harvested on each pass. As a result, the coffee trees are typically harvested 68 times per season. Growers themselves carry out much of the processing, using the wet processing method. The first step is to remove the pulp with a pulping machine. Next, the beans are put in a tank of water for 12-24 hours to allow the sticky coating to ferment. Third, the beans are washed with clean water to remove the coating. Finally, the beans are dried, either by sun or in mechanical dryers. The green coffee beans are then sold for further cleaning and selection. The processing and export industry is composed of both private companies and coffee cooperatives. Although Colombia does produce soluble coffee, virtually all of its exports are in the form of green (unroasted) beans.

The *Federacion Nacional de Cafeteros Colombianos* (the National Federation of Colombian Coffee Growers or FEDECAFE) has played an important role in developing the coffee sector. With revenues generated from a small export tax, FEDECAFE funds coffee research at various centers, an effective extension system, and a coffee inspection service. It also funds projects to improve infrastructure and social services in coffee-growing areas and to diversify income among small farmers. FEDECAFE also sponsors a successful world-wide advertising campaign to maintain Colombia's reputation as a high-quality producer. The advertising campaign is only successful, however, because it is backed up by efforts to ensure coffee quality. Colombia defines six grades of export-quality *Excelso* coffee based on seven criteria: humidity, aroma, color, bean size, defects, foreign material, and taste. Coffee that does not meet *Excelso* standards cannot be exported by law and is marketed domestically.

3.5. Prospects And Policy Issues

3.5.1. Prospects for the domestic market

Given continued growth in per capita income in Viet Nam, we can expect three trends in domestic demand for coffee.

- The per capita demand for coffee will rise somewhat more quickly than per capita income. This follows from the fact that the income elasticity of coffee demand is greater than one. For example, if income growth is 6 percent and the elasticity is 1.5, we would expect 9 percent growth in per capita coffee demand. At this rate, per capita demand would double in eight years.
- The demand for soluble coffee will rise more quickly than the demand for ground coffee and coffee beans. This is because soluble coffee is more expensive, but also more convenient. As incomes rise and a premium is put on convenience, consumers will slowly shift to soluble coffee.
- The demand for roasted coffee will shift from bulk coffee beans to packaged and ground coffee and to branded coffee. This is related to the convenience factor mentioned above and to the quality assurance associated with brands.

These trends will have little effect on the overall demand for coffee beans because domestic demand is such a small portion of total. They will, however, create a larger market for VINACAFE's Bien Hoa coffee factory. On the other hand, the government has recently approved a joint venture with Nestle to build a second soluble coffee factory in Dong Nai. This plant will provide stiff competition for the Bien Hoa factory, particularly given that the Nescafe brand is already well-established in Viet Nam. At the same time, the joint venture, with its name brand and international expertise in management and marketing, will stand a much better chance of competing against imported soluble coffee.

3.5.2. Prospects for export markets

In some ways, the prospects for Vietnamese coffee exports are bright. The demand for coffee is strong, as reflected in relatively high world prices. Coffee demand continues

to grow, although at a modest rate. Furthermore, Viet Nam still accounts for a relatively small share of world exports so that increases in output do not have a noticeable effect on world prices. And there is a growing interest in coffee, particularly higher quality coffee, in Western countries. One sign of this is the greater availability of different types of coffee beans in supermarkets. They are labeled both by the country of origin and by the roasting method. Another indication is the rapid growth in the United States of coffee shops selling premium coffee in the medium and large cities, the most notable example being the successful *Starbucks* chain.

At the same time, Viet Nam faces a number of issues in developing its coffee sector. First, although the taste of Vietnamese coffee beans is considered good for robusta, it does not fetch as high a price as Indonesian coffee on the world market. Second, the system for carrying out research and extension in coffee production and processing is weak and underfunded. Third, the world market for coffee is notoriously unstable and prices will probably fall over the next few years. Fourth, virtually all of Viet Nam's coffee exports are robusta, but arabica coffee has a higher price and probably better growth prospects. Fifth, often it is argued that Viet Nam must carry out more processing in the country, particularly secondary processing. Sixth, VINACAFE faces conflicts between its role as a commercial processor-exporter than must cover its costs and its developmental role which, while socially beneficial, are not profitable to the enterprise. Finally, Viet Nam's entry into the ASEAN-sponsored ASEAN Free Trade Agreement will have consequences for the coffee industry. These issues are discussed below.

3.5.3. Coffee quality

As shown in Table 3.7 the Vietnamese system for classifying green coffee beans for export has three grades based on four criteria. According to interviews with SIMEXCO, one of the largest processor-exporters in the country, only 2 percent of Vietnamese coffee exports satisfy the strict requirements of Grade 1. And yet, on international markets Grade 1 coffee beans are worth US\$ 50 to 60 per ton more than Grade 2 and US\$ 100-120 per tons more than Grade 3.

The first and most commonly cited explanation for Viet Nam's relatively low quality is the drying procedures used by Vietnamese coffee farmers. As Brown (1991) notes:

Drying is critical to both wet and dry processing. Flavor, bean color, and other quality factors are materially affected at this stage. Production of high-quality beans requires the correct combination of temperatures, duration of heat, ventilation, and light.

Many of the state farms use brick drying yards and some farmers have invested in concrete yards or plastic sheeting, but the overall capacity is limited. According to one source, Viet Nam has just 0.8 hectares of suitable drying ground per 100 hectares of producing coffee, compared to the optimal level of 3 hectares per 100 hectares of coffee (VET, 1998, p 36). The remainder of the coffee is dried on the ground or even in roads. This practice introduces stones, dirt, and other foreign material. Some of this foreign material can be removed in processing, but at a cost. Off-color beans can also be removed in processing, but this requires laborious hand selection or expensive color sorting machinery. The effect of drying on flavor cannot be corrected in processing.

A related problem is that occasionally it rains during the drying season. If the beans remain wet for too long, mold will develop with serious implications for the taste and consequent value of the green coffee beans. The long-term solution to these problems involves farm-level mechanical driers and/or storage facilities.

The second most commonly cited problem is processing facilities. Coffee processing is not a very complex procedure. As described earlier, it involves vibrating screens with different sized holes to separate particles of different sizes, vibrating surfaces to separate according to density, and a series of bucket elevators and conveyor belts to move the beans from one machine to the next. The most expensive piece of machinery in a coffee processing plant is the color sorter. Not only does it cost as much as the rest of the machinery combined, but calibrating the color sorter is a complex and skilled task.

Although there is little doubt that the machinery used in Vietnamese coffee processing plants is relatively simple, this does not necessarily imply that capital investment should be the highest priority. More detailed and technical evaluation of the processing facilities would be necessary to make this judgement. It should be noted that there is a tendency of company directors and plant managers to attribute all problems to inadequate machinery, perhaps in the expectation that the interviewer will facilitate the approval of loans for capital investment. This is partly a reflection of the problems of

Vietnamese financial markets in which investment decisions are largely determined by the government using political criteria rather than by banks using financial ones. It is also a reflection of the engineering approach which dominated in the pre-reform era, in which production was seen as a technical rather than an economic problem.

3.5.4. Research and extension

The research and extension system for the coffee suffers from the general neglect of agricultural research in Viet Nam, compounded by the fact that the coffee sector has grown so quickly that the supporting institutions to maintain the sector have not been able to develop in tandem. VINACAFE operates the EAKMAT Coffee Research Institute in Dak Lak province. The research activities are being supported by a GTZ-funded coffee project. Nonetheless, the allocation of financial and human resources to coffee research is inadequate given the importance of the coffee sector and the high returns that agricultural research yields. Three areas deserve particular attention.

- The first is farm-level post-harvest technology. More attention needs to be given to developing low-cost methods for drying and storing coffee in order to avoid problems of foreign materials, mold, and uneven drying. Coffee farmers have generated relatively high incomes over the past few years, but they lack information on how to invest in their coffee processing in ways that will increase the price they receive for their coffee.
- The second area is coffee disease. Because coffee is a relatively new crop, disease has not been a problem. But as the area planted to coffee grows, the risk of an outbreak increases. This is particularly true given the concentration of coffee production in Dak Lak province and the fact that the coffee is grown under irrigated conditions, thus facilitating the spread of soil-borne diseases. An early warning system for such diseases depends crucially on farmers' ability to recognize symptoms and report it to the appropriate authorities.
- The third area for research is water resources. Viet Nam is somewhat unusual in growing coffee under irrigated conditions. The El Niño-related drought this year highlights the importance of water for the coffee sector, but the problem will not disappear with the end of the drought. Roughly 30 percent of the water used to irrigate the coffee in Dak Lak is ground water and the rate of

water extraction may exceed the maximum sustainable yield. The evidence of this is that the water table appears to be falling. The sustainability of the coffee sector is dependent on finding ways to reduce ground water use to a sustainable level. The solution will probably require more research into the size and nature of the problem, investments to make more effective use of surface water resources, the development of recommendations for reduced water use in coffee production, and some system for pricing or taxing water use to generate the appropriate incentives for conservation.

The key issue is how to fund coffee research and extension efforts. Perhaps the most reliable funding method would be through a small tax on coffee exports. Even a tax of \$15/ton (about 1 percent of the F.O.B value) would generate US\$ 4.5 million dollars per year. In Colombia, the National Federation of Coffee Growers (FEDECAFE) is funded this way and has been a major force in coffee research, extension, and community development in coffee growing areas (see Box 3.1). It is important to establish a method for feedback to ensure that the organization caters to the needs of coffee farmers. One approach would be to subject the tax to a referendum among coffee growers every few years.

3.5.5. International price volatility

As discussed above, the international coffee market is subject to volatility due, in large part, to supply shocks in Brazil combined with the lag between price changes and supply response. There are no easy solutions to this problem, although there are some policy options.

Some participants in the coffee sector propose a *buffer stock*, in which the government would buy coffee when prices are low and sell when they are high. The government might make a profit in these transactions, but it is unlikely unless the government has better information about future trends in world supply and demand than specialized coffee traders that work in the commodity exchanges of New York and London. Because Vietnamese exports are small (less than 8 percent) relative to world trade, the operations of a buffer stock are unlikely to influence world markets. And because competition will maintain farmgate prices close to world prices, the buffer stock would not have much influence on domestic prices. Thus, a buffer stock is not likely to address the problem of volatile prices and could be expensive to the government.

Another option is to use a *variable levy*, an export tax that varies depending on world prices. In principle, an export tax would be imposed when world prices are high and the revenue would be used to pay for a subsidy when world prices are low. This would moderate the price variability within Viet Nam relative to the variability in world prices. The experience in other countries is not promising, however. In one case (Cameroon), the export tax revenue was spent on the over-expansion of the state enterprise managing coffee exports so that no assistance was available when world prices fell. In another case (Rwanda), the tax revenue was invested in state tin mines that eventually failed. Again, the funds were not available when world coffee prices fell.

A third option is to provide farmers with *information* to allow them to anticipate and prepare for price volatility. A study of a coffee boom in Kenya showed that farmers were more likely to save the temporary windfall associated with the boom than the government was. Thus, coffee farmers may be better protected by allowing them to receive the higher price and prepare themselves for the eventual decline. Although Vietnamese farmers are quickly learning about world coffee markets, they have less experience than coffee farmers in Kenya and other traditional coffee growing countries. For this reason, coffee extension services should emphasize the volatility of coffee prices and encourage farmers to be prepared for price declines. In Colombia, the National Federation of Coffee Growers has programs to help small farmers diversify their income sources to maintain food security in the event of lower coffee prices (see Box 3.1).

3.5.6. Arabica promotion

Arabica coffee accounts for less than 5 percent of coffee area in Viet Nam. Although arabica has a higher price on world markets, the “wet” process used for arabica is more complex. Coffee berries need to be picked selectively to get those of the right maturity. The berries are then depulped, soaked in a tank, allowing the sticky coating to ferment, and then washed. Finally, the berries are dried, cleaned, and sorted. In Colombia, the depulping, soaking, washing, and drying is done at the farm level, thanks to many decades of experience with coffee and an effective extension service (see Box 3.1)

Currently, the French development agency is helping to plant 40,000 hectares of arabica coffee in the north of the country. The idea of exploring the viability of arabica

coffee production is certainly a good one. However, it is worth raising two concerns with regard to this project.

First, even though arabica coffee gets a higher price than robusta on world markets, this does not necessarily make it profitable for Viet Nam. The profitability of arabica production in Viet Nam depends largely on the yields that can be obtained under local growing conditions, the additional costs of arabica processing, and level of quality than can be achieved. These factors can only be determined by pilot programs and careful cost-benefit analysis. It is not clear whether the project has invested sufficiently in background research to verify the economic viability of arabica coffee production in Viet Nam.

Second, arabica coffee is being promoted using a centralized production system in which Vinacafe builds a processing plant, grows the trees, and “rents” the plots to farmers to manage. This may be useful as a transitional phase, but the objective should be to establish independent coffee growers that are able to carry out the “wet method” processing. This is another case where the commercial role of Vinacafe as a processor-exporter may conflict with the developmental role of Vinacafe as the promoter of a stronger coffee sector.

3.5.7. Secondary processing

Some observers have argued that Viet Nam should carry out secondary processing (roasting, grinding, decaffeination, etc.) instead of exporting green coffee beans. The argument is that by processing the coffee further within the country, the domestic value added, employment, and income effects of the coffee sector would be enhanced. Although this argument is intuitively appealing, it is not necessarily true. The price difference between green coffee beans and soluble coffee generally corresponds to the processing costs in countries that are currently producing soluble coffee. Assuming that quality is not an issue, Viet Nam can increase its value added only if it can produce soluble coffee at a lower cost than other countries. If Viet Nam’s costs are higher, whether due to lack of domestic packaging materials, smaller plant size, or any other reason, the value added will be negative. Thus, processing investments must be subject to case-by-case evaluation of costs and benefits. A priori arguments and the experience of other countries are only useful to identify areas that deserve further study.

In the world coffee market, secondary processing is almost always done in the consuming country. In 1995, world exports of green (unroasted) coffee beans were 4.2 million tons, while exports of roasted coffee were just 220 thousand tons, less than 5 percent of total coffee exports (FAO Agrostat). One reason is that secondary processing usually involves blending arabica and robusta coffee to produce a consistent smooth flavor. This would not be possible currently in Viet Nam because of the lack of arabica coffee. Even in countries like Colombia that produces 600 thousand tons of high quality arabica coffee and has an international reputation in coffee, virtually all its coffee exports are in the form of green coffee beans.

Another factor is that roasted coffee is a highly differentiated product, with consumer preferences varying sharply across countries, particularly the high-income countries that form most of the world demand for coffee. In Europe, international trade in roasted coffee is limited because consumers will rarely accept coffee roasted in another country. For example, German consumers buy almost exclusively coffee that has been roasted in that country because of the specific taste that their processors give it.

One possibility would be to produce roasted or soluble coffee for low-income, relatively indiscriminating markets. In the end, however, this is a commercial decision that should be made by investors on commercial grounds, not by policymakers. It is difficult to identify an economic argument for promoting or subsidizing such an investment.

3.5.8. Role of VINACAFE

VINACAFE fulfills a variety of roles in the coffee sector. On the one hand, it is responsible for the promotion of the coffee industry in general. This includes implementing government policy regarding the expansion of arabica areas, research, extension, quality certification, and representing Viet Nam at international coffee fora. On the other hand, it is a competitor within the coffee industry, accounting for perhaps 10 percent of coffee production and around 25 percent of coffee exports. Mr. Khai, President of VINACAFE, believes that his company should concentrate on coffee processing and export. This response is understandable from the point of view of a commercial organization that is saddled with unprofitable functions such as research and extension. It illustrates the tension created by forcing a state enterprise to cover its own costs *and* fulfill a social function.

Although the social functions of quality control, research, and extension are not profitable to VINACAFE, they are almost certainly “profitable” from the point of view of the economy as a whole. Numerous studies of agricultural research and extension (over 100 have been published) demonstrate that the internal rate of return for these investments is 25-50%, far higher than many alternative investments¹⁴. It is more difficult to measure the benefits of establishing grades and providing quality certification, but the consensus is that these activities are socially profitable. The public good characteristics of quality standards, new varieties, and improved cultivation practices make it impossible for the institute to charge the full value for these services. Thus, subsidization of research, extension, and quality control activities is fully justified by both economic theory and empirical evidence.

On the other hand, it is generally accepted the commercial functions of state-owned enterprises are performed more efficiently when the SOE is subject to internal incentives for efficiency and external discipline from the market. Among the elements of external discipline is that the enterprise be forced to compete against other enterprises without any government-provided advantages such as subsidies.

Thus, VINACAFE, like many state-owned enterprises, has a mandate to pursue social objectives that *should* be funded by the government because of their public good characteristics as well as commercial objectives that should *not* be subsidized in order to impose market discipline on the enterprise. Because of this conflict, one of the principles in reforming state-owned enterprises (SOEs) is that commercial and social functions should be separated. A report on improving state enterprise reform expresses the idea this way:

A critical element contributing to the poor performance of many SOEs has been the diverse, ill articulated and often conflicting roles set by [the government] for the management of these enterprises (Muir and Saba, 1995).

International experience with SOE reform suggests two solutions to this problem. The first is to ensure that the non-commercial functions of the SOE are clearly identified

¹⁴ The internal rate of return is the annual interest rate that a project could repay and still break even, based on the flow of costs and benefits generated by the project.

and separated in terms of the accounting of the enterprise, allowing the government to subsidize or fully fund those activities. If performance can be quantified, performance contracts should be considered. The second solution is to separate the two functions in different institutions, one for the social objectives and the other operating as a commercial enterprise.

3.5.9. Effect of trade policy

Trade liberalization under the ASEAN Free Trade Agreement will take the form of phased reduction of tariffs on goods imported from the members of the Association of South East Asian Nations (ASEAN). This trend will generally be either neutral or positive for the coffee sector in Viet Nam, although it may adversely affect the secondary coffee processing industry.

Currently, the tariff rate on unroasted (green) coffee beans is 20 percent. Eliminating this tariff would not adversely affect the coffee sector. Because of climate, natural resources, and labor costs, Viet Nam has a comparative advantage in coffee production so that movement toward a more liberalized trade regime in the area can only benefit coffee farmers. Three characteristics of primary processing virtually require that it be carried out near production areas. First, the farm-level product (dried cherries) is more perishable than the processed product (green beans), creating incentives for processing to take place near the producing area. Second, processing reduces the bulk of the product, so that transportation costs are minimized by processing as close to the farm as possible. Third, the economies of scale are not very great. There appear to be little or not cost advantage in processing plants above 10,000 tons per year. Processing plants with large capacities generally just install multiple copies of the machinery under one roof. These characteristics explain the tendency of new plants to be established in Dak Lak rather than Ho Chi Minh City. They also suggest strongly that even in a free trade environment, primary processing of Vietnamese coffee will continue to take place in the coffee zones of Viet Nam.

The tariff rate on both soluble and non-soluble roasted coffee is now 50 percent, representing a significant level of protection for the Bien Hoa coffee factory and other coffee roasters. In the case of soluble coffee, imports from Singapore and Indonesia already have seem to have a majority of the domestic market. Thus, eliminating or reducing the tariff would further weaken, and possibly eliminate, VINACAFE's position

in the domestic soluble coffee market. Reducing the tariff will benefit coffee consumers at the expense of soluble coffee processor(s), but there would be no effect on coffee farmers because local soluble coffee is a negligible portion of the demand for Vietnamese coffee.

With regard to roasted nonsoluble coffee, it is likely that domestic roasters would not be affected by the elimination of the 50 percent tariff. The packaging and transportation cost of imported roasted (non-soluble) coffee would probably not allow it to compete with locally roasted coffee, except for the high-income market.

3.6. Conclusions and Recommendations

The increase in the number of coffee processors and traders has reduced coffee marketing margins and improved the prices received by farmers. Although information on margins over time is not available, this is the conclusion of almost all coffee processors (including state and private).

Recent policy decisions to allow private coffee processors to export will have a modest effect initially, but a large effect over the coming years. Initially, few private processors will have the expertise, contacts, and liquidity to export, but the incentives for direct exporting will encourage private processors to develop the expertise, make contacts, and seek credit.

One of the main threats to sustained coffee exports is the depletion of groundwater resources in the Central Highlands. The current drought has highlighted the dependence of coffee on water, but the problem will not disappear with the return of normal rainfall.

Another threat to sustained coffee exports is the risk of an outbreak of disease. Coffee production has expanded more quickly than the institutional capacity to deal with outbreaks of disease. The use of irrigation increases the risk of disease.

The government should not limit the number of companies that are allowed to export coffee, nor set minimum export prices. Greater competition in the export sector will improve the prices received by farmers without lowering the export price. Importers will prevent inexperienced or under-capitalized processors from exporting, although it might be useful for the government to "certify" some exporters as qualified.

The government should invest more in coffee research and extension, focusing on disease, post-harvest practices, and water conservation. As a result of the risks described above, research in the issue of sustainable water use, Arabica production, and disease is needed, as are extension efforts to establish a system for monitoring and reporting diseases.

The government should consider a small export tax to fund coffee research and extension activities. This would ensure that research funds are available on a sustained basis to support the coffee sector. The example of FEDECAFE in Colombia should be studied as a model, though initially a Vietnamese institute should pursue a more modest agenda.

The government should separate the commercial and public service roles of VINACAFE. State enterprises should not be given public services functions *and* expected to cover all their costs. Nor should the public service functions of VINACAFE be neglected in the interest of state enterprise reform. Commercial activities should be self-financing, while public service activities (research, extension, inspection, etc) should be fully funded by the government or by taxing the coffee sector.

The government should evaluate the economic returns to arabica coffee production. The expansion of arabica coffee production in the north appears to be following an accelerated schedule, and it is not clear whether there have been adequate studies of the agronomic and financial aspects of this investment.

The government should study the issue of groundwater depletion in the Central Highlands in order to design policies to ensure the sustainability of coffee production in this region. Such a study would examine the extent of depletion and the mechanisms that the government could use to reduce water use and/or increase water supply.

Table 3.1 Trends in coffee production

| Year | Planted area (000 ha) | Harvested area (000 ha) | Yield (tons/ha) | Production (000 tons) |
|----------------------|--------------------------|----------------------------|--------------------|--------------------------|
| 1986 | 65.6 | 19.1 | 1.00 | 19.1 |
| 1987 | 92.0 | 23.4 | 0.99 | 23.1 |
| 1988 | 111.9 | 32.3 | 1.04 | 33.7 |
| 1989 | 123.1 | 43.3 | 0.99 | 43.0 |
| 1990 | 119.3 | 61.9 | 1.57 | 97.4 |
| 1991 | 115.1 | 73.2 | 1.51 | 110.6 |
| 1992 | 103.7 | 81.8 | 1.93 | 158.1 |
| 1993 | 101.3 | 82.1 | 2.11 | 173.6 |
| 1994 | 123.9 | 99.9 | 2.08 | 208.2 |
| 1995 | 186.4 | 99.9 | 2.07 | 206.5 |
| 1996 | | 127.5 | 1.82 | 231.5 |
| 1997 | | | | 300.0 |
| Annual growth | | 20.9% | 6.1% | 28.3% |

Source: GSO (1996, p 166) for 1986-1995. Binh (1997) for 1996.

Table 3.2 Geographic distribution of coffee production (1996)

| Region or province | Yield (tons/ha) | Production (000 tons) | Percent of total |
|---------------------------|-----------------|-----------------------|------------------|
| North Mountain & Midlands | 0.99 | 4,443 | 1.9% |
| Red River Delta | -- | 0 | 0.0% |
| North Central Coast | 1.09 | 2,486 | 1.1% |
| South Central Coast | 0.86 | 1,618 | 0.7% |
| Central Highlands | 1.88 | 185,895 | 80.3% |
| Dac Lac | 2.09 | 134,815 | 58.2% |
| Lam Dong | 1.49 | 37,690 | 16.3% |
| Gia Lai | 1.59 | 11,457 | 4.9% |
| Southeast | 1.83 | 37,056 | 16.0% |
| Dong Nai | 1.87 | 29,894 | 12.9% |
| Mekong River Delta | -- | 0 | 0.0% |
| Total | 1.82 | 231,498 | 100.0% |

Source: GSO, cited in Binh (1997).

Table 3.3 Trends in coffee processing

| Year | Value (billion VND) | | Ratio of value added to gross output |
|----------------------|---------------------|-------------|--------------------------------------|
| | Gross output | Value added | |
| 1991 | 33.8 | 1.8 | 5.4% |
| 1992 | 46.2 | 2.4 | 5.2% |
| 1993 | 71.4 | 3.7 | 5.2% |
| 1994 | 82.6 | 4.3 | 5.2% |
| 1995 | 119.7 | 6.0 | 5.0% |
| 1996 | 138.0 | 6.9 | 5.0% |
| 1997 | 151.0 | 7.6 | 5.0% |
| Annual growth | 23.5% | 21.9% | |

Source: General Statistics Office. (Data obtained by DSI/MPI).

Table 3.4 Characteristics of medium and large coffee processors in Dak Lak

| Processor | Ownership | Production (tons/year) | Number of plants | Processing capacity (tons/year) | Export volume (tons/year) |
|------------------------|-----------|------------------------|------------------|---------------------------------|---------------------------|
| INEXIM | province | 0 | 3 | 22,000 | 45,655 |
| SIMEXCO | province | 0 | -- | -- | 42,934 |
| Viet Nam Coffee Co. | central | 0 | 1 | -- | 34,052 |
| Phuoc An | province | 4,500 | 1 | 12,000 | 13,701 |
| Dak Lak Trading Co. | province | 0 | -- | -- | 13,307 |
| Thang Loi Coffee Co. | province | 5,000 | 1 | 8,000 | 12,912 |
| Viet Duc | central | Yes | 7 | 15,000 | 11,611 |
| Hiep Phuc | private | 0 | 1 | 8,000 | 0 |
| Dak-Man | JV | 0 | 1 | 15,000 | 8,182 |
| Doan Ket Coffee Co. | private | 800 | 1 | 5,000 | 0 |
| Lien Phat | private | 0 | 1 | 5,000 | 0 |
| Imp.-Exp. Transp. Co. | province | 0 | | -- | 4,182 |
| October Coffee Farm | province | Yes | | -- | 2,396 |
| Buon Ma Thuot Coffee | province | Yes | | -- | 2,175 |
| Mountain Area Dev. Co. | central | 0 | | -- | 1,368 |
| Duc Lap Coffee Farm | province | Yes | | -- | 828 |
| Total | | | | | 193,303 |

Source: Export data from Department of Planning and Investment, Dak Lak. Production and processing data from interviews.

Note: The production and processing data should be considered indicative since only seven of the processors were interviewed and there were conflicting reports on some of the numbers.

Table 3.5 Cost structure of coffee processing

| Item | Cost (VND/kg of green bean) | Cost (US\$/ton of green bean) | Percent of total costs | Percent of processing costs |
|---------------------------------|-----------------------------|-------------------------------|------------------------|-----------------------------|
| Dry coffee cherry | 22,036 | 1,695 | 95.2% | |
| Labor for hulling | 170 | 13 | 0.7% | 36.6% |
| Petrol for hulling | 59 | 5 | 0.3% | 12.7% |
| Hulling machine | 195 | 15 | 0.8% | 42.0% |
| Other hulling costs | 40 | 3 | 0.2% | 8.6% |
| Total hulling costs | 464 | 36 | 2.0% | 100.0% |
| Green bean (cherry+hulling) | 22,500 | 1,731 | 97.2% | |
| Transport to reprocessing plant | 60 | 5 | 0.3% | |
| Labor for reprocessing | 60 | 5 | 0.3% | 15.4% |
| Electricity | 10 | 1 | 0.0% | 2.6% |
| Sacks | 100 | 8 | 0.4% | 25.6% |
| Depreciation and profit | 200 | 15 | 0.9% | 51.3% |
| Tax to province | 20 | 2 | 0.1% | 5.1% |
| Total reprocessing cost | 390 | 30 | 1.7% | 100.0% |
| Transport to HCMC | 200 | 15 | 0.9% | |
| Total (FOB price) | 23,150 | 1,781 | 100.0% | |

Source: *Hulling costs from Binh (1997), Table 12. Additional processing costs from interviews with Manager of INEXIM Plant No. 1 and others.*

Table 3.6 Trends in coffee exports

| Year | Coffee export volume (000 tons) | Coffee Export price (US\$/ton) | Coffee export value (million US\$) | Total exports (million US\$) | Coffee as a percentage of total exports |
|-------------------------|---------------------------------|--------------------------------|------------------------------------|------------------------------|---|
| 1985 | 9.2 | | | | |
| 1986 | 18.6 | | | | |
| 1987 | 25.6 | | | | |
| 1988 | 33.8 | | | | |
| 1989 | 57.4 | 871 | 50.0 | 1,946 | 2.6% |
| 1990 | 89.6 | 859 | 77.0 | 2,404 | 3.2% |
| 1991 | 93.5 | 816 | 76.3 | 2,087 | 3.7% |
| 1992 | 116.2 | 787 | 91.5 | 2,581 | 3.5% |
| 1993 | 122.7 | 903 | 110.8 | 2,985 | 3.7% |
| 1994 | 176.4 | 1,872 | 330.3 | 4,054 | 8.1% |
| 1995 | 248.1 | 2,411 | 598.1 | 5,449 | 11.0% |
| 1996 | 239.0 | 1,410 | 337.0 | 7,256 | 4.6% |
| 1997 | 355.0 | 1,208 | 429.0 | 8,700 | 4.9% |
| Annual growth 1989-1997 | 25.6% | 4.2% | 30.8% | 20.6% | |

Source: *For 1985-1990, GSO (1996, p 9) and Binh (1997). For 1991-1997, General Statistics Office (data provided by DSI/MPI).*

Table 3.7 Coffee quality standards

| Criterion | Standards for each grade | | |
|------------------|--------------------------|---------|---------|
| | Grade 1 | Grade 2 | Grade 3 |
| Humidity | 12% | 12% | 13-15% |
| Foreign material | 0.5% | 0.5% | 1.0% |
| Broken beans | 2-3% | 2-3% | 4-5% |
| Bean size | 7 mm | 6-7 mm | 5 mm |

Source: Interview with Vice-Director of SIMEXCO, Dak Lak.

Table 3.8 Import tariffs on coffee products

| Code | Description | Import tariff |
|---------|---|--|
| #090111 | Unroasted (green) coffee with caffeine | 20% |
| #090112 | Unroasted (green) coffee without caffeine | 20% |
| #090121 | Roasted coffee with caffeine | 50% |
| #090122 | Roasted coffee without caffeine | 50% |
| | Description | Minimum price for calculating tariff (US\$/kg) |
| #0901 | Instant coffee from Switzerland and G7 countries | 15.00 |
| #0901 | Instant coffee from ASEAN countries | 10.00 |
| #0901 | Powdered coffee from Switzerland and G7 countries | 10.00 |
| #0901 | Powdered coffee from ASEAN countries | 7.00 |
| #0901 | Decaffeinated coffee | 3.00 |

Source: Tariff rates from Decision 280/TTg of 28 May 1994 and minimum price from Decision No. 975 TC/QD/TCT of 29 October 1996, as reprinted in Statistics Publishing House (1997, p. 23 and 315).

4. FRUIT AND VEGETABLE PROCESSING

4.1. Background

During the 1970s and 1980s, Viet Nam's membership in the Council on Mutual Economic Association defined its export opportunities in most sectors. As one of the few CMEA members with a tropical climate, Viet Nam was called upon to supply the east bloc countries with fruits and vegetables. Farmers were organized in cooperatives and were obliged to sell their output to state enterprises, thus facilitating procurement for food processors. Trade was negotiated between governments, so the only task of the food processors was to meet their production targets.

With the collapse of the CMEA and the liberalization of agricultural markets, fruit and vegetable processors found themselves in a very different environment. Now, they had to compete with traders and other processors for the farmers' harvest, requiring them to be attuned to market prices and quality issues. In addition, they could no longer count on the government to arrange export agreements for them and were forced to learn how to contact importers, negotiate contracts, and arrange for delivery. The early 1990s were difficult years for many of the state-owned fruit and vegetable processors, with the value added in fruit and vegetable processing and the value of exports falling by over half. The sector started to recover in 1994, based on the expansion of exports. By 1997, the value added of fruits and vegetables was more than double the 1990 level.

Viet Nam's low wages, varied climate, and proximity to large growing markets in east Asia suggest that fruit and vegetable processing exports have the potential to expand further. Government assistance will be required to overcome weaknesses in the production and marketing system in order to take full advantage of this potential.

4.2. Fruit and Vegetable Production and Marketing

4.2.1. Product characteristics

Fruits are generally colorful fleshy parts of a tree or bush that contain the seed(s), while vegetables are a diverse category that includes a variety of other parts of the plant including the roots (e.g. potatoes, carrots, and onions), stalks (e.g. celery and rhubarb), and leaves (e.g. lettuce, spinach, cabbage). The definitions used in everyday terminology, however, are cultural rather than botanical. For example, tomatoes and

squash fit the botanical definition of fruit, but are generally considered vegetables because they are not sweet and they are consumed like vegetables (cooked or in salads) rather than like fruit (as desert).

Unlike many other food commodities that are processed, almost all fruits and many vegetables can be eaten in their original fresh state. Thus, the motive for processing fruits and vegetables is not to convert the commodity into an edible form, as it is with rice and coffee. Rather the main motivation is to preserve them so they can be consumed far from the place of harvest and throughout the year. Perhaps one of the most distinguishing characteristics of fruits and vegetables is their perishability in the fresh state. Although the root vegetables such as potatoes and onions can last four to nine months without refrigeration, most fruits and vegetables will spoil within two or three weeks.

4.2.2. Production patterns

The economic reform process in Viet Nam has stimulated the production of fruits and vegetables in three ways. First, by raising the production and domestic availability of rice, rural households are able to allocate part of their land to fruits and vegetables with some assurance of purchasing the rice needed for household consumption. Second, by expanding domestic incomes, the reforms have increased the demand for fruits and vegetables as consumers seek to add diversity to their diets. The two largest cities are particularly important as sources of demand for fruits and vegetables. Because of the perishability of fruits and vegetables, the production zones to supply the city are often located relatively close to the cities. Third, by establishing a realistic exchange rate and liberalizing exports, the reforms have created new outlets for fruit and vegetable processors. The reforms have not been without costs, as a number of processors have faced costly adjustments to the new, and more demanding, export markets.

As shown in Table 4.1, the area planted with fruit trees grew 71 percent between 1985 and 1995, equivalent to a rate of 5.5 percent per year. This growth has been equally shared between the north and the south of the country. Citrus¹⁵ area has grown even more rapidly than other fruits and now accounts for 17 percent of the total fruit area. Banana area is large but stagnant, so its share of fruit area has declined to 26 percent. Pineapple area declined in both absolute and relative terms between 1990 and 1995 for

¹⁵ GSO tables refer to "oranges", but the statistics cover include orange, mandarin, lemon, and grapefruit.

reasons discussed below. Mango area has grown at the same rate as total fruit area, maintaining its share at 6 percent. These four fruit crops account for over half (57 percent) of the fruit area in Viet Nam.

Production data reveal that citrus production increased 14 percent per year period 1985-1995, but almost all of this growth has occurred in the second half of this period. The annual growth rate over 1989-1995 was close to 25 percent. Most of this growth is attributable to a four-fold increase in planted area since 1990, but yields have also risen by more than 25 percent over this period.¹⁶ The data for banana production is limited to the first half of the 1990s, but shows little trend upward or downward. Pineapple production grew steadily in the second half of the 1980s and then fell abruptly by over 35 percent in 1992. This drop was caused by the sharp reduction in production in just two provinces, Kien Giang and Minh Hai, presumably due This drop is apparently related to the abandonment of plantations the result of reductions in both yield and sown area of pineapple. Vegetable output has increased 4.8 percent per year.

The geographic patterns in fruit and vegetable production are shown in Table 4.3. With regard to fruits, the Mekong Delta accounts for over two thirds of the output of citrus, pineapple, and mango. Banana production is somewhat more dispersed, with important production in the Mekong Delta, Southeast, and the Red River Delta.

Concerning vegetables, the Red River Delta has the largest production, accounting for 29 percent of the national output. This is the result of its good soils, cooler climate, and access to the Hanoi market. Temperatures are cool enough in the October-February period to grow temperate vegetables such as cabbage, onions, tomatoes, turnips, and cauliflower. The Mekong Delta is the second most important region, representing 13 percent of national output. Dalat, in the Central Highlands, has specialized in the production of fruits and vegetables both for export and for domestic consumption.

4.2.3. Marketing channels

The marketing channels vary depending on the product and the eventual consumer. It is estimated that about half of vegetable production is marketed, largely for domestic consumption. In the simplest case, fruits and vegetables are harvested and brought to

¹⁶ Growth in production is less than the sum of growth in area and yield in GSO statistics. Presumably, area refers to planted area, whereas yield is calculated on the basis of *producing* area.

town in bamboo baskets by bicycle or bus and sold to stall-based retailers at the marketplace. For longer distance internal trade, the farmer may sell his produce to a wholesaler who arranges transport into the city. Transportation is readily available, although it is rarely refrigerated, limiting the distance it can be shipped. Private traders in the Dalat area have organized overnight truck services to ship vegetables into Ho Chi Minh City some 250 km away to be sold the following day (World Bank, 1993, p. 65).

Processors use a variety of methods to procure their raw materials. Pineapples for canning are usually produced on state farms in the north. The state farm may be vertically integrated with the processor-exporter. For example, the Dong Giao Export Foodstuff Company (a central SOE) obtains pineapples for its canning factory both from its own farm with 2000 cultivated hectares and from other state farms in the area (DSI, 1998). In the south, there are fewer state farms so procurement from farmers is more common. For example, the Tan Binh Foodstuff Export Company purchases pineapples for canning from farmers using agents in the provinces. Another system is for pineapples to be purchased through contracts with communal authorities. The authorities agree to sell a given volume to the plant and organize selected households in the commune to fulfill the contract.

4.3. Fruit and Vegetable Processing

4.3.1. Technical aspects

Fruit and vegetable processing can be defined broadly to include sorting, grading, and packaging of fresh produce. It can also be defined more narrowly to include only the transformations of fruits and vegetables to preserve them and to reduce preparation time. Preservation methods include canning, freezing, drying, and pickling. Processing to increase convenience include combining different ingredients, removing inedible parts, and carrying out other steps that consumers would otherwise do in the home.

The vast majority of fruits and vegetables in the world are consumed in fresh form, but processing has become more important over time. With rising incomes, consumers become more willing to pay to have their favorite fruits and vegetables available in the off season and far from the production areas. In addition, they become willing to pay for semi-prepared foods that require less preparation time.

Canning increases the shelf life of fruits and vegetables to 1-3 years, depending on

the product. After cleaning the produce, it is peeled using air pressure, chemicals, or abrasion. Next, the produce is blanched, which involves raising the temperature to 95-100? C for a brief period to wilt the product, remove bubbles of air, and inactivate enzymes. The cans are filled, air at the top of the can is “exhausted” by heating, and the can is sealed. The cans are then sterilized by heating them to a specified temperature (usually 85-115C) for a time sufficient to kill micro-organisms. The criteria vary depending on the size of the can, the acidity of the product, and other factors. Spoilage is usually caused by leakage, corrosion, or inadequate heating.

Because of the chemical reactions involved in canning, the fruit and vegetable varieties that are good for fresh consumption may not be suitable for canning. For example, tropical tomatoes often have a high level of acidity which results in a bitter and discolored product after canning. Similarly, the best varieties of pineapple for fresh consumption are not necessarily best for canning.

Drying preserves food by reducing the water content below the level needed for micro-organisms to survive. Normally, 95 percent of the water content is removed. Fruits and vegetables are peeled and prepared, removing inedible portions and making even slices to facilitate uniform drying. Next, in the case of most products, preservatives are applied. The drying may be accomplished in sun or shade, though contamination by dust or insects is a problem. Alternatively, a variety of kilns, vacuum trays, and air chambers are used to dry fruits and vegetables. Dried goods usually have a shelf life of one year or so.

Freezing preserves food by making the water needed by micro-organisms unavailable. In order to avoid water loss in the initial cooling period, it is necessary to freeze fruits and vegetables relatively quickly. Freezing methods include, in order of increasing cost and effectiveness, still-air freezing, air blast freezing (where fans accelerate the cooling), liquid immersion freezing, and cryogenic freezing.

4.3.2. Structure of the fruit and vegetable processing sector

The fruit and vegetable processing industry in Viet Nam is dominated by state-owned enterprises. Although this is true in other subsectors as well, the degree of SOE control over fruit and vegetable processing appears to be greater than in rice, coffee, and seafood.

The Vegetables and Fruits General Corporation (VEGETEXCO) is a centrally-managed state-owned enterprise under the Ministry of Agriculture and Rural Development. VEGETEXCO has 14 fruit and vegetable processing companies with capacities from 600 tons/year to 10,000 tons/year. In 1997, the company produced 11,000 tons of processed fruits and vegetables, their main products being canned pineapple, other canned fruit, jarred pickles, fruit drinks, and canned vegetables. VEGETEXCO has entered into a joint venture with Dona Newtower, Ltd of Hong Kong to produce fruit juice in Dong Nai under the "Nature" label. The exports of VEGETEXCO were US\$ 22 million in 1997, but only half of this was in fruits and vegetables. Thus, VEGETEXCO represents about 7-8 percent of Viet Nam's US\$ 140 million export sales of fruits and vegetables.

There are also an estimated 22 provincial state-owned enterprises (SOEs) involved in fruit and vegetable processing. The capacity of these companies ranges from 500 to 10,000 tons/year. One of the largest of these is a joint venture between a Malaysian company and a Dong Nai provincial SOE to produce fruit juice under the "Wonderfarm" label. Finally, there are 17 private fruit and vegetable processors. Another example is the Vegetable and Fruit Company of Ho Chi Minh City (VEGFRUCO) which processes and exports a wide variety of products including lychee, red dragon fruit, Chinese cabbage, and garlic. VEGFRUCO sells several thousand tons of fresh and frozen goods to demanding markets in Japan, Taiwan, and Europe.

The structure of the fruit and vegetable processing sector appears to be changing, with the provincial and private companies expanding at the expense of VEGETEXCO. For example, VEGETEXCO was said to be producing 30,000 tons of canned and frozen good in 1993, compared to just 11,000 in 1997. Much of the decline appears to be related to the loss of pineapple export markets, particularly in the former eastern bloc.

4.3.3. Processing costs

According the General Statistics Office, the cost of raw materials accounts for 72 percent of the output value of fruit and vegetable processors. Among the actual processing costs, labor is the largest item, representing 10 percent of the value of output.

These figures should be treated with some caution, however, since the structure of costs varies widely depending on the product and the type of processing. Interviews with pineapple canners suggested that raw material were only 40 percent of the final value and

that the packaging (mostly the cans) represent another 40 percent. The remaining 20 percent was divided among labor, depreciation, and other operating costs. These figures indicate that the economic viability of the canning industry is dependent on access to cans at a reasonable price. Since the metal for the cans is imported, the price of cans is sensitive to changes in the exchange rate.

4.4. Fruit and Vegetable Demand

4.4.1. Domestic demand for fruits and vegetables

Vietnamese households consume an average of 52 kg of vegetables per person per year, according to the 1994 Household Survey. As shown in the Table 4.6, per capita vegetable consumption rises with income but tends to level off at middle and higher incomes. The table also reveals a regional pattern in which vegetable consumption tends to be higher in the north than in the south. At the extremes, the per capita vegetable production is almost twice as high (64 kg) in the Northern Uplands as it is in the Mekong River Delta (34 kg). This pattern presumably represent, in part, differences in price and availability, since production per capita is much higher in the Northern Uplands and Red River Delta than in the south.

Information on the consumption patterns for fruit alone is not available, but we expect the income pattern to be similar. Econometric analysis of the 1992-93 Viet Nam Living Standards Survey suggests that the income elasticity for fruits and vegetables as a group is close to 1.0. This means that per capita consumption will rise at approximately the same rate as per capita income. With regard to the regional demand for fruits, it is probably higher in the south due to the concentration of production of the four major fruits in the Mekong Delta and Southeast.

Little information exists on the consumption of processed fruits and vegetables. Informal surveys of retail shops in the urban areas reveal some general patterns, however. First, canned fruits and vegetables can be found in most shops, even small shops that carry only a few dozen products. Among canned fruits, lychee is the most important, followed by rambuttan, pineapple, and mixed fruit. In lychee and rambuttan, Vietnamese brands such as VEGETEXCO and Foli compete with numerous Thai brands such as Twin Elephants. One large supermarket in Ho Chi Minh City carried 10 Thai brands of canned lychee. In most stores, the imported brands appear to dominate, at least as measured by shelf space.

In pineapple, VEGETEXCO and Tuyen Ky brands are the most important, with little import competition. In mixed fruit, the Ligo brand, containing fruit from the United States and South Africa, dominates with no local competition.

Fruit preserves (jam) is available only in the medium and large food stores, suggesting that the demand is limited to high-income households. The main brands are from Holland and Spain, with some competition from a less expensive Thai product sold under the Best Foods brand.

There are two Vietnamese brands of canned fruit juice, Wonderfarm and Nature, one or both of which are available in most medium-sized and large stores. Each produces juices from 4-5 fruits, as well as coffee and herbal drinks. In the supermarkets, one can find Taiwanese herbal drinks and “fruit teas”, but these are less widely available.

In canned vegetables, the most widely available products are mushrooms, baby corn, peas, and sweet corn. In mushrooms and baby corn, local brands such as VEGETEXCO, Tuyen Ky, and Topwell appear to be the most important. Canned peas and corn are primarily imported from the United States under the Crystal brand. Other vegetables such as green beans and mixed vegetables, are available only in the larger supermarkets and are imported.

Pickled vegetables are not common in smaller stores, but one large supermarket had a wide range of pickled vegetables produced by a number of Vietnamese companies. Frozen vegetables are not sold in Viet Nam, even in the larger supermarkets.

4.4.2. Export demand for fruits and vegetables

More than the other three food sectors in this report, the fruit and vegetable industry was severely affected by the collapse of the Soviet Union and the shift from central planning to a market economy. As one of the few tropical countries within the Council for Mutual Economic Assistance (CMEA), Viet Nam was an important supplier of off-season vegetables and tropical fruits to the Soviet Union and eastern Europe. In 1985, Viet Nam exported almost 12 thousand tons of fresh bananas and 3.5 thousand tons of fresh pineapple, but these exports had fallen to one third of this level by 1990 (GSO, 1996, p 9). In the late 1980s, the Tan Binh Foodstuff Export Company (part of VEGETEXCO) exported 7 thousand tons of canned and frozen produce to the east bloc

through government-to-government contracts. In 1990-91, these markets virtually disappeared and the company “lost” two years finding new export markets. Only in the last few years have they established new markets for their goods in Japan, Taiwan, and the United States.

These patterns are reflected at the national level in Table 4.7, which shows a sharp decline in fruit and vegetable exports in 1991, a long trough, and then a recovery starting in 1995. The recovery has been rapid and 1997 exports were US\$ 140 million, 170 percent above the 1985 level. Data from the Food and Agriculture Organization, shown in Table 4.8, do not show a sharp drop in exports but confirm that growth has accelerated in the past few years. Differences between the two sets of figures may be related to differences in the definition of fruits and vegetables.

Detailed information on the composition of fruit and vegetable exports is not available, but it appears there is a trend toward higher-valued and more diversified fruit and vegetable exports. According to FAO statistics, in 1985 dry beans and canned fruit (largely pineapple) represented two thirds of the value of fruit and vegetable exports. During the 1980s, the average value of fruit and vegetable exports ranged from US\$ 250 to US\$ 390 per ton during the 1980s, averaging US\$ 323 per ton for the decade (see Table 4.8). By contrast, 1996 exports include dry beans, onions, fresh mushrooms, canned mushrooms, bananas, mangoes, and canned pineapple, none of which account for more than 10 percent of the total value. Furthermore, starting in 1991 Viet Nam began to export higher value fruits and vegetables. The average value of fruit and vegetable exports over 1990-1996 was US\$ 507 per ton, 57 percent higher than the average value during the 1980s.

Although VEGETEXCO continues to try to revive canned pineapple exports to the east bloc, newer smaller competitors have been opening markets in Japan, Taiwan, Hong Kong, and Singapore. In addition, interviews with processors give the impression that much of the new fruits and vegetable exports to Asia are fresh and frozen goods rather than canned.

4.5. Prospects and Policy Issues

4.5.1. Prospects for the domestic market

As mentioned above, analysis of household survey data indicates that the income

elasticity of fruits and vegetables is close to 1. This implies that as incomes rise, the per capita demand for fruits and vegetables should rise at roughly the same rate. Given the budget share of food falls with higher incomes, this means that an increasing portion of the food budget of Vietnamese households will be spent on fruits and vegetables.

In 1993, a World Bank report noted that “there is as yet almost no internal market for canned or frozen vegetables and only a luxury market for canned fruit”. This may still be true, but one suspects that the domestic market for canned goods has increased. Five years later, canned fruit can now be found in even the smaller retail food outlets in the cities, and canned vegetables are not uncommon in such stores. Pineapple, lychee, and baby corn are some of the more common canned products in food stores. Nonetheless, given the general preference for fresh ingredients in Vietnamese cooking, it seems that the domestic demand for canned fruits and vegetables will grow slowly.

4.5.2. Prospects for export markets

Given the high transportation costs of fruits and vegetables, either in fresh or processed form, fruit and vegetable exporters are only successful when they have some advantage over domestic producer in the importing country. Three types of advantages have been identified (Jaffee, 1992):

- One type of advantage is lower costs of production of the exported product. In principle, this could be lower costs of processing or lower costs of commodity production. In practice, because the raw material represents a large share of the total cost, the exporter must be a lower cost producer of the commodity. In a study of successful agricultural export industries, five of the six fruit and vegetable cases were based at least in part on lower costs of commodity production. Lower processing costs was not seen to be an advantage in any of the six cases.
- A second type of advantage for fresh fruit and vegetable exporters is supply during the off-season. For example, fruit and vegetable exporters in Chile, South Africa, and New Zealand have taken advantage of their ability to ship fresh products to the large markets in the northern hemisphere (see Box 4.1). In addition, tropical countries such as Kenya and Mexico have made use of their warmer climates to ship fruits and vegetables north during the winter (see Box 4.2).

- A third type is to provide a differentiated product or service associated with the product. For example, Mexican tomato producers were able to provide vine-ripened tomatoes to the US market, which were preferred by consumers to the artificially ripened variety produced domestically. The provision of tropical fruits to temperate climate countries is another example. Other exporters may gain an advantage by being able to supply a broad range of fruits and vegetables or in establishing a more economical method of shipping.

Box 4.1: Chile fruit exports

Chile has become an important supplier of temperate fruits, primarily table grapes and apples, to North America. Exports took off in the mid-1970s following devaluation, trade liberalization, and other economic reforms. Fresh temperate fruit exports have risen from less than 50 thousand tons in 1974 to almost 900 thousand tons in 1989, generating over US\$ 700 million in export revenue (Jaffee, 1992). Currently, fruit and vegetable exports from Chile are worth US\$ 1.6 billion per year, of which table grapes represent US\$ 429 million (FAO Agrostat).

Trade policy reform provided the initial stimulus for the fruit export industry. Its growth was sustained by a number of other factors, however. First, the labor costs in Chile are significantly lower than those of other southern hemisphere fruit exporters such as New Zealand and Australia. Second, improvements in quality and yield have been made possible by the large number of Chileans who have obtained graduate degrees at universities in California, bringing improved methods and technology back to Chile when they returned. Over time, Chilean universities and Fundacion Chile, a semi-public institution, have developed local capacity to train agricultural scientists. Agricultural research has not only increased yields, but it has introduced new varieties that extend the season over which Chile can export fresh fruit. Third, banking sector reforms in the 1970s allowed a 30-fold increase in the disbursement of long-term credit over the period 1974-80.

Although Chile's initial growth has been based on the grape and apple exports to North America, it is now diversifying into other markets, such as Europe and the Middle East, and into other temperate fruits. For example, apple and grape exports represented two thirds of fruit and vegetable exports in 1985 but only 42 percent by 1996.

Fruit production in Chile involves a large number of medium and large-scale growers. According to Jaffee (1992), the sector employs over 10 percent of the active labor force. Growers are organized in voluntary producer associations which facilitate the dissemination of new seed and methods. Coordination between growers and exporters is often maintained through the use of production contracts. Agricultural research is carried out by public universities and Fundacion Chile. The government supports the fruit industry by providing information about export markets and trade policy in other countries, by organizing and participating in trade fairs, and by providing product inspection and certification services. The government has also provided subsidies for irrigation development and packing and processing facilities, but in general, it has adopted a policy of minimal intervention in direct production and marketing activities, focusing its efforts on facilitating market development.

The example of Chilean fruit exports demonstrates that, while comparative advantage based on climate and cost of production are generally a necessary foundation for agricultural exports, they are not sufficient. Appropriate macroeconomic policy, research, and technical skills are necessary to adapt to changing markets and meet quality standards, particularly in the fresh fruit and vegetable export market.

Viet Nam should be able to export initially on the basis of its lower costs of production (related to lower wages and land values) for export to high-wage markets such as Europe, North America, Japan, Taiwan, South Korea, Hong Kong, and Singapore. In addition, Viet Nam has climate-based advantages for exporting fruits and vegetables. On the one hand, Viet Nam can supply tropical fruits (processed or fresh) and fresh vegetables during the winter to temperate markets such as Europe, Russia, Japan, and North America. On the other hand, it can supply temperate vegetables produced in the Central Highlands and Northern Uplands to tropical markets.

The development of the third type of advantage will take more time and experience with international markets. Jaffee (1991) notes that agricultural exporters often start as low-cost commodity exporters and later, building on this experience, become producers of differentiated or value-added products for niche markets. Thus, there is not a question of “choosing” a low-cost based strategy *or* a high-value differentiated product strategy; rather, the experience and reputation established as reliable low-cost supplier allows the evolution of differentiated product exports. Some of the main obstacles faced by the fruit and vegetable processing industry include problems with product quality, dispersed production, financial constraints in traditional markets of the former east bloc, and reduced export demand associated with the Asian currency crisis.

4.5.3. Quality issues

Under the old system, exports were arranged by government-to-government contracts and product quality was rarely an issue. Fruit and vegetable processor-exporters became accustomed to the idea that whatever was produced would be exported, regardless of quality. With the new market orientation of domestic and international trade, fruit and vegetables processor-exporters have had to raise quality standards in order to compete.

Box 4.2: Kenyan Fresh Vegetable Exports

Kenya has become an important supplier of fresh vegetables to the European market. These exports have grown from less than 2 thousand tons in 1970 to over 20 thousand tons in the late 1980s (Jaffee, 1992). Today, fruit and vegetable exports generate US\$ 150 million per year in foreign exchange revenue (FAO, Agrostat).

In the 1960s, Kenyan vegetable growers supplied lower-value less perishable vegetables such as potatoes and onions to the domestic and regional market and higher-quality vegetables to the European settler population and growing tourist industry. In the 1970s, fresh vegetable exports from Kenya to Europe began to take off. Kenya became a leading supplier to Europe for sweet peppers, courgettes, green beans, and a variety of specialty vegetables catering to the Asian immigrant community (chilies, okra, etc.). Several factors contributed to this growth. First, the tourism industry resulted in a higher frequency of direct air carrier service with Europe. Second, the low labor costs made Kenya competitive with European producers. Third, its equatorial location and high-altitude production areas made it possible to supply a wide variety of vegetables throughout the year. Fourth, trade was facilitated by business and family links between south Asian traders in Kenya and Asian importers in the United Kingdom.

Even after establishing itself as a leading 'niche' producer of specialty vegetables, Kenya was not immune from competition. In the 1980s, Kenya lost its European market for peppers and courgettes to Mediterranean suppliers. It was able to offset this loss, however, by expanding its exports of fresh green beans to Europe.

Vegetable production was initially carried out by larger farmers. Over time, production shifted to thousands of small farmers, many of whom grow vegetables on contract, receiving seed, inputs, and technical assistance from the buyer-exporter. The government facilitated the growth of the industry by providing market information, quality inspection services, and cold storage facilities at the airport. It also controlled air freight rates, although this was not a major factor in Kenya's cost competitiveness. It was not involved in production or marketing of vegetables, and export promotion played only a minor role (see Jaffee, 1992 for more details).

This case study demonstrates the potential of creating a niche as a supplier of a wide variety of fresh vegetables to high-income markets. It also shows that even a high-quality specialty-good exporter is subject to competition from other suppliers. There are no safe, permanent export markets, but adaptability and flexibility in production and management are critical skills for dealing with this uncertainty.

Product quality is a function of varieties, production methods, transportation, and processing. Nonetheless, fruit and vegetable processors are almost universal in their complaints about the fruit and vegetables varieties in Viet Nam. For example, in pineapples a major obstacle to greater exports is that the main variety grown in Viet Nam, Queen Victoria, is small, low-yielding, and more appropriate for fresh consumption than canning. Although the taste is very good, it is woodier and not as juicy as consumers in high-income markets have come to expect. Citrus and bananas are other examples in which the current varieties have served the domestic market well, but their size, yield, and taste characteristics prevent them from being major export products. Addressing this problem would require agricultural research to identify appropriate varieties, credit for farmers to replace existing tree crops, and technical assistance to improve cultivation methods.

The quality of packaging and labeling is an issue as well. Both of the joint ventures to produce canned fruit juice have installed equipment to allow the labels to be printed directly on the can. In addition, the graphics and labels are of export quality. Many of the canned fruit and vegetable products, however, have labeling which appear dated and do not contribute to international marketability.

Processors also identify outdated canning technology as a constraint. One example cited by officials from VEGETEXCO is that the equipment in Viet Nam seals cans using a tin strip. Health concerns about this method are making it less acceptable in the industrialized countries, calling for investment in equipment to seal cans with electric welding. In general, however, food processing enterprises (particularly state owned ones) appear too willing to believe that larger and more modern machinery is the solution to what are really complex institutional and marketing problems.

4.5.4. Processed vs. fresh fruit and vegetable export

It is often assumed that exporting processed commodities is more advantageous for a country than exporting unprocessed commodities. Thus, for example, some argue that exporting canned or frozen fruits and vegetables will be more profitable than exporting fresh fruits and vegetables because of its higher value added. There are two flaws with this argument.

First, although the *gross revenue* from exporting processed goods is generally greater than that of exporting unprocessed goods, the profitability of processing a

commodity is determined by a comparison of the additional revenue and the additional cost of processing. Since the difference in the world price of unprocessed and processed goods is closely related to the cost of processing in competing countries, the question is whether the exporting country can process the commodity at a lower cost than competing countries can. It is not possible to answer this question in general; rather it can only be answered on a case-by-case basis after careful cost-benefit analysis.

Second, fresh fruits and vegetables have a high value on world markets, sometimes even higher than some types of processed fruits and vegetables. For example, Chile is an important exporter of fresh table grapes and apples (see Box 4.2). The unit value of these two exports in 1996 was US\$ 836 per ton and US\$ 504 per ton, respectively. By comparison, the unit value of canned pineapple exports is US\$ 677 per ton. The explanation is that exporting fresh fruits and vegetables is an operation requiring careful timing of harvest, packaging, cold storage, air freight, and marketing. Exporters need skills to deal with the risk of

4.5.5. Effect of trade policy

The effect of joining the Asian Free Trade Agreement (AFTA) will be to lower the barriers for Vietnamese products in the other countries of the Association of Southeast Asian Nations (ASEAN), as well as lowering the barriers in Viet Nam to products from those countries. The effect of this policy depends on the current import restrictions and the degree to which they will be reduced. Import restrictions can be classified into two groups: tariff barriers and non-tariff barriers.

- Tariff barriers for fruit and vegetable products vary between 20 and 40 percent. As shown in Table 4.9, the import tariff on most fresh and dried vegetables is 20 percent, while the tariffs on all fresh and dried fruit is 30 percent. Table 4.10 shows that the tariff rates for pickled and canned fruits and vegetables have tariff rates of 40 percent¹⁷.
- Non-tariff barriers consist of a system of import permits and import quotas that limit the import of goods already produced in the country. According to an official at VEGETEXCO, which is involved in imports as well as exports, the

¹⁷ Although canned goods are not mentioned by name, they seem to be included in category #200500 described as “Other vegetables treated or stored by all without vinegar and acetic acid; but not frozen”.

non-tariff barriers have been a more important barrier than the tariffs.

In an important but relatively unpublicized move, the government has issued a decision to drastically reduce non-tariff import barriers. Except for a specified list of goods¹⁸, the decision states that:

Enterprises that have been granted a license to export or import a particular good shall be allowed to import such goods depending on their own demand and shall pay import duties in accordance with existing laws. *Quota and permission on import of consumer goods is hereby abolished...* (Decision No. 11/1998/QD-TTg of 23 January 1998)

An official at one of the VEGETEXCO subsidiaries noted that earlier their main competition was from other domestic canners because of the import quotas. Now, with the quotas eliminated, the company faces more competition from imported canned fruits and vegetables, particularly from Thailand.¹⁹

As mentioned earlier, imported goods represent a substantial share of the canned fruits and vegetable products in local retail outlets. Whether or not these goods are smuggled into the country, the removal of import tariffs will increase the market share of foreign canners in Vietnamese markets. If the imported goods are entering officially and paying the 40 percent tariff, then eliminating the tariff will sharply reduce domestic prices of canned goods. If the imported goods are entering illegally, the effect may be less dramatic but we would still expect an increased volume of imports and lower domestic prices. This is because smuggling involves additional risks, such as confiscation, and additional costs, such as those associated with shipping goods in small lots to avoid detection.

This policy may be behind the reported increases in imported fresh fruit in Ho Chi Minh City in recent months. According to press reports, about 7000 tons of fruit was imported in all of 1997, but 2500 tons was imported in the first three months of 1998. Although imported fresh fruit used to be rare at the city market, it now accounts for

¹⁸ The exempted goods are petrol and oil, fertilizer, construction steel, cement, paper, construction glass, sugar, and liquor.

¹⁹ One discrepancy is that the official reported that the quotas were removed in 1997, but the decree is dated January 1998. Either a separate decision was made earlier for fruits and vegetables, or the implementation of the quota was relaxed in 1997 in anticipation of the policy change.

roughly half of the fruit sold there, according to press reports. The market offers a wide variety of imported fruit including Chinese apples, pears, citrus, grapes, and plum from Thailand, Singapore, and Australia (Viet Nam News, 20 April 1998).

4.5.6. Effect of exchange rates

The Asian currency crisis is putting pressure on the dong in two ways. First, capital inflows to Viet Nam have been slowed, partly due to a loss of confidence in the region among investors and partly due to domestic problems of Asian investors, particularly those from South Korea. With smaller capital inflows, the availability of foreign currency in Viet Nam is tighter, putting upward pressure on the exchange rate. Second, the devaluation of other currencies, notably those of Thailand and Indonesia, make it more difficult for Vietnamese exports to compete against exports from those countries.

In addition, it is possible that the Asian Free Trade Agreement (AFTA) will put pressure on the Vietnamese dong. AFTA will probably raise imports from ASEAN countries to Viet Nam, as well as stimulating Vietnamese exports to ASEAN members. If Viet Nam's trade barriers are higher than those of the other ASEAN countries, then trade liberalization may worsen the trade deficit, possibly resulting in devaluation. Thus, it is worth examining the effect of devaluation on fruit and vegetable processing.

On the one hand, devaluation would alleviate some of the pressure on fruit and vegetable processors caused by imported goods. For example, 10 percent devaluation would cause the Vietnamese dong price of Thai oranges to rise by 10 percent (assuming that Thai exporters maintain a constant margin). This would make it easier for local citrus producers to compete. On the other hand, devaluation would raise the price of imported machinery and inputs, making it more difficult to replace and upgrade machinery. The net result of these two effects is complex, but a first approximation can be obtained by comparing the share of costs going to imported goods and the share of output that is exported.

In general, it is safe to say that the fresh fruit and vegetable sector would benefit from devaluation. Producers for the domestic market would face less competition from imports, and exporters would receive higher dong prices for their sales. Furthermore, the costs of machinery and imported goods is a small part of their costs.

The canning industry is more vulnerable to devaluation. Although it is more dependent on imported machinery, capital costs are a very small portion of total costs. More important is their dependence on cans. Because cans are made with imported metal, their price will rise with a devaluation. Cans are a relatively large component of costs of canned fruits and vegetables. As mentioned earlier, in canned pineapple production, cans represent almost 40 percent of the costs of production.

At the same time, devaluation helps canneries on the revenue side. A company such as the Tan Binh Foodstuffs Export Company (a branch of VEGETEXCO), for which exports make up 95 percent of sales and for which imports make up less than 50 percent of costs, will generally benefit from devaluation. Since export revenue exceeds the cost of the cans, the net effect of devaluation would be positive. A canner that produces for the domestic market will receive more protection from imported cans, since the latter are made more expensive by the devaluation. Thus, although the result is less assured than for fresh fruit and vegetable producers, fruit and vegetable canners should also benefit from devaluation.

4.6 Conclusions and Recommendations

The fruit and vegetable export processing subsector is the least developed of the four subsectors. This is partly because, unlike the other three commodities, fruits and vegetables do not need to be processed (transformed) in order to be edible. Furthermore, virtually all of the domestic market and some of the export market is for fresh fruits and vegetables. Furthermore, fruit and vegetables exports are small compared to rice, coffee, and seafood exports.

More than the other export food processing sectors, fruit and vegetable export processors were adversely affected by the collapse of the Soviet Union than the other three subsectors. Rice was not an export crop in the 1980s. Similarly, coffee exports were minimal in the mid-1980s and have grown during the economic reform process. Seafood exports were large during the 1980s, but even then they were oriented toward Japan and other market economies.

Fruit and vegetable processors are recovering by seeking new markets and developing new products. The new markets include Japan, Taiwan, Hong Kong, Singapore, and to a lesser degree the United States and other southeast Asian nations. The traditional exports of dry beans, bananas and pineapples have declined, while a

variety of fresh and canned products.

The average value of fruit and vegetable exports has been 57 percent higher during the 1990s than it was in the 1980. This is the result of the economic reforms that have provided incentives for smaller private and provincial processor-exporters to seek out high-value markets.

The subsector is overly focused on canned fruits and vegetables, in spite of the fact that the more rapidly growing markets are in fresh fruits and vegetables. Too often the assumption is that exporting canned and frozen fruits and vegetables is more profitable and beneficial for the economy than exports of fresh fruits and vegetables. But demand growth is higher in fresh produce and, because of the skills required to market fresh produce the returns can be high.

Some of the main opportunities in fresh fruit and vegetable exports are temperate fruits and vegetables for Hong Kong and Singapore, and tropical fruits for Japan, Taiwan, South Korea, and North America. These patterns take advantage of the range of climatic conditions in Viet Nam,

One of the main constraints on the fruit and vegetable export processing sector is the lack of varieties that are suitable for processing and/or export. For example, pineapple processors consistently noted that the Queen Victoria variety grown in Viet Nam is too small and not juicy enough for international markets.

The government should expand its investment in research to select and develop suitable varieties of fruit and vegetable for domestic consumption and for export. Citrus, pineapple, and banana are some of the more obvious examples, but nearly every product would benefit from the introduction of new varieties with higher yields and/or characteristics desired by importing countries.

The government should facilitate the collection and dissemination of information about export markets, particularly standards, health restrictions, prices, and demand patterns. This would make it easier for Vietnamese processors and exporters to become informed about foreign markets and identify opportunities.

The government should facilitate the formation of an association of fruit and vegetable product exporters. As mentioned earlier, the association should be voluntary

and open to all interested parties. It should not be involved in setting terms for dealing with farmers or with importers, but rather should focus on information exchange, the identification of ways the government can support the subsector, and assistance to the government in the establishment of grades and certification.

Table 4.1 Trends in fruit area

| Year | Citrus | Banana | Pineapple | Mango | Other fruit | Total |
|---------------|---------------------------------------|--------|-----------|-------|-------------|--------|
| | Planted area (1000 hectares) | | | | | |
| 1985 | 12.7 | | 33.1 | | | 202.5 |
| 1990 | 14.5 | 88.3 | 38.9 | 16.4 | 119.6 | 277.7 |
| 1995 | 59.5 | 91.8 | 24.0 | 21.1 | 150.0 | 346.4 |
| Annual growth | 16.7% | 0.8% | -3.2% | 5.2% | 4.6% | 5.5% |
| | Percentage of total fruit area | | | | | |
| 1985 | 6.3% | | 16.3% | | | 100.0% |
| 1990 | 5.2% | 31.8% | 14.0% | 5.9% | 43.1% | 100.0% |
| 1995 | 17.2% | 26.5% | 6.9% | 6.1% | 43.3% | 100.0% |

Source: General Statistics Office, 1996, p. 109, 191, 197, 203, and 209.

Table 4.2 Trends in fruit and vegetable production (000 tons)

| Year | Citrus | Banana | Pineapple | Mango | Vegetables |
|---------------|--------|---------|-----------|-------|------------|
| 1985 | 99.3 | | 363.0 | | 2,605.2 |
| 1986 | 112.0 | | 374.9 | | 2,938.1 |
| 1987 | 103.0 | | 403.6 | | 3,014.2 |
| 1988 | 103.1 | | 420.5 | | 2,909.1 |
| 1989 | 101.0 | | 458.5 | | 3,152.3 |
| 1990 | 119.2 | 1,221.4 | 467.9 | 173.0 | 3,224.9 |
| 1991 | 121.1 | 1,285.8 | 420.2 | 139.9 | 3,213.7 |
| 1992 | 160.1 | 1,365.5 | 264.2 | 112.1 | 3,304.9 |
| 1993 | 249.7 | 1,397.7 | 257.5 | 119.2 | 3,484.9 |
| 1994 | 285.6 | 1,375.1 | 235.0 | 135.5 | 3,783.8 |
| 1995 | 379.4 | 1,282.2 | 184.8 | 152.5 | 4,145.6 |
| 1996 | | | | | |
| Annual growth | 14.3% | 1.0% | -6.5% | -2.5% | 4.8% |

Source: General Statistics Office, 1996, p. 109, 191, 197, 203, and 209.

**Table 4.3 Geographic distribution of fruit and vegetable production in 1995
(000 tons)**

| Region | Vegetables | Citrus | Banana | Pineapple | Mango |
|--|------------|--------|--------|-----------|--------|
| North Uplands | 635 | 25 | 124 | 7 | 4 |
| Red River Delta | 1,200 | 24 | 270 | 16 | 0 |
| North Central Coast | 336 | 23 | 90 | 19 | 0 |
| South Central Coast | 230 | 22 | 128 | 9 | 24 |
| Central Highlands | 282 | 0 | 21 | 1 | 1 |
| Southeast | 512 | 3 | 325 | 1 | 22 |
| Mekong River Delta | 950 | 301 | 323 | 131 | 101 |
| Viet Nam | 4,146 | 379 | 1,282 | 185 | 153 |
| Percentage of national production | | | | | |
| North Uplands | 15.3% | 6.6% | 9.7% | 3.8% | 2.6% |
| Red River Delta | 28.9% | 6.3% | 21.1% | 8.6% | 0.0% |
| North Central Coast | 8.1% | 6.1% | 7.0% | 10.3% | 0.0% |
| South Central Coast | 5.5% | 5.8% | 10.0% | 4.9% | 15.7% |
| Central Highlands | 6.8% | 0.0% | 1.6% | 0.5% | 0.7% |
| Southeast | 12.3% | 0.8% | 25.4% | 0.5% | 14.4% |
| Mekong River Delta | 22.9% | 79.4% | 25.2% | 70.8% | 66.0% |
| Viet Nam | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Source: General Statistics Office, 1996, p. 109, 191, 197, 203, and 209.

Table 4.4 Trends in fruit and vegetable processing

| Year | Value (billion VND) | | Ratio of value added to gross output |
|---------------|---------------------|-------------|--------------------------------------|
| | Gross output | Value added | |
| 1991 | 74.1 | 12.8 | 17.3% |
| 1992 | 101.3 | 17.4 | 17.2% |
| 1993 | 156.7 | 26.9 | 17.2% |
| 1994 | 181.1 | 31.1 | 17.2% |
| 1995 | 262.6 | 44.6 | 17.0% |
| 1996 | 300.6 | 51.1 | 17.0% |
| 1997 | 331.3 | 56.3 | 17.0% |
| Annual growth | 23.5% | 23.2% | |

Source: General Statistics Office. (Data obtained by DSI/MPI).

Table 4.5 Cost structure of fruit and vegetable processors

| Item | Proportion of all costs | Proportion of costs other than raw materials |
|-------------------------|-------------------------|--|
| Raw materials | 71.9 | |
| Wages | 10.2 | 36.3 |
| Other labor income | 2.1 | 1.8 |
| Electricity | 1.1 | 0.9 |
| Fuel | 2.4 | 2.1 |
| Interest | 2.0 | 1.8 |
| Depreciation on capital | 2.6 | 2.3 |
| Taxes | 1.2 | 1.1 |
| Other | 6.7 | 6.3 |
| Total | 100.0 | 100.0 |

Source: General Statistical Office. Data for 1997.

Table 4.6 Domestic demand for vegetables in Viet Nam

| Household type | Per capita consumption of vegetables (kg/person/yr) | Population (million) | Total consumption of vegetables (000 tons/year) | Percent of total demand |
|--------------------|---|----------------------|---|-------------------------|
| Average | 52.1 | 75.0 | 3,906 | 100.0 |
| Income group | | | | |
| Poorest 20 % | 46.1 | 15.0 | 691 | 17.7 |
| 2 | 50.5 | 15.0 | 758 | 19.4 |
| 3 | 53.3 | 15.0 | 799 | 20.5 |
| 4 | 55.4 | 15.0 | 832 | 21.3 |
| Richest 20% | 56.6 | 15.0 | 850 | 21.8 |
| Region | | | | |
| North Uplands | 65.5 | 12.8 | 835 | 21.4 |
| Red River Delta | 74.2 | 15.0 | 1,112 | 28.5 |
| N. C. Coast | 52.1 | 10.5 | 547 | 14.0 |
| S. C. Coast | 39.0 | 8.3 | 322 | 8.2 |
| Central Highlands | 49.1 | 3.0 | 147 | 3.8 |
| Southeast | 46.9 | 9.0 | 422 | 10.8 |
| Mekong River Delta | 34.4 | 16.5 | 568 | 14.5 |

Source: 1994 Household Survey (GSO, 1998, p. 847-850).

Table 4.7 Trend in fruit and vegetable exports

| Year | Fruit and vegetable exports (million US\$) | Total exports (million US\$) | Fruit and vegetables as a percentage of total exports |
|---------------|--|------------------------------|---|
| 1990 | 52.3 | 2,404 | 2.2% |
| 1991 | 33.2 | 2,087 | 1.6% |
| 1992 | 32.3 | 2,581 | 1.3% |
| 1993 | 23.6 | 2,985 | 0.8% |
| 1994 | 20.8 | 4,054 | 0.5% |
| 1995 | 56.1 | 5,449 | 1.0% |
| 1996 | 110.0 | 7,256 | 1.5% |
| 1997 | 140.0 | 8,700 | 1.6% |
| Annual growth | 15.1% | 20.2% | |

Source: General Statistics Office. Data assembled by DSI/MPI.

Table 4.8 Trend in the unit value of fruit and vegetable exports

| Year | Volume (thousand tons) | Value (US\$ million) | Unit value (US\$/ton) |
|------------------|------------------------|----------------------|-----------------------|
| 1980 | 33.2 | 8.4 | 253.0 |
| 1981 | 44.7 | 17.6 | 393.7 |
| 1982 | 75.4 | 28.1 | 372.7 |
| 1983 | 51.2 | 19.0 | 371.1 |
| 1984 | 73.0 | 28.6 | 391.8 |
| 1985 | 104.6 | 35.5 | 339.4 |
| 1986 | 188.1 | 42.5 | 225.9 |
| 1987 | 167.4 | 44.5 | 265.8 |
| 1988 | 155.3 | 50.8 | 327.1 |
| 1989 | 139.8 | 40.6 | 290.4 |
| 1990 | 129.4 | 50.8 | 392.6 |
| 1991 | 81.4 | 41.2 | 506.1 |
| 1992 | 132.7 | 69.7 | 525.2 |
| 1993 | 117.5 | 55.7 | 474.0 |
| 1994 | 166.2 | 88.2 | 530.7 |
| 1995 | 179.6 | 99.3 | 552.9 |
| 1996 | 182.0 | 102.8 | 564.8 |
| Average in 1980s | 103.3 | 31.6 | 323.1 |
| Average in 1990s | 141.3 | 72.5 | 506.6 |

Source: Volume and value of fruit and vegetable exports from FAO, Agrostate database (World Wide Web address: apps.fao.org/cgi-bin/nph-db.pl?subset=agriculture). Unit value calculated as value divided by volume.

Note: There are discrepancies between these data (from FAO) and the data presented in Table 4.7 (from GSO). This difference may be partly or entirely due to differences in the definition of fruit and vegetable exports, such as whether or not cashews, bananas, and canned goods are included.

Table 4.9 Import tariffs on fresh and dried fruits and vegetables

| Code | Description | Import tariff |
|------------|--|---------------|
| #070200 | Fresh or frozen tomatoes | 20% |
| #070300 | Fresh or frozen bulb, onion, leek, garlic, etc. | 20% |
| #070400 | Fresh or frozen cabbage, kohlrabi, cauliflower, etc. | 20% |
| #070500 | Fresh or frozen salad, lettuce | 20% |
| #070600 | Fresh or frozen carrot, radish, and other edible tubers | 20% |
| #070700 | Fresh or frozen cucumber | 20% |
| #070800 | Fresh or frozen bean kinds | 20% |
| #070900 | Other fresh or frozen green vegetables | 20% |
| #071000 | Green vegetables (boiled or not), low frozen | 20% |
| #071100 | Contemporary treated vegetables not already eaten | 20% |
| #071200 | Dried vegetables, whole or bits, or powder | 25% |
| #080300 | Banana, fresh or dried | 30% |
| #080400 | Date-palm fruit, ananas, fig, Chinese pear, guava, mango, mangosteen; fresh or dried | 30% |
| #080500 | Orange fruits, fresh or dried | 30% |
| #080600 | Fresh or dried grape | 30% |
| #080700 | Melon, watermelon, fresh papaya | 30% |
| #080800 | Fresh apple, pear | 30% |
| #080900 | Fresh apricot, peach, cherry, plum | 30% |
| #081000 | Other fresh fruits | 30% |
| #081310-30 | Dried apricot, red plum, and apple | 30% |

Source: Tariff rates promulgated in conjunction with Decree 54/CP of 28 August 1993, except for last line which is from Decision No.848 TC/QD/TCT dated 1 November 1997. Statistics Publishing House, 1997, p. 22-23, 472.

Table 4.10 Import tariffs on fruits and vegetables products

| Code | Description | Import tariff |
|---------|--|---------------|
| #200100 | Vegetables, fruits, nuts, and other edible plant parts treated or stored by acetic acid or vinegar | 40% |
| #200200 | Tomatoes treated or stored by all without vinegar and acetic acid | 40% |
| #200300 | Mushroom treated or stored by all without vinegar and acetic acid | 40% |
| #200400 | Other vegetables treated or stored by all without vinegar and acetic acid low frozen | 40% |
| #200500 | Other vegetables treated or stored by all without vinegar and acetic acid; but not frozen | 40% |
| #200600 | Fruits, nuts, fruit shells, and other plant parts treated by sugar (extracted water, ice-frozen) | 40% |
| #200700 | Confitures, fruit, agar-agar, sugar preserved fruits (of citrus fruits), fruit juices, filtered and concentrated, fruit paste boiled, not or mixed sugar or other sweets | 40% |
| #200800 | Fruits, edible plant parts stored treated by other ways, mixed or not sugar or other sweets, or alcohol; not described elsewhere | 40% |
| #210320 | Tomato mushroom sauces and other tomato sauces | 40% |

Source: Tariff rates promulgated in conjunction with Decree 54/CP of 28 August 1993, except for last line which is from Decision No.848 TC/QD/TCT dated 1 November 1997. Statistics Publishing House, 1997, p. 26-27, 472.

5. SEAFOOD PROCESSING

The Vietnamese seafood subsector has grown rapidly: since 1985, the value of seafood output has grown by an average of 5 percent per year. The export performance of this sector has been even more impressive, averaging 20 percent per year over the same period. The value of seafood exports reached US\$ 776 million in 1997. By comparison, rice exports in 1997 were around US\$ 900 million.

For the purposes of this report, seafood is defined broadly as food derived from fish, crustaceans, and other aquatic animals, whether from the ocean or from freshwater. The fisheries industry includes marine fisheries, marine (or coastal) aquaculture, freshwater fisheries, and freshwater aquaculture. Marine and freshwater fisheries are sometimes called “capture fisheries” to distinguish them from aquaculture.

5.1. Background

Unlike many of the export sectors, the seafood industry was not oriented toward supplying the eastern bloc countries during the 1970s and 1980s. Japan has been the main market for Vietnamese seafood throughout this period and remains the most important outlet for seafood exports today. The seafood sector has, however, seen dramatic changes. During the 1980s and early 1990s, the only legal exporter of seafood was SEAPRODEX, a state-owned enterprise (SOE) managed by the Ministry of Fisheries. In the 1980, the government used SEAPRODEX as an experiment in SOE reform. Initially, SEAPRODEX was given greater autonomy in its management and required to cover its own costs from the export revenue it generated.

In 1994, the reforms were extended by allowing other companies, private and SOE, to export directly. The number of exporters has grown to over 100 and a large number of new seafood processors have entered the field. Most of these new entrants have been provincial state enterprises and private enterprises, particularly in the Mekong River Delta and the southern coast. The market share of SEAPRODEX in seafood exports has fallen sharply, reaching 17 percent in 1997. The general impression among seafood processors is that the private sector is growing faster than the SOE sector and that the competition for raw material has intensified in the last several years.

5.2. Seafood Production and Marketing

5.2.1. Production trends

Gross output of fisheries has risen from 0.82 million tons in 1986 to 1.6 million tons in 1997 (VEN, 1998). This represents an annual growth rate of 6.2 percent, but even this figure understates the growth in the economic importance of fisheries. The value of exports has increased almost eight fold since 1986, growing at 20 percent per year since that date. Marine capture fisheries account for about two third of the total volume, but the importance of aquaculture is growing. Fisheries researchers believe that marine capture fisheries may be close to the maximum sustainable yield, but aquaculture has the potential to continue its rapid pace of expansion (ADB, 1996 and VEN, 1998).

5.2.2. Fisheries production

The national fishing fleet contains an estimated 93,600 boats. About one third of these (31,500) are not motorized. These boats are used for near shore fishing using simple technology and generating only modest returns for the fisherman. The bulk of the fleet (62,000 vessels) consist of larger motorized fishing boats, generally 10-20 meters long with 20-40 hp inboard engines. Only 100 vessels are equipped for deep-sea fishing.

These boats have 500 hp engines and are often owned by state-owned enterprises. The average boat and engine size tends to be larger in the south than in the north. About half of the fishing fleet is in the South Central Coast, with Da Nang ranking as the largest marine fishing port (ADB, 1995, p. 2-6).

The **marine fisheries** catch in 1995 was 929 million tons, compared to the estimated maximum sustainable yield is 1.3 million tons per year. The situation is not as favorable as suggested by these figures, however. To begin with, because of the small size of the majority of the boats, much of the fishing activities are concentrated close to shore. It is estimated that 86 percent of the catch comes from waters less than 30 m in depth. In these areas, fishing activity may be reaching or exceeding maximum sustainable yield. Furthermore, the marine catch is rising at 5 percent per year, so it may reach 1.3 million tons within five years.

The marine fishing industry follows a distinct seasonal pattern. In most regions, the main fishing season occurs during the dry season (November to April), when fishing activity is concentrated around the offshore islands. During the rainy season, the boats

move closer to shore following as a number of species in their spawning migration. The main species of fish are tuna, bonito, sardine, mackerel, gizzard shad, and giant catfish.

There are also regional differences. The marine fishing grounds of Viet Nam are usually divided into four areas: the Tonkin Bay in the north, the central coast, the southeastern coast, and the southwestern coast. The Tonkin Bay fishing industry is relatively small, accounting for just 13 percent of the marine fishing vessels and 12 percent of the annual catch. The water is less productive, and Vietnamese fishing boats face intense competition from Chinese and Hong Kong boats. The central coast boast the largest fishing fleet, with 50 percent of the vessels, though it accounts for just 21 percent of the catch. The continental shelf is very narrow in this region, so the fishing industry tends to focus on large pelagic (deep sea) fish rather than demersal (bottom-feeding) fish. As in the north, fishing on the central coast is disrupted annually by typhoons.

The southeast region is the most productive due to nutrients flowing from the Mekong River, a wide continental shelf, and little international competition. With just 16 percent of the vessels, this region accounts for 43 percent of the catch. The fishing boats in this region tend to be somewhat larger and more powerful than those in the center and north. The southwest region involves fishing in the Gulf of Thailand, using ports in Kien Giang in the Mekong Delta. It accounts for 21 percent of the vessels and 23 percent of the catch (IFES, 1995).

The output of aquaculture and inland fisheries was 409 thousand tons, representing about 31 percent of the total fisheries catch (see Table 5.1). **Inland fisheries** are an important source of income in some areas, but many of the main rivers are either overfished or environmentally damaged. The damage is related to the dyke systems that interfere with spawning patterns and the run-off from agricultural chemicals. Although statistics are hard to find, it appears that inland fisheries produce less than aquaculture.

Aquaculture production is complex and involves a variety of species and methods. Coastal aquaculture includes marine fish cages, pearl oyster production, lagoon-based extensive aquaculture, brackishwater fishponds, and shrimp farming. Near Danang, fish farmers buy yellowtail fish fry from China, raise them in cages, and export the harvested fish to Japan. In the Mekong Delta, shrimp farms cover 200 thousand hectares and produce 80 thousand tons of shrimp per year. Freshwater fish culture is thought to produce 275 thousand tons of fish, including 100 thousand tons from fishponds and 24 thousand tons from freshwater fish cages. There are an estimated 450 freshwater hatcheries producing 6 billion fish larvae and fish fry each year. The most common fish for freshwater aquaculture are the Chinese carp species and the Indian carp species.

5.2.3. Marketing channels

Given the numerous marketing channels for each type of fishery production, it is only possible to provide the broad outlines here. The inland fishery activity is mostly on a small scale, so that the marketing is done through a local trader or directly by a member of the fisherman's family (often his wife). Aquaculture activities are more likely to be commercial and sometimes for export, most notably shrimp farming. Normally, shrimp farmers sell to agents representing wholesalers, who in turn sell to processors or processor/exporters.

For the marine fishing industry, the first link in the marketing channel is the private trader. The relationships between the traders and fishermen are long-standing and complex, based on a web of debts and obligations. Traders provide credit to fishermen for ice, fuel, boat repairs, and new equipment. In exchange, the fishermen are bound to sell a portion of the catch to that trader, sometimes at a fixed price. The relationship need not be exclusive in that a given fisherman may have relationships with more than one trader. Traders sell to wholesalers or one of their agents. Unlike the traders who specialize in a set of fishermen and purchase a variety of species, the wholesaler generally specializes in one product and perhaps one market (e.g. restaurants, fish oil factories, export processing plants). Seafood processors buy from wholesalers and traders, but report that it is almost impossible to buy directly from fishermen because of the fisherman-trader bond²⁰.

²⁰ One fish processor who does buy direct, does so by providing the credit, ice, fuel, and boat repair services needed by fishermen.

Perhaps 90 percent of the marine fisheries catch is consumed within Viet Nam, either in fresh form, dried, or as fish sauce. The remaining 10 percent is exported, usually in frozen form or dried form. Processors that export tend to be specialized in that area, selling 90-100 percent of their output to other countries.

5.3. Seafood Processing

5.3.1. Structure of seafood processing sector

As mentioned above, seafood processing plants tend to specialize in catering to either the domestic market or the export market. The ADB (1996: 414) estimates that there are more than 350 processing plants producing fish sauce, fish paste, and dried fish for the domestic market. There are 40-50 fish sauce processing plants produce an estimated 150 million liters of fish sauce. Normally, the plants have capacities of 0.5-2 million liters, but some have capacities of 6 million liters per year. Dried fish production is often done on a small scale using sun drying on simple racks. Dried fish from the Mekong Delta is transported to fish sauce plants in the north.

There are 214 seafood processors producing for the export market, although not all export directly. These processors are located in 33 provinces, primarily on the coast or in one of the two main cities. As shown in Table 5.4, Ho Chi Minh City has the largest number of seafood processors serving the export market, with 51 processors or 24 percent of the total. Other provinces with large numbers of processors include Khanh Hoa (25), Ca Mau Bac Lieu (17), and Ba Ria - Vung Tau (14). These top four seafood processing areas account for half Viet Nam's seafood processors producing for the export market.

Table 5.4 also shows the number and proportion of export seafood processors in each province that were licensed to export to the European Union in late 1997. Overall, 61 seafood processors (28 percent) were licensed for export to the EU. The proportion varies across provinces, being highest in "Other Mekong Delta" provinces. This category includes An Giang, Tien Giang, Vinh Long, and Tra Vinh provinces. The proportion of EU licensed processors is 50 percent in Hai Phong, Binh Dinh, and Can Tho.

The same data is presented by region in Table 5.5. This table highlights the concentration of export-oriented seafood processors in the southern part of Viet Nam.

Fully 80 percent of the processors and 91 percent of the EU-licensed processors are located in the three southern regions.

As of 1995, the proportion of state-owned export processors (including both central and provincial) was 81 percent, the remaining 19 percent being private enterprises . There are no statistics on the proportion of production or exports generated by each type of processor. On the one hand, the state enterprises tend to be larger than the private ones, so we would expect the SOEs share of output to be greater than 81 percent. On the other hand, there is a general perception among processors that the private sector is growing more rapidly than the state sector.

The largest seafood processor-exporter is SEAPRODEX. Formed in 1978, SEAPRODEX originally had responsibility for all seafood exports. In the 1980s, it became one of the first state-owned enterprises to be held responsible for covering its own expenses. Its monopoly on seafood exports was removed in 1994. The number of seafood exporters rose quickly and the market share of SEAPRODEX has declined to around 17 percent.

5.3.2. Processing margins

The processing margin for seafood varies depending on the product. For frozen shrimp, the cost of the raw material accounts for 80 percent of the value of the final product. Labor and depreciation are each roughly 10 percent in frozen shrimp processing. Dried products vary widely, but one company reports that raw materials represent 60 percent of the value of its dried squid products. Although the drying process is quite simple, laying the squid out to dry and collecting them is a relatively labor-intensive process. SEAPRODEX produces some packaged consumer goods such as spring rolls for the Japanese market. In this case, the raw material costs are said to be just 50 percent of the ex-factory value of the final product.

These figures illustrate the importance of procurement skills for the competitiveness of individual companies. Small errors in purchasing can have large consequences in terms of the profitability of seafood processing, particularly in the case of frozen shrimp production. Indeed, complaints about “excessive” competition for seafood raw material among processors were almost universal among interviews with seafood processors.

5.4. Seafood Consumption

5.4.1. Domestic consumption

According to the 1994 GSO Household Survey, with a sample of 91 thousand households, Vietnamese households consume an average 15 kg of fish and shrimp per person per year. Not surprisingly, consumption of these items rises with income. Consumption of fish and shrimp is 8.5 kg per capita among the poorest 20 percent of the households, rising to 21.4 kg per capita among the richest 20 percent (see Table 5.7). This pattern suggests that the income elasticity of demand is close to 1.0 at low incomes but falls below that level at middle and higher incomes.

Fish and shrimp consumption show even greater variation across regions. Households in the South Central Coast and the Mekong Delta consume more than 20 kg per capita, while those in the Northern Uplands and the Red River Delta consume less than 10 kg per capita. This presumably reflects regional differences in consumer preferences, prices, and availability.

By far the most commonly consumed processed seafood product is fish sauce. According to the 1994 Household Survey, the average consumption is 4.9 liters per capita. Although consumption rises somewhat with income, there is less variation with income than in the case of fish and shrimp consumption. The implication is that the income elasticity of demand for fish sauce is lower than that of fish and shrimp demand.

Detailed information on the breakdown of seafood demand into different types (fresh, canned, dried, frozen, etc.) is not available, but interviews with fishery industry participants and informal visits to urban retail outlets suggests a number of patterns. First, the bulk of seafood consumption is undoubtedly in fresh form, being consumed near the place where it was brought to land or harvested. The inventory of retail food stores confirms that fish sauce is the most important processed seafood product in the consumption basket of Vietnamese households. Fish sauce is sold in 750-1000 ml bottles in even the smallest retail food stores. Furthermore, the importance of this product is reflected in both the shelf space allocated to it and the large number of brands. In one large supermarket, over 20 brands of fish sauce were available. All the brands were Vietnamese.

Another important processed seafood product is canned sardines, most commonly packed in tomato sauce. In this market, Vietnamese brands such as Saki, Sun-Up, and CANFOOCO compete with Thai brands such as Three Lady Cooks and Pigeon, as well as other brands from Indonesia, Taiwan, and Malaysia. It appears that Vietnamese brands have a minority position in this market. The Three Lady Cooks brand, for example, can be found in almost any retail food store and at sidewalk vending stands, whereas the Vietnamese brands are only found in larger stores with a wider variety. Canned tuna is a much smaller market than sardines, but the competing brands are similar. Canned fish and squid are even more rare, being found only in the largest supermarkets.

Frozen fish products are not available in small and medium food stores, but they are available in supermarkets and in specialized seafood stores. One fish store in Ho Chi Minh City had an entire freezer full of about two dozen frozen seafood products produced including spring rolls and various types of dumplings. All the products were supplied by one company, Agrex Saigon, a state-owned enterprise managed by the Ho Chi Minh City municipal government. In general, it seems likely that such prepared frozen foods are purchased only by high-income urban households or for special events.

5.4.2. Seafood export market

Seafood exports from Viet Nam have shown remarkably high growth rates, sustained for more than a decade. As shown in Table 5.8, seafood exports have risen from US\$ 90 million in 1985 to US\$ 776 million in 1997, representing a 20 percent annual growth rate over the 12- year period. The table also shows that this growth is relatively broad based, with exports of frozen shrimp, frozen squid, frozen fish, and dried products all growing at over 20 percent per year over the period 1985-95. Seafood exports account for 10-12 percent of total exports, making seafood the third largest export after crude oil and rice.

In the 1980s, SEAPRODEX had a legal monopoly over seafood exports. In addition, Viet Nam exported seafood to just three countries: Japan, Hong Kong, and Taiwan. Today, there are over 100 exporters, and Vietnamese seafood is shipped to 28 countries. Japan continues to dominate the list of importers: in 1995, slightly more than half of Vietnamese seafood exports were shipped to Japan. Europe is a relatively new

market for Vietnamese seafood. Only recently have Vietnamese seafood processors been licensed for export to the European Union, passing strict hygiene standards. The share of exports going to Europe may be increasing: in 1997, Japan accounted for just 40 percent of Vietnamese seafood exports, while exports to Europe represented 25 percent of the total.

Seafood exports are dominated by frozen shrimp. As shown in Table 5.9, frozen shrimp represents 62 percent of the value and 52 percent of the volume of seafood exports. Frozen squid and fish represent 8 and 13 percent of the value of exports, respectively. The proportions of the different products demanded by different countries are relatively similar. For example, shrimp is the main item for almost all the main markets for Vietnamese seafood. One exception is Taiwan, which imports more fish than shrimp from Viet Nam.

Data on export destinations for 1997 is available from SEAPRODEX, the largest seafood exporter in Viet Nam. As shown in Table 5.10, the exports of SEAPRODEX reflect the national pattern, with Japan accounting for about half of exports. This table also highlights the wide variation in the unit value (average value per ton) of seafood exports. As a general rule, unit values are generally highest for exports to high-income countries. SEAPRODEX exports to the industrialized countries are generally above US\$ 5,000 per ton.

5.5. Prospects and Policy Issues

5.5.1. Prospects for the domestic market

The most important determinants of food demand in the long run are income growth, urbanization, and population growth. Econometric analysis of demand patterns using the Viet Nam Living Standards Survey²¹ suggests that the income elasticity of demand for seafood products is 1.05. This implies that, other things being equal, the per capita domestic demand on seafood can be expected to rise approximately at the rate of per capita income. The analysis also reveals that urban households consume somewhat less seafood than rural households, presumably due to the proximity of the latter to

²¹ This survey was carried out in 1992-93 using a sample of 4800 households. The income elasticity was estimated by regression the budget share of fish and seafood as a function of total expenditure, local prices, and a variety of household characteristics.

sources of fresh seafood. The effect, however, is not large enough to make a noticeable difference, particularly given the relatively low pace of urbanization in Viet Nam. These results suggests that seafood demand will follow the rate of population growth. This rate is about 2 percent currently but is expected to fall to close to 1.2-1.6 percent for the period 2005-2010.

Although the per capita demand may not change much, we can expect the composition of seafood demand to shift with higher incomes. For example, we can expect a gradual shift toward the more expensive types of seafood, including shrimp. Currently, the demand for frozen and semi-prepared seafood products is negligible. As households freezer capacity increases and as households change their shopping patterns to make purchases less frequently, we would expect frozen seafood demand to rise, primarily in the largest cities. Furthermore, as incomes rise the convenience of semi-prepared items such as frozen spring rolls and fish fillets will begin to outweigh the additional cost. Given the very low base, this process is expected to be gradual.

5.5.2. Prospects for export markets

Japan is by far the largest market for fisheries products in the world, importing 3.3 million tons worth almost \$US 17 billion in 1994. Only 2 percent of these imports come from Viet Nam, suggesting that there is room for significant expansion provided that Viet Nam can compete successfully with other suppliers. The import demand from Japan appears to be stable, showing neither growth nor contraction. Seafood consumption is declining as a result of “westernization” of food consumption patterns, including growing demand for bread, meat, and dairy products. This trend, however, is offset by declining fisheries production due to rising labor costs and import competition.

Japanese seafood consumers are considered very demanding and well informed. They place a high priority on cleanliness and hygiene and, for this reason, tend to prefer seafood caught by Japanese fishing vessels. Shrimp is the main product purchased from Viet Nam. In this market, Viet Nam represents less than 20 percent of Japan’s imports and competes with Indonesia, Thailand, India, and China. In Japan, fish is often consumed raw as sushi or sashimi, importers place a premium on products that are fresh and completely free of bacterial contamination.

Europe is a large and growing market for imported seafood. Partly as a result of

declining domestic fisheries industries, the level of imports is rising. The largest importers are Spain, France, and Italy. Current imports from Viet Nam are dominated by frozen shrimp, in part because transportation costs are a smaller share of the high-valued products. The harmonization of seafood import requirements has benefited seafood exporters such as Viet Nam. Although the licensing requirements for the European Union are strict, one approval opens up the markets for the continent.

The United States is also a very large market for seafood (imports are US\$ 12 billion), a market that Viet Nam has only started to exploit. Seafood consumers in the United States are considered less informed than those in Japan, since seafood has always played a smaller role in US diets. The demand for shrimp, the largest seafood import, tends to be in more processed form, such as peeled and/or deveined. With regard to fish, US consumers tend to prefer fish that are white, bland, and have few bones.

The main limitations on Vietnamese exports is meeting the sanitary requirements of the importing countries and establishing a reputation with importers. A major task of seafood processors is to achieve certification to export to the large markets.

5.5.3. Quality issues

In 1994, the National Fisheries Inspection Quality Assurance Center (NAFIQACEN) was formed to establish standards, regulate seafood processors, and issue quality and health certification to Vietnamese seafood processors. NAFIQACEN was created in recognition of the need for an independent body to regulate food quality and certify processors. In doing so, it reduces the transaction costs for importers by providing information about products they are purchasing. This is an example of a positive and constructive role for the government in facilitating the economy in the new market mechanism.

Seafood inspection and regulations in all the industrialized countries are being revised in accordance with a system called Hazard Analysis Critical Control Point (HACCP). HACCP is a set of procedures for identifying, correcting, monitoring, and documenting possible sources of contamination. Once established, a HACCP system does not require much time but has been shown effective in minimizing the risk of contamination. Fisheries experts say that Vietnamese legislation on seafood health and safety is sufficient, but the capacity to enforce those regulations is weak.

Importers have their own health and safety requirements, and they vary across importers. In Japan, the importer has primary responsibility for ensuring quality. Generally, when working with a new exporter, the importer will visit the processing plant, inspect the equipment, and examine the raw material available. If these are acceptable, the importer negotiates a contract and leaves a technician at the plant to monitor the processing. Sometimes, a reference sample of processed product is taken and later compared with the export shipment. This sample serves as a standard against which to compare the eventual shipment. In subsequent shipments, the importer reduces the level of monitoring. Japanese importers are said to place great weight on freshness, as determined by appearance, texture, and smell.

Certification by the United States and by Europe tends to be based more on bacterial counts and other scientific measures rather than smell and appearance. The European Union (EU) certifies a local organization (NAFIQACEN in this case) to monitor and certify local processing plants following criteria set by the EU. It may send EU inspectors to verify that certified plants do indeed meet the required standards. In early 1998, the EU announced that it would carry out an inspection of Vietnamese seafood processors. NAFIQACEN decertified a large number of processors, apparently in order to protect its own reputation as a certifying agency. This has disrupted seafood exports to the EU, although it is hoped that many of these processors will be recertified following the inspection.

The United States seafood quality is under the jurisdiction of the Food and Drug Administration (FDA). The importer is held responsible for ensuring that the imported product meets FDA health standards, subject to random inspections by the FDA. A recent report by the General Accounting Office (a U.S. government institute that evaluates the effectiveness of public agencies) criticized the FDA for inspecting just 1.7 percent of shipments of imported seafood, fruits, and vegetables. The report argued that since imports now represent over half of the seafood consumed in the United States, the FDA should be given authority and budget to control the quality of imported food. In particular, the report recommended that the FDA be given the authority to require processors and exporters in other countries to adopt safe practices for seafood, fruits, and vegetables shipped to the United States (Washington Post, 1998),

5.5.4. Upgrading the seafood processing industry

There are two areas where Vietnamese seafood processor need to upgrade their facilities and skills: the improvement of hygienic conditions within the plant and the ability to produce value-added products.

In the area of plant hygiene, there are numerous steps. First, there is a need for investment in waste water treatment in the form of either settling ponds or filtration systems. Second, the surfaces in the plant need to be gradually converted to tile, stainless steel, and other surfaces that can be cleaned more effectively. Third, cleaning procedures themselves would be more effective carried out with hot water under pressure rather than room-temperature tap water. Fourth, although all plants have a quality control section, the lack of laboratory supplies hampers their ability to scientifically test samples. Fifth, few seafood processing plants have adequate facilities to chill raw material until processing. And finally, the capacity of ice production is below what is considered necessary by international standards.

The second area of investment is in equipment and skills to produce so-called value-added products. This includes machinery for making fillets, spring rolls, dumplings, and other consumer products. This includes machinery for higher quality packaging.

It is not, however, the role of the government to provide these equipment out of the state budget. All of these are commercial investments that generate returns for the processor and thus do not need to be subsidized. The market incentives for installing health and safety equipment comes from the advantages of certification for export to Japan, the EU, or the United States. Importers are in a better position than the government to help processors decide the most cost-effective way to meet these requirements. Similarly, investing in machinery to produce consumer goods requires extensive information about the demands of the market, the capacity of different machines, and the training necessary to operate them efficiently. All of these are more likely to come from a Japanese or Taiwanese importer than from a planning official in Hanoi.

5.5.5. Role of state-owned enterprises

There are about 200 seafood processors that produce for export. As noted above, the majority are state-owned enterprises, mostly owned by provincial People's Committees. This pattern is the legacy of socialist central planning in which all medium- to large-scale enterprises were managed by the state. During the 1980s, SEAPRODEX had a monopoly of seafood exports. In the late 1980s, the state-owned seafood processors were allowed to retain the foreign exchange they earned from exports. Since the exchange rate was severely overvalued, there was little incentive to sell the earnings back to the state. Instead, the earnings were used to import scarce consumer goods for resale. This system was quite profitable and generated a large increase in installed capacity among the state enterprises. As a result, there is a problem of over-capacity in the state-owned seafood processing sector.

Box 5.1: Shrimp industry in China

By the 1970s, China's marine shrimp resources were fully exploited at the same time that world demand, and Asian demand in particular, was growing. This created incentives for private and public enterprises in China to invest in aquaculture shrimp production. During the 1980s, cultured shrimp production grew from less than 26 thousand tons to 200 thousand tons, while exports expanded from 22 thousand tons to 123 thousand tons.

The government played a key role in starting the shrimp culture industry, creating a shrimp SOE, providing low interest loans and tax benefits to producers and processors, and creating a highly effective system of research and extension for aquaculture. These policy measures built on existing cost advantages related to China's long coastline, low labor costs, and an elaborate system of dykes that facilitates the creation of shrimp ponds. On the other hand, the relatively cool climate means that the growing season in much of China is just 45 months. The strongly seasonal production cycle creates a problem for processors and exporters. Although China has become a leading supplier of shrimp to the United States and Japan, it is a low-quality producer of undifferentiated products, exporting mainly 2-kg blocks of frozen shrimp.

(cont.)

5.1: Shrimp industry in China (continued)

Of the 14 cases studies of successful expansion of a high-value agricultural commodity studied by Jaffee (1992), the case of Chinese shrimp exports is the only one in which the government took a leading role in direct production and marketing. It is also one of the few in which little progress has been made in moving to more differentiated value-added product.

The fact that almost all the seafood processors are managed by the provincial authorities puts a constraint on the development of the sector. On the one hand, the management of the processing enterprises is selected by the provincial People's Committees. In some cases, the People's Committees have brought in qualified managers from outside. In other cases, the managers are unqualified, having been selected on the basis of other criteria. A related problem is that, as a unit of the People's Committee, these processors are often not able to accumulate retained earnings for investment. Instead, retained earnings are absorbed by the People's Committee. This legal status also makes it difficult or impossible to obtain credit from commercial banks. As a result, the only source of capital for these enterprises is the People's Committee, that must approve and fund any capital spending by seafood processors.

Seafood processors (both private and state) made a number of observations about the differences between the two:

- The most common comment was that private enterprises are able to make decisions more quickly. State enterprises must get decisions approved by political authorities and occasionally miss opportunities as a result of the delay.
- State enterprises are less flexible in their labor management. They are required by statute to fill certain positions, regardless of the size of the enterprise. Furthermore, it is more difficult for state enterprises to lay off workers.
- Another frequent comment was that a manager at a state enterprises must make a profit on each transaction, at the risk of losing his job or (in extreme cases)

being arrested for misuse of state funds. As a result, SOE managers may abrogate a contract in order to avoid losing money. By contrast, a private manager can decide to lose money on one transaction if it is necessary to develop or maintain a reputation for reliability. In the long run, this is an advantage for private enterprises.

- Managers at state-owned enterprises argue that part of the profitability and success of private processors is due to their ability to evade taxes and to smuggle products into China. By contrast, SOEs are required to obtain receipts for every purchase, even if requiring a receipt means paying a higher price for the input (suppliers can more easily avoid taxes if they do not provide an official “red receipt”).

International experience suggests that private enterprises may be more likely to seek out and take advantages of opportunities to export new products, particularly more differentiated products with a higher value added. The comparison of the shrimp industries in China and Thailand illustrates this point (see Box 5.1 and 5.2).

Box 5.2: Shrimp industry in Thailand

Like China, Thailand reached the maximum capacity of its marine shrimp resources in the early 1970s. Also like China, it benefitted from relatively low labor costs and a large irrigated delta area where shrimp could be grown. Mirroring the growth in Chinese shrimp exports, Thai shrimp exports rose from less than 20 thousand tons to over 75 thousand tons in the 1980s. And finally, in Thailand (as in China), shrimp aquaculture was initially characterized by low yields (under 300 kg/ha), but the adoption of larger varieties of shrimp and more intensive management has resulted in yields of over 800 kg/ha (Jaffee, 1992).

A major difference between the Chinese and Thai shrimp industries has been the role of the government. In Thailand, the government was not directly involved in production, processing, and export. Instead, it limited its involvement to aquaculture research and extension, factory inspection and certification services, and some investment in cold storage facilities. The government also managed buffer stocks in an attempt to stabilize prices. Shrimp raising, processing, and export is carried out almost entirely by aquaculture farmers and private enterprises.

Another difference with China is that the Thai shrimp industry has developed a wide range of value-added products for export, including cooked and peeled shrimp, peeled tempura, battered and breaded shrimp, spring rolls, dumplings, and shrimp skewers. These value-added shrimp products are exported to Japan, the United States, and Europe. According to Jaffee (1992, p 97), "Thailand has developed the most diversified shrimp product mix and market outlets of any of the Asian shrimp-exporting countries." It is tempting to conclude that Thailand's ability to diversify into value-added products is related to a more flexible market-oriented processing and export industry.

5.5.6. Effect of trade policy

Currently, there is a 20 percent import tariff on fish, crustaceans, and molluscs, whether live, frozen, dried, or processed in any other way (Decree No. 82 of 13 December 1996, as cited in Statistics Publishing House, 1997, p. 397). Under the Asian Free Trade Agreement, this rate would be reduced gradually toward zero. In general, the seafood processing industry will not be adversely affected by this import liberalization. The existence of sizable exports of frozen shrimp, frozen squid, and fish is a reliable sign that Viet Nam has a comparative advantage in fisheries. Furthermore, the perishability of unprocessed seafood products guarantees that seafood processing will remain close to its source of raw material, that is in Viet Nam.

To the extent that other southeast Asian countries reduce their import barriers, Vietnamese seafood exports to some of its ASEAN neighbors could increase. This effect is likely to be limited, however, since many of the other members of ASEAN are already seafood exporters, notably Thailand and Indonesia.

There are two areas where import liberalization could erode the market share of Vietnamese seafood processors. The first area is canned seafood. As noted above, Vietnamese seafood canners already faces strong competition from Thailand and Indonesia in canned sardines and tuna even within the country. To the extent that these imports pay duties now and will pay less under AFTA, consumers will benefit at the expense of domestic seafood canners. It is worth noting that domestic seafood canning is a relatively small portion of the demand for seafood in Viet Nam.

The second area where import liberalization may allow increased import of processed seafood is in specialty and convenience food. Semi-prepared food, particularly that involving numerous ingredients and some high-technology processing, may be imported more easily under the AFTA. The volumes will be quite small and concentrated in the larger cities. Although seafood processors may see this as a sign that import protection is needed, they should instead view it as providing free information about the potential market for value-added products in the domestic market.

5.6 Conclusions and Recommendations

The seafood processing sector has grown rapidly on the basis of low wages, a long

coastline, and proximity to important markets in Asia, primarily Japan. The adjustment of the seafood subsector to the *doi moi* reforms was less painful than that of the fruits and vegetables subsector because it was not closely tied to trade with the eastern bloc in the 1980s.

The seafood processing sector is dependent on the continued availability of seafood at reasonable prices. Although Thailand has developed a tuna canning industry based on raw materials caught outside its waters, this is unusual. In general, the success of the seafood processing industry is tied to the success of the fisheries sector, including aquaculture.

The biggest threat to the subsector growth is the sustainability of marine seafood resources. Estimates of the maximum sustainable yield are not very accurate, but most studies agree that Viet Nam is at or will soon arrive at the capacity of the coastal waters. Spectacular collapses of North Sea (Europe) and Grand Banks (North America) fish stocks demonstrate that under-regulated fishing can result in the rapid disappearance of marine resources.

Further growth in seafood production and exports will depend to an increasing extent on aquaculture. The process of switching to aquaculture as the basis of seafood processing and export growth has already occurred in China and Thailand. In both countries, the transition was facilitated by strong support for aquaculture research and extension.

The development of shrimp aquaculture is vulnerable to epidemic diseases. A sizable Taiwanese shrimp export subsector was completely undermined by problems related to disease and pollution. Smaller scale disease problems are already appearing in the Vietnamese press.

The government should increase its efforts to study and monitor the maximum sustainable yield of different types of marine species and in different regions. This information is vital in order to design fishing regulations that protect the marine resources without unnecessarily limiting the growth of the marine fisheries industry.

The government should strengthen its enforcement of existing regulations designed to protect fishery resources. Fisheries specialists believe that the current regulatory system is adequate, given the limited information available, but that enforcement is weak

and inconsistent. Although enforcement may be expensive, the costs are small relative to the value of the resource being protected.

The government should increase its investment in research and extension in aquaculture. At least three areas should receive special attention. First, shrimp yields are low by Thai and Chinese standards and will need to be raised to maintain competitiveness. Second, research and extension efforts are needed in monitoring and controlling contagious diseases (particularly in shrimp). And third, the development of improved breeds would facilitate the transition to a more aquaculture-based seafood subsector.

The government should facilitate the collection, analysis, and dissemination of information on seafood export markets, particularly in the area of health and safety regulations of importers. Health and safety regulations are tighter on seafood than any of the other three subsectors. Furthermore, the regulations vary widely from one importer to another. Initially, information could be collected and disseminated by a government institute, but eventually this function should be taken over by a seafood exporters association.

Table 5.1 Trends in fishery production

| Year | Marine fisheries (000 tons) | Aquaculture and inland fisheries (000 tons) | Total fisheries catch (000 tons) | Percent from marine fisheries |
|---------------|--------------------------------|--|-------------------------------------|-------------------------------|
| 1986 | 570.5 | 234.9 | 805.4 | 70.8% |
| 1987 | 611.8 | 242.2 | 854.0 | 71.6% |
| 1988 | 630.6 | 233.1 | 863.7 | 73.0% |
| 1989 | 626.7 | 247.1 | 873.8 | 71.7% |
| 1990 | 641.5 | 300.8 | 942.3 | 68.1% |
| 1991 | 699.4 | 341.0 | 1,040.4 | 67.2% |
| 1992 | 696.6 | 356.1 | 1,052.7 | 66.2% |
| 1993 | 798.1 | 368.0 | 1,166.1 | 68.4% |
| 1994 | 890.0 | 397.2 | 1,287.2 | 69.1% |
| 1995 | 928.9 | 408.8 | 1,337.7 | 69.4% |
| Annual growth | 5.6% | 6.4% | 5.8% | - - |

Source: IFEP, 1997.

Table 5.2 Geographic patterns in marine fisheries production

| Region | Percent of fishing vessels | Percent of fishing horsepower | Percent of marine fisheries catch |
|-----------|----------------------------|-------------------------------|-----------------------------------|
| North | 13% | 7% | 12% |
| Central | 50% | 39% | 21% |
| Southeast | 16% | 22% | 43% |
| Southwest | 21% | 32% | 23% |
| Total | 100% | 100% | 100% |

Source: IFEP, 1997, pages 27,29.

Table 5.3 Geographic patterns in inland fisheries and aquaculture

| Region | Potential area for aquaculture (000 ha) | Estimated area used for aquaculture (000 ha) | Used area as a percentage of potential area | 1995 production of inland fisheries and aquaculture (000 tons) | Share of total production |
|------------------|---|--|---|--|---------------------------|
| Northern Uplands | 187.4 | 67.7 | 36.1% | 24.1 | 5.9% |
| Red River Delta | 145.7 | 62.4 | 42.8% | 53.5 | 13.1% |
| N. C. Coast | 101.5 | 32.9 | 32.4% | 23.2 | 5.7% |
| S. C. Coast | 119.9 | 15.9 | 13.3% | 7.6 | 1.9% |
| Cent. Highlands | 65.0 | 4.2 | 6.5% | 5.6 | 1.4% |
| Southeast | 140.5 | 61.5 | 43.8% | 20.3 | 5.0% |
| Mekong Delta | 619.0 | 301.4 | 48.7% | 274.5 | 67.1% |
| Total | 1,379.0 | 546.0 | 39.6% | 408.8 | 100.0% |

Source: Ministry of Fisheries, cited in IFEP, 1997, pages 35, 36.

Table 5.4 Trends in seafood processing

| Year | Value (billion VND) | | Ratio of value added to gross output |
|---------------|---------------------|-------------|--------------------------------------|
| | Gross output | Value added | |
| 1991 | 1,514.9 | 248.4 | 16.4% |
| 1992 | 2,070.1 | 335.4 | 16.2% |
| 1993 | 3,202.1 | 518.7 | 16.2% |
| 1994 | 3,701.4 | 599.6 | 16.2% |
| 1995 | 5,365.3 | 858.4 | 16.0% |
| 1996 | 6,143.1 | 982.9 | 16.0% |
| 1997 | 6,770.9 | 1,083.3 | 16.0% |
| Annual growth | 23.5% | 23.0% | |

Source: General Statistics Office. (Data obtained by DSI/MPI).

Table 5.5 Geographic distribution of seafood export processing by province

| Province | Number of companies | Percentage of all seafood export processors | Number of seafood export processors with EU certification | Percentage of seafood export processors with EU certification |
|--------------------|---------------------|---|---|---|
| Quang Ninh | 5 | 2.3% | 1 | 20.0% |
| Hai Phong | 6 | 2.8% | 3 | 50.0% |
| Ha Noi | 4 | 1.9% | 0 | 0.0% |
| Other Red R. Delta | 5 | 2.3% | 1 | 20.0% |
| Thanh Hoa | 7 | 3.3% | 0 | 0.0% |
| Quang Tri | 4 | 1.9% | 0 | 0.0% |
| Thua Thien Hue | 6 | 2.8% | 2 | 33.3% |
| Other N.C. Coast | 6 | 2.8% | 2 | 33.3% |
| Da Nang | 11 | 5.1% | 4 | 36.4% |
| Kanh Hoa | 25 | 11.7% | 4 | 16.0% |
| Quang Ngai | 4 | 1.9% | 0 | 0.0% |
| Binh Dinh | 4 | 1.9% | 2 | 50.0% |
| Binh Thuan | 4 | 1.9% | 0 | 0.0% |
| Other S.C. Coast | 6 | 2.8% | 1 | 16.7% |
| Ba Ria - Vung Tau | 14 | 6.5% | 3 | 21.4% |
| Ho Chi Minh City | 51 | 23.8% | 18 | 35.3% |
| Dong Thap | 4 | 1.9% | 0 | 0.0% |
| Ben Tre | 4 | 1.9% | 0 | 0.0% |
| Can Tho | 6 | 2.8% | 3 | 50.0% |
| Kien Giang | 10 | 4.7% | 3 | 30.0% |
| Ca Mau - Bac Lieu | 17 | 7.9% | 6 | 35.3% |
| Other Mekong Delta | 11 | 5.1% | 8 | 72.7% |
| Total | 214 | 100.0% | 61 | 28.5% |

Source: Calculated from data from the Ministry of Fisheries, SEAQIP project.

Table 5.6 Geographic distribution of seafood export processing by region

| Region | Number of companies | Percentage of all seafood export processors | Number of seafood export processors with EU certification | Percentage of seafood export processors with EU certification |
|---------------------|---------------------|---|---|---|
| Northern Uplands | 5 | 2.3% | 1 | 20.0% |
| Red River Delta | 15 | 7.0% | 4 | 26.7% |
| North Central Coast | 23 | 10.7% | 4 | 17.4% |
| South Central Coast | 54 | 25.2% | 11 | 20.4% |
| Southeast | 65 | 30.4% | 21 | 32.3% |
| Mekong River Delta | 52 | 24.3% | 20 | 38.5% |
| Total | 214 | 100.0% | 61 | 28.5% |

Source: Calculated from data from the Ministry of Fisheries, SEAQIP project.

Table 5.7 Largest seafood processor-exporters

| Company | Value of exports (million US\$) | Percent of all seafood exports |
|--|------------------------------------|-----------------------------------|
| Ca Mau - Minh Ha Frozen Seafood PME Co. (CAMINEX) | 53.2 | 6.9% |
| Can Tho Animal Fishery Prod. PE Enterprise (CAFATEX) | 42.5 | 5.5% |
| FIMEX - Viet Nam | 36.2 | 4.7% |
| Kim Anh Company Ltd. | 30.5 | 3.9% |
| STAPIMEX | 30.0 | 3.9% |
| An Giang Fishery Imp.-Exp. Company (AGIFISH) | 26.3 | 3.4% |
| SEAPRODEX Exporter Centre | 25.2 | 3.2% |
| Aquatex Products Trading Company (APT Co.) | 22.9 | 3.0% |
| Special Aquatic Product Imp.-Exp. Co. (SEASPIMEX) | 20.9 | 2.7% |
| Coastal Fisheries Development Corp. (COFIDEC) | 20.3 | 2.6% |
| Others | 468.0 | 60.3% |
| Total | 776.0 | 100.0% |

Source: Data from Ministry of Fisheries, SEAQIP Project.

Table 5.8 Cost structure of seafood processors

| Item | Proportion of all costs | Proportion of costs other than raw materials |
|-------------------------|-------------------------|---|
| Raw materials | 80.0 | |
| Wages | 4.3 | 21.3 |
| Other labor income | 1.9 | 1.6 |
| Electricity | 1.4 | 1.3 |
| Fuel | 0.6 | 0.5 |
| Interest | 1.9 | 1.7 |
| Depreciation on capital | 1.2 | 1.1 |
| Taxes | 2.5 | 2.3 |
| Other | 6.3 | 6.0 |
| Total | 100.0 | 100.0 |

Source: General Statistical Office. Data for 1997.

Table 5.9 Domestic demand for fish and shrimp in Viet Nam

| Household type | Per capita consumption of fish and shrimp (kg/person/yr) | Population (million) | Total consumption of fish and shrimp (000 tons/year) | Percent of total demand |
|--------------------|--|----------------------|--|-------------------------|
| Average | 15.2 | 75.0 | 1,143 | 100.0 |
| Income group | | | | |
| Poorest 20 % | 8.5 | 15.0 | 128 | 11.2 |
| 2 | 13.0 | 15.0 | 194 | 17.0 |
| 3 | 16.4 | 15.0 | 247 | 21.6 |
| 4 | 18.8 | 15.0 | 283 | 24.7 |
| Richest 20% | 21.4 | 15.0 | 320 | 28.0 |
| Region | | | | |
| Northern Uplands | 4.6 | 12.8 | 58 | 5.1 |
| Red River Delta | 8.0 | 15.0 | 121 | 10.6 |
| N. C. Coast | 13.0 | 10.5 | 136 | 11.9 |
| S. C. Coast | 24.8 | 8.3 | 205 | 17.9 |
| Central Highlands | 10.1 | 3.0 | 30 | 2.6 |
| Southeast | 18.5 | 9.0 | 166 | 14.6 |
| Mekong River Delta | 26.6 | 16.5 | 440 | 38.5 |

Source: 1994 Household Survey (GSO, 1998, p. 847-850).

Table 5.10 Domestic demand for fish sauce in Viet Nam

| Household type | Per capita consumption of fish sauce (liters/pers/year) | Population (million) | Total consumption of fish sauce (million liters/year) | Percent of total demand |
|--------------------|---|----------------------|---|-------------------------|
| Average | 4.9 | 75.0 | 369 | 100.0 |
| Income group | | | | |
| Poorest 20 % | 3.4 | 15.0 | 50 | 13.7 |
| 2 | 4.6 | 15.0 | 68 | 18.5 |
| 3 | 5.3 | 15.0 | 79 | 21.5 |
| 4 | 5.8 | 15.0 | 86 | 23.4 |
| Richest 20% | 6.1 | 15.0 | 92 | 24.9 |
| Region | | | | |
| Northern Uplands | 2.9 | 12.8 | 37 | 10.0 |
| Red River Delta | 4.7 | 15.0 | 70 | 19.0 |
| N. C. Coast | 4.3 | 10.5 | 45 | 12.3 |
| S. C. Coast | 6.1 | 8.3 | 50 | 13.7 |
| Central Highlands | 4.4 | 3.0 | 13 | 3.6 |
| Southeast | 5.3 | 9.0 | 48 | 12.9 |
| Mekong River Delta | 7.1 | 16.5 | 117 | 31.7 |

Source: 1994 Household Survey (GSO, 1998, p. 847-850).

Note: Because it is difficult for household surveys to measure accurately the consumption of condiments, these estimates may have a high margin of error.

Table 5.11 Trend in the composition of seafood exports

| Year | Volume (000 tons) | | | | | Value (mill. US\$) |
|---------------|-------------------|-----------------|----------------|-------------------|-------|-----------------------|
| | Frozen shrimp | Frozen squid | Frozen fish | Dried products | Total | |
| 1985 | 8.5 | 0.7 | 0.9 | 2.3 | 12.4 | 90.0 |
| 1990 | 34.0 | 4.8 | 3.2 | 5.0 | 47.0 | 205.0 |
| 1991 | 40.0 | 4.5 | 10.9 | 5.1 | 60.5 | 262.2 |
| 1992 | 48.1 | 5.3 | 16.5 | 8.2 | 78.1 | 305.1 |
| 1993 | 55.4 | 7.1 | 23.1 | 9.2 | 94.8 | 368.4 |
| 1994 | 63.1 | 10.0 | 25.5 | 12.3 | 110.9 | 458.2 |
| 1995 | 66.5 | 11.3 | 31.4 | 18.5 | 127.7 | 550.6 |
| 1996 | | | | | | 670.0 |
| 1997 | | | | | | 776.0 |
| Annual growth | 22.8% | 32.1% | 42.6% | 23.2% | 26.3% | 19.7% |

Source: Data for 1985-1995 from Ministry of Fisheries, cited in ADB (1996), Appendix H, p. 6. Figures for 1996 and 1997 from Viet Nam News (5 January 1998).

Table 5.12 Trend in the value of seafood exports

| Year | Seafood exports (million US\$) | Total exports (million US\$) | Seafood exports as a percentage of total exports |
|---------------|-----------------------------------|---------------------------------|--|
| 1991 | 285.4 | 2,087 | 13.7% |
| 1992 | 307.7 | 2,581 | 11.9% |
| 1993 | 427.2 | 2,985 | 14.3% |
| 1994 | 551.2 | 4,054 | 13.6% |
| 1995 | 621.4 | 5,449 | 11.4% |
| 1996 | 651.0 | 7,256 | 9.0% |
| 1997 | 750.0 | 8,700 | 8.6% |
| Annual growth | 17.5% | 26.9% | |

Source: General Statistics Office, 1997.

Table 5.13 Seafood exports by destination (1995)

| | Value (million US\$) | | | | Percent of total |
|-------------|----------------------|--------------|------|-------|------------------|
| | Frozen shrimp | Frozen squid | Fish | Total | |
| Japan | 183.7 | 33.7 | 20.9 | 285.7 | 51.9% |
| Europe | 50.7 | 2.9 | 4.6 | 73.1 | 13.3% |
| Hong Kong | 32.8 | 2.7 | 3.2 | 44.0 | 8.0% |
| Singapore | 26.6 | 0.9 | 7.5 | 36.6 | 6.6% |
| Taiwan | 4.2 | 0.3 | 6.2 | 13.2 | 2.4% |
| S Korea | 5.6 | 2.0 | 2.6 | 11.8 | 2.1% |
| Others | 35.6 | 2.9 | 28.8 | 86.2 | 15.7% |
| Total value | 339.2 | 45.4 | 73.8 | 550.6 | 100.0% |

Source: Ministry of Fisheries, cited in ADB (1996), Appendix H, p. 7. Note that column headings in original were in the wrong order and have been corrected here.

Table 5.14 Seafood exports by product (1995)

| | Volume (000 tons) | Percent of volume | Value (million US\$) | Percent of value | Unit value (US\$/ton) |
|---------------|-------------------|-------------------|----------------------|------------------|-----------------------|
| Frozen shrimp | 66.5 | 52.0% | 339.2 | 61.6% | 5,101 |
| Frozen squid | 11.3 | 8.8% | 45.4 | 8.2% | 4,018 |
| Fish | 31.4 | 24.6% | 73.8 | 13.4% | 2,350 |
| Other | 18.7 | 14.6% | 92.2 | 16.7% | 4,930 |
| Total | 127.9 | 100.0% | 550.6 | 100.0% | 4,305 |

Source: Ministry of Fisheries, cited in ADB (1996), Appendix H, p. 7. Note that product headings in original were in the wrong order and have been corrected here.

Table 5.15 Exports and domestic sales by SEAPRODEX

| Country | Volume (tons) | Value (000 US\$) | Percent of total exports | Percent of total sales | Average price (US\$/ton) |
|-----------------|----------------------|-------------------------|---------------------------------|-------------------------------|---------------------------------|
| Japan | 11,416 | 62,087 | 49.8% | 47.2% | 5,439 |
| Hong Kong | 2,021 | 10,231 | 8.2% | 7.8% | 5,062 |
| United States | 896 | 9,107 | 7.3% | 6.9% | 10,164 |
| Singapore | 593 | 3,205 | 2.6% | 2.4% | 5,405 |
| Thailand | 1,202 | 3,205 | 2.6% | 2.4% | 2,666 |
| Holland | 649 | 2,998 | 2.4% | 2.3% | 4,619 |
| Belgium | 548 | 2,861 | 2.3% | 2.2% | 5,221 |
| Taiwan | 794 | 2,733 | 2.2% | 2.1% | 3,442 |
| Italy | 1,065 | 2,023 | 1.6% | 1.5% | 1,900 |
| Other countries | 6,903 | 26,160 | 21.0% | 19.9% | 3,790 |
| Total exports | 26,087 | 124,610 | 100.0% | 94.7% | 4,777 |
| Viet Nam | 1,709 | 6,932 | - - | 5.3% | 4,056 |
| Total sales | 27,796 | 131,542 | - - | 100.0% | 4,732 |

Source: Data provided by SEAPRODEX.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions for the food processing sector

The competitiveness of food processing industry depends largely on quality and the cost of production of the raw material. For export-oriented food processing enterprises, the price of the output is fixed by international prices. At the same time, the price of raw materials typically accounts for 70-90 percent of the cost of producing the exported product. Thus, a small change in the cost or the quality of the raw material will make a large difference in the ability of the processor-exporter to compete with other suppliers on the world market. The success of the food processing sector hinges on the ability of farmers and fishermen to make continual progress in productivity. This implies a need for higher yields, more efficient use of inputs, and reduction in post-harvest losses. This message is reinforced by international experience: cases of successful expansion of high-value agricultural commodities is almost always based, at least in part, on lower costs of commodity production.

The competitiveness of food processing in international markets is subject to rapid change. International experience provides numerous cases of countries that were major exporters, only to lose their ability to compete in export markets some years later. This may be due to rising wage rates or land use patterns in the exporting country, the emergence of new competitors, or shifts in demand patterns among importers. Furthermore, this pattern is, if anything, stronger among "niche" markets for differentiated high-value products. Thus, it is not enough to find a niche; countries must develop the ability to continuously seek new niches. The food processing sectors in countries like Thailand and Taiwan have succeeded mainly by being able to respond quickly to changing market conditions (see Box 6.1).

Most countries progress from exporting unprocessed, undifferentiated commodities toward higher quality, differentiated products. This process is facilitated by a competitive market-oriented (private) food processing sector. The vast majority of the dramatic "success stories" in exports of high-value agricultural commodities were characterized by private producers and processor-exporters, facilitated by strong public support in the areas of research, extension, inspection and certification, and dissemination of information (see Jaffee, 1992). A comparison of the shrimp industries in China and Thailand illustrates this point. Similarly, in each of the four subsectors examined in this

report, high-value niche exports have grown with the liberalization of the economy and the emergence of private and provincial enterprises operating on a commercial basis.

In Viet Nam, state-owned enterprises (particularly centrally managed ones) play a dominant but declining role in the food processing sector. In all four subsectors, a centrally-managed state-owned enterprise formerly had a large share of the processing and export market and often was involved in production as well. In some of the subsectors, such as seafood and coffee, the SOE had a monopoly on exports. In all four subsectors, the share of this dominant SOE has declined rapidly as provincial SOEs and private companies have proven themselves more agile and efficient. VINACAFE now has a 20 percent share of coffee exports and SEAPRODEX now accounts for 7 percent of seafood exports. This does not necessarily mean that exports by these formerly-dominant SOEs have declined; rather provincial and private enterprises have been responsible for much of the dramatic growth in these sectors.

The main reason for the decline in the share of food processing being carried out by central SOEs is lack of flexibility, slow decision-making, and higher costs. Both private and state-owned processors identify the lack of flexibility as a key constraint on state enterprises. One SOE manager complained that regulations required him to employ people for certain positions even if he did not need them. Furthermore, SOEs are perceived by those inside and outside the state sector as unable to take advantage of unexpected opportunities, a serious handicap in a rapidly growing and evolving subsector. Decision-making by SOEs was widely seen as too slow and bureaucratic, with centrally managed SOEs needing permission from headquarters and provincial SOEs needing authorization from the People's Committee. Although good cost data are difficult to obtain, the SOEs appear to have higher overhead expenses related to over-staffing, larger office spaces, and, in some cases, inappropriate machinery.

The creation of general corporations has not improved SOE performance. In spite of the consolidation of state-owned enterprises into large general corporations, it is the provincial SOEs and private companies that are expanding their market shares in the four food processing subsectors considered in this report. Furthermore, the international experience with merging SOEs into general corporations or holding companies is not promising. In many countries, it tends to lead to cross-subsidization of weaker SOEs and more layers of management. Indeed, the success of small, specialized provincial SOEs relative to central SOEs is a strong sign that the merging of SOEs is not likely to bear fruit.

Box 6.1: Evolution of food processing exports from Taiwan

Taiwan illustrates both the long-term trends in food processing that most countries undergo, as well as the dynamic nature of food processing exports (this case is based on Jaffee, 1992). In the early 1960s, Taiwan's agricultural sector was dominated by rice and rice milling, reflecting the fact rice was the dominant commodity in Taiwanese diets at the time. As a result of rapid economic growth, food consumption patterns changed: the demand for rice fell, while that of wheat, meat, dairy, and vegetables rose rapidly. Higher wages and urbanization has increased the demand for packaged partially-prepared "convenience" food. These demand shifts have been reflected in the agricultural and food processing sectors.

In 1960, Taiwan's main agricultural export was sugar, followed by bananas and canned pineapples. In the 1970s, banana and canned pineapple exports stagnated in the face of competition from lower-wage countries, but shrimp, fish products, canned mushrooms, and canned asparagus expanded rapidly to become the dominant agricultural exports. During the 1980s, the exports of sugar, canned mushrooms, and canned asparagus collapsed dramatically, having become uncompetitive relative to Thailand, China, and other countries. Similarly, disease and pollution virtually destroyed the Taiwanese shrimp industry. However, exports of hogs and pork products, other canned vegetables and eel products expanded more than enough to fill the gap.

The government's role in the agricultural sector has included strong support for one of the best systems of agricultural research and extension in the region, infrastructure, marketing information systems, the establishment of hog auction markets, and the promotion of a voluntary cooperative system for vegetable marketing. Subsidies were provided for some inputs and investment, but they tended to be focused on declining traditional sectors rather than emerging ones. The food processing industry is composed of a several hundred small to medium private enterprises, known for strong management, high productivity, and flexibility. The sustained growth in agricultural exports in spite of the dramatic changes in the composition of exports is a reflection of the strength and adaptability of the Taiwanese food processing sector.

Outdated machinery is not the key constraint in the food processing sector. It is striking that the most successful enterprises are not those with the most modern and technologically advanced equipment. Rather, the successful ones are those that are skilled at finding a new and better way to do something: the coffee processor who realizes he can save money on transportation by filling the truck for the return trip from Ho Chi Minh City, the seafood processor who works to develop relationship directly with fish traders instead of wholesalers, or the vegetable exporter who to accepts a loss on one shipment in order to maintain his reputation for reliability with the importer. "Modern" machinery is almost always more efficient from a technical point of view, but to be efficient from an economic point of view it must justify its higher cost. Certainly, additional equipment is needed in many cases, but it will do little to improve the

economic performance without strong management, responsive marketing skills, adequate training, and a good incentive structure.

Financial sector reform is a key element in improving the competitiveness of the food processing sector. The economic reforms have moved in the financial sector in the right direction by separating commercial banking functions from the State Bank and allowing the entrance of foreign financial companies. However, government policy maintains interest rates that are low in real terms (relative to inflation), presumably to protect existing borrowers, including a large number of indebted state enterprises. This policy, however, has two adverse effects. First, it makes it difficult for banks to mobilize domestic capital, that is to attract household savings, thus limiting the pool of capital available for investment. Second, it forces banks to pursue a highly risk-averse lending strategies such requiring high levels of collateral and focusing on short-term commercial credit rather than longer-term investment lending.

Importers and foreign investors are important sources of marketing and management expertise . Interviews with food processors revealed numerous examples in which importers and/or foreign partners work with domestic processors to provide technical assistance, quality control, and sometimes credit. In the seafood processing industry, Japanese importers have taken an active role in upgrading skills and procedures, and in some cases providing credit for the establishment of new private enterprises to supply seafood. In fruits and vegetables, it is more often a joint venture partner. Even if when no new equipment is involved, this is an important form of technology transfer and should be facilitated by the government.

6.2. Recommendations for the food processing sector

Given the importance of the cost and quality of raw materials to the competitiveness of the food processing sector, *agricultural and fisheries research and extension activities are critical for maintaining the competitiveness of the food processing industry.* In the case of rice, the opportunities for area expansion have already been exhausted and opportunities for raising cropping intensity are being exhausted. The only way to maintain the existing pace of rice production growth is by increased public investment in agronomic research and extension services. Although Viet Nam's agricultural research institutes are staffed with dedicated researchers, they work in conditions of very limited resources. Numerous studies of agricultural research across

the world indicate that the economic returns to agricultural research are quite high, in the range of 30-50 percent. At the least, investment in agriculture (particularly agricultural research and extension) should be proportional to its share in gross domestic product.

Reform of the state-owned enterprises (SOEs) is central to the evolution of a stronger food processing sector. International experience shows that certain common patterns in successful reform of the state-owned enterprise sector. First, commercial and public service functions should be separated, forcing the former to cover its costs and fully funding the activities of the latter. This issue is particularly relevant in the case of VINACAFE, which is responsible for both commercial functions of processing and exporting coffee and public service functions of research and promotion. Second, SOEs involved in commercial activities should be required to compete on the same terms as private enterprises. Although Viet Nam has made progress in reducing direct subsidies, indirect support through low-interest loans, uncollected loans, access to land, and (in the case of rice and coffee) preferential access to export markets. Third, the internal structure of SOEs needs to be reformed to create incentives for efficiency and commercial orientation. This implies giving management greater autonomy from the political authorities and perhaps partial equitization.

The government should not limit the number of exporters in a subsector since export prices are not affected by the number of exporters. There is a widespread belief that the existence of a large number of exporters means that exports are sold at below their market value. This argument has been a persistent part of the debate over rice export policy and appears in discussions of coffee export policy as well. This argument leads to proposals for government licensing to reduce the number of exporters. Limiting the number of exporters, however, does not improve export prices and is likely to hamper the development of the food processing-export sector. Exporting 3 million tons of rice has the same effect on world prices whether five exporter ship 600 thousand tons each or 30 exporters ship 100 thousand tons each. Generally, unqualified exporters will have difficulties finding a buyer and financing the transaction, so the problem is self-regulating.

The government should not require approval of the price of export contracts. Exporters do occasionally make mistakes and offer goods at a too-generous price. But this is rare among experienced exporters. If the price is too generous, the exporter will lose money on the contract. Government intervention is not needed to ensure that

exporters follow their own self-interest. Furthermore, the price depends on so many factors including world market conditions, expectations about future market conditions, the quality of the product, the reputation of the exporter (this affects the risk of default or conflicts), the efficiency of port facilities, and the bargaining skills of each party. Thus, evaluating the “fairness” of each contract is not easy. At best, the approval system would be cumbersome. At worst, it would create a temptation for irregular payments. One exception to this rule is that case of intra-company transfers. When the buyer and seller are the same company, "transfer pricing" may be used to avoid taxes. In this case, tighter regulation is warranted.

The government should strengthen its role in disseminating market information and facilitating market coordination. Collecting and disseminating information is an important role of the government. Interviews with food processors revealed numerous cases in which enterprises had little information about recent government decisions, the nature of the firms they compete against, long terms trends in their markets, and so on. With experience, these enterprises will become better informed because it is in their interest, but the government can accelerate the process. In rice, information is needed regarding the commitments to export rice in order to help the government and processors make more informed decisions. In seafood, there is a need for information about health and safety certification procedures and regulatory activities by the government. In fruits and vegetables, information about markets, shipping options, and price trends would be useful.

The government should facilitate the creation and strengthening of business associations. These associations should be voluntary and open to all participants in the sector. It is important that these organization *not* become involved in setting prices or other anti-competitive behavior nor should they be a regulatory body with the power to sanction members. Making them open to all would reduce this risk since each group (exporters, processors, wholesalers, etc.) could monitor the others. These groups could also serve an important function of proposing standards for certification of quality. The standards would have to be approved by the relevant authorities, but it is important to get input from those the system is designed to serve.

The government should focus address issues related to common-pool resources. Common-pool resources are resources available to many people with no limits on their access. This is one situation when self-interested behavior is often destructive. In the

case of fishing, even if fishermen realize that they are over-fishing an area, there is no incentive for an individual to conserve. The Ministry of Fisheries has taken steps to prevent over-fishing of coastal waters, including size limits, seasonal restrictions, and protection of spawning areas. Nonetheless, greater resources should be devoted to monitoring fish stocks, estimating maximum sustainable yield, designing protective measures, and enforcing those measures. In the area of coffee development, the issue is groundwater resources. There are signs that coffee production is depleting groundwater resources. The Ministry of Agriculture and Rural Development should study the evidence, develop a plan to ensure sustainable use of groundwater, and enforce the policy.

The government should de-emphasize its role in promoting specific sectors of the economy. Advocates of industrial policy believe that the government should select specific sectors with growth potential and promote them. In the 1950s, governments were advised to promote “infant industries”. In the 1960s, the emphasis was placed on sectors with growth linkages. In the 1980s, industrial policy advocates recommended supporting high-value or high-wage industries. And currently, the attention has turned to high-technology sectors. While the arguments are intuitively plausible, they face severe problems in implementation. First, governments rarely have better information about the future direction of the economy than the private sector. Second, government decisions on which sectors to promote are too often affected by lobbying and personal relations. And third, assistance in the form of import protection or subsidies seems to make enterprises less competitive rather than more so. Indeed, a key ingredient in the Asian currency crisis was the fact that some governments have channeled foreign loans into sectors that, although not profitable, were favored by the political authorities. The agricultural sector and the food processing sector are neither high-wage sectors, nor high-value sectors, nor high-technology sectors, and thus are neglected in most industrial policy proposals. And yet these sectors have grown rapidly, providing jobs for millions of Vietnamese and raising the standards of living among many poor households. The growth in income and subsequent changes in demand will inevitably result in a gradual decline in the share of agriculture in GDP, but this does not mean that the government can accelerate the rise in incomes by neglecting agriculture.

Technology should be defined broadly to include any improved method using resources to produce and market a good or service, rather than narrowly as industrial machinery. Among government officials and enterprise managers, there is a tendency to

think of technology in narrow terms. This misunderstanding is linked to the idea that the main determinant of economic growth is fixed capital. Other factors such as natural resources, human capital, and efficient institutions are equally important determinants of growth, as has been repeatedly demonstrated in economic analysis of growth in developing countries. For example, the technology of improved rice seed, developed in part from varieties from the International Rice Research Institute, has undoubtedly contributed more to raising Vietnamese standards of living than all the sugar mills in the country, even though the latter are more visibly impressive. Similarly, technology that raises yields on shrimp farms by 10 percent would almost certainly have a greater economic impact than a new high-speed modern cannery.

6.3. Conclusions and recommendations for the rice subsector

The most important constraint on the growth of the rice processing subsector is the sustainability of rice export growth. Vietnamese rice exports have expanded rapidly as a result of decollectivization and market liberalization which have improved incentives to use fertilizer and modern seed varieties. However, some of this increase is a onetime response to reforms. It is very unlikely that rice production and exports can continue to grow at the same pace that it has over the past decade.

An increasing share of rice production growth is due to yield growth. The cultivated area of rice lands has not increased since the mid-1980s. Production growth has been due to rising cropping intensity and higher yields. Further increases in cropping intensity are probably limited, as evidenced by slowing growth in recent years. Thus, yield growth is becoming the only avenue for expanding rice output.

Raising the unit value of rice exports requires improvements in port facilities, reliability, and rice quality. This conclusion generates several recommendations for government action:

These conclusions lead to a number of recommendations. First, the government should strengthen its support for rice research. The rate of return on investment in agricultural research is probably high, particularly given the importance of continuing to raise rice yields. This investment could be in the form of better salaries and more funds for equipment and operating costs.

In addition, the government should improve Saigon Port facilities, focusing on reducing the delays in loading which depress the FOB price. Furthermore, developing the Can Tho port would reduce the cost of moving rice to the port, thus raising the producer price.

The government should avoid policies that result in exporters abrogating existing rice export contracts. The costs of such policies are not visible, but by damaging the reputation of Viet Nam as a reliable exporter, they reduce the FOB price that the country will receive in the future.

The government should implement a system for reporting rice export commitments. This would allow policymakers to limit the volume of rice exports for food security reasons without causing exporters to abrogate their contracts. It would also generate information useful for monitoring rice markets.

The government should allow private rice millers to participate in rice exports. A more competitive export sector will benefit farmers without reducing the price Viet Nam receives for its rice exports. In addition, based on international experience and the experience of other food processing sectors in Viet Nam, private exporter are more likely to seek out and exploit market niches for specialty rices.

6.4. Conclusions and recommendations for the coffee subsector

The increase in the number of coffee processors and traders has reduced coffee marketing margins and improved the prices received by farmers. Although information on margins over time is not available, this is the conclusion of almost all coffee processors (including state and private).

Recent policy decisions to allow private coffee processors to export will have a modest effect initially, but a large effect over the coming years. Initially, few private processors will have the expertise, contacts, and liquidity to export, but the incentives for direct exporting will encourage private processors to develop the expertise, make contacts, and seek credit.

One of the main threats to sustained coffee exports is the depletion of groundwater resources in the Central Highlands. The current drought has highlighted the dependence

of coffee on water, but the problem will not disappear with the return of normal rainfall.

Another threat to sustained coffee exports is the risk of an outbreak of disease. Coffee production has expanded more quickly than the institutional capacity to deal with outbreaks of disease. The use of irrigation increases the risk of disease.

The government should invest more in coffee research and extension, focusing on disease, post-harvest practices, and water conservation. As a result of the risks described above, research in the issue of sustainable water use, Arabica production, and disease is needed, as are extension efforts to establish a system for monitoring and reporting diseases.

The government should consider a small export tax to fund coffee research and extension activities. This would ensure that research funds are available on a sustained basis to support the coffee sector. The example of FEDECAFE in Colombia should be studied as a model, though initially a Vietnamese institute should pursue a more modest agenda.

The government should not limit the number of companies that are allowed to export coffee, nor set minimum export prices. Greater competition in the export sector will improve the prices received by farmers without lowering the export price. Importers will prevent inexperienced or under-capitalized processors from exporting, although it might be useful for the government to "certify" some exporters as qualified.

The government should separate the commercial and public service roles of VINACAFE. State enterprises should not be given public services functions *and* expected to cover all their costs. Nor should the public service functions of VINACAFE be neglected in the interest of state enterprise reform. Commercial activities should be self-financing, while public service activities (research, extension, inspection, etc) should be fully funded by the government or by taxing the coffee sector.

The government should evaluate the economic returns to arabica coffee production. The expansion of arabica coffee production in the north appears to be following an accelerated schedule, and it is not clear whether there have been adequate studies of the agronomic and financial aspects of this investment.

The government should study the issue of groundwater depletion in the Central Highlands in order to design policies to ensure the sustainability of coffee production in this region. Such a study would examine the extent of depletion and the mechanisms that the government could use to reduce water use and/or increase water supply.

6.5. Conclusions and recommendations for the fruit and vegetable subsector

The fruit and vegetable export processing subsector is the least developed of the four subsectors. This is partly because, unlike the other three commodities, fruits and vegetables do not need to be processed (transformed) in order to be edible. Furthermore, virtually all of the domestic market and some of the export market is for fresh fruits and vegetables. Furthermore, fruit and vegetables exports are small compared to rice, coffee, and seafood exports.

More than the other export food processing sectors, fruit and vegetable export processors were adversely affected by the collapse of the Soviet Union than the other three subsectors. Rice was not an export crop in the 1980s. Similarly, coffee exports were minimal in the mid-1980s and have grown during the economic reform process. Seafood exports were large during the 1980s, but even then they were oriented toward Japan and other market economies.

Fruit and vegetable processors are recovering by seeking new markets and developing new products. The new markets include Japan, Taiwan, Hong Kong, Singapore, and to a lesser degree the United States and other southeast Asian nations. The traditional exports of dry beans, bananas, and pineapples have declined, while a variety of fresh and canned products.

The average value of fruit and vegetable exports has been 57 percent higher during the 1990s than it was in the 1980. This is the result of the economic reforms that have provided incentives for smaller private and provincial processor-exporters to seek out high-value markets.

The subsector is overly focused on canned fruits and vegetables, in spite of the fact that the more rapidly growing markets are in fresh fruits and vegetables. Too often the assumption is that exporting canned and frozen fruits and vegetables is more profitable and beneficial for the economy than exports of fresh fruits and vegetables. But demand

growth is higher in fresh produce and, because of the skills required to market fresh produce the returns can be high.

Some of the main opportunities in fresh fruit and vegetable exports are temperate fruits and vegetables for Hong Kong and Singapore, and tropical fruits for Japan, Taiwan, South Korea, and North America. These patterns take advantage of the range of climatic conditions in Viet Nam,

One of the main constraints on the fruit and vegetable export processing sector is the lack of varieties that are suitable for processing and/or export. For example, pineapple processors consistently noted that the Queen Victoria variety grown in Viet Nam is too small and not juicy enough for international markets.

The government should expand its investment in research to select and develop suitable varieties of fruit and vegetable for domestic consumption and for export. Citrus, pineapple, and banana are some of the more obvious examples, but nearly every product would benefit from the introduction of new varieties with higher yields and/or characteristics desired by importing countries.

The government should facilitate the collection and dissemination of information about export markets, particularly standards, health restrictions, prices, and demand patterns. This would make it easier for Vietnamese processors and exporters to become informed about foreign markets and identify opportunities.

The government should facilitate the formation of an association of fruit and vegetable product exporters. As mentioned earlier, the association should be voluntary and open to all interested parties. It should not be involved in setting terms for dealing with farmers or with importers, but rather should focus on information exchange, the identification of ways the government can support the subsector, and assistance to the government in the establishment of grades and certification.

6.6. Conclusions and recommendations for the seafood subsector

The seafood processing sector has grown rapidly on the basis of low wages, a long coastline, and proximity to important markets in Asia, primarily Japan. The adjustment of the seafood subsector to the *doi moi* reforms was less painful than that of the fruits and vegetables subsector because it was not closely tied to trade with the eastern bloc in the

1980s.

The seafood processing sector is dependent on the continued availability of seafood at reasonable prices. Although Thailand has developed a tuna canning industry based on raw materials caught outside its waters, this is unusual. In general, the success of the seafood processing industry is tied to the success of the fisheries sector, including aquaculture.

The biggest threat to the subsector growth is the sustainability of marine seafood resources. Estimates of the maximum sustainable yield are not very accurate, but most studies agree that Viet Nam is at or will soon arrive at the capacity of the coastal waters. Spectacular collapses of North Sea (Europe) and Grand Banks (North America) fish stocks demonstrate that under-regulated fishing can result in the rapid disappearance of marine resources.

Further growth in seafood production and exports will depend to an increasing extent on aquaculture. The process of switching to aquaculture as the basis of seafood processing and export growth has already occurred in China and Thailand. In both countries, the transition was facilitated by strong support for aquaculture research and extension.

The development of shrimp aquaculture is vulnerable to epidemic diseases. A sizable Taiwanese shrimp export subsector was completely undermined by problems related to disease and pollution. Smaller scale disease problems are already appearing in the Vietnamese press.

The government should increase its efforts to study and monitor the maximum sustainable yield of different types of marine species and in different regions. This information is vital in order to design fishing regulations that protect the marine resources without unnecessarily limiting the growth of the marine fisheries industry.

The government should strengthen its enforcement of existing regulations designed to protect fishery resources. Fisheries specialists believe that the current regulatory system is adequate, given the limited information available, but that enforcement is weak and inconsistent. Although enforcement may be expensive, the costs are small relative to the value of the resource being protected.

The government should increase its investment in research and extension in aquaculture. At least three areas should receive special attention. First, shrimp yields are low by Thai and Chinese standards and will need to be raised to maintain competitiveness. Second, research and extension efforts are needed in monitoring and controlling contagious diseases (particularly in shrimp). And third, the development of improved breeds would facilitate the transition to a more aquaculture-based seafood subsector.

The government should facilitate the collection, analysis, and dissemination of information on seafood export markets, particularly in the area of health and safety regulations of importers. Health and safety regulations are tighter on seafood than any of the other three subsectors. Furthermore, the regulations vary widely from one importer to another. Initially, information could be collected and disseminated by a government institute, but eventually this function should be taken over by a seafood exporters association.

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