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Emerging Products and Markets for Upland Crops in Vietnam

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Agriculture plays an essential role in general economic development. This role is by no means confined to productivity increases of the major crops. In fact, the cutting edge of the dynamic role of agriculture in economic development is encountered in new and emerging markets for agricultural products. In early stages one often observes very fast and then slower development. Inevitably, some attempts fail, and some are successful. This article will discuss three emerging markets, which show some degree of success. The case of cashew and orange concern tree crops with long gestation time, significant investment and highly specific marketing needs. The third case concerns investment in a half product, cassava chips, which supplies various end products.

Cashew nut

Cashew nut has been planted in Vietnam since the 16th-17th century. In the 1980s, cashew nut became a good cash crop. Especially since 1990, cashew nut has been accepted as a very promising commodity for export. Now the majority of cashew production is for export. Domestic consumption is for baked goods, candies, and processed cashew nut.

Production

In 1992, the total area of cashew was 78,983 ha with the South North East the leading production region (76,378 ha). Surprisingly, by 1995, the total area of cashew increased to 187,553 ha with the South North East still the leading production region with 137,414 ha (Table 1).

The total cashew production was 23,730 tons in 1992, increasing to 50,676 tons in 1995 (Table 2). Since 1993, Vietnam has ranked number three in the world in cashew production after Brazil and India.

Processing

At present, Vietnam has 52 cashew processing plants with a total capacity of 100,000 tons/year. Most of the processing plants are concentrated in Song Be, Dong Nai, Tay Ninh and Ho Chi Minh City. Unfortunately, several processing plants were built in provinces with only small areas of cashew production. Therefore, only 40 - 45% of total

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processing capacity has been utilized. Moreover, there is strong competition in buying raw material for processing.

The cashew processing industry has concentrated only on cashew processing. High value added cashew products have not yet received

much attention. However, the quantity of high value added cashew products has recently increased. For example, cashew oil production was 380 tons in 1990 increasing to 7,500 tons in 1994 (Table 3).

Table 1 Area planted to cashew in Vietnam, 1992 - 1995.

Region / Province	1992	1993	1994	1995
Whole Country (hectares)	78,9839	122,530	172,742	187,553
South	78,983	122,530	172,742	187,553
South Central Coast	2,051	18,350	18,963	21,212
Quang Nam - Da Nang	-	-	-	-
Quang Ngai	-	-	-	265
Binh Dinh	2,051	3,537	4,008	5,657
Phu Yen	-	2,313	-	-
Khanh Hoa	-	-	2,313	1,864
Ninh Thuan	-	-	142	446
Binh Thuan	-9	12,500	12,500	12,980
Central Highlands	554	13,760	20,569	28,451
Gia Lai	554	3,228	5,905	11,482
Dac Lac	-	4,551	7,502	9,627
Lam Dong	-	4,981	7,162	7,342
North East South	76,378	90,420	133,210	137,414
Dong Nai	21,774	27,365	31,946	32,990
Song Be	44,089	57,928	78,563	77,539
Tay Ninh	1,700	4,606	4,556	7,506
TP. Ho Chi Minh	521	-	2,283	2,133
Baria - Vung Tau	8,8159	-	15,862	17,246
Mekong River Delta	-	-	-	476
Long An	-	-	-	476

Source: General Statistical Office, Statistical Data of Agriculture, Forestry and Fishery, 1985-1995. Statistical Publishing House, Hanoi 1996.

Table 2 Harvested area, yield and production of cashew in Vietnam, 1992-1995.

Year	Harvested Area (ha)	Yield (kg/ha)	Production (tons)
1992	32,009	741	23,730
1993	69,089	674	46,550
1994	87,957	590	
1995	92,512	548	
			51,885
			50,676

Source: General Statistical Office. Statistical Data of Agriculture, Forestry and Fishery 1985-1995. Statistical Publishing House, Hanoi 1996.

Table 3 Changes in cashew nut processing.

Year	Cashew Nut (tons)	Cashew Oil (tons)
1990	480	380
1991	1,200	950
1992	2,400	1,900
1993	8,400	6,700
1994	8,900	7,500

Source: Agricultural Economic Institute. Economy of Oil Crops. Agricultural Publishing House, 1995. Nguyen Tien Manh, Nguyen Dinh Long, Nguyen Huu Tien, Vu Ngoc Quyet, Ngo Hai and Duong Ngoc Thi.

Efficiency of production

In comparison with other crops, net income for cashew (1,200,000 VND) was lower than that for rubber (2,420,000 VND/ha), coffee (1,472,000 VND/ha) and tea (1,472,000 VND/ha). Nevertheless, the net income of cashew was much higher than that of groundnut (998,000 VND/ha), soybean (217,000 VND/ha), spring rice (431,000 VND/ha) and winter maize (503,000 VND/ha) (Table 4).

The value of a manday of labor was 19,800 VND for cashew, much higher than that of coffee (12,000 VND), tea (12,000 VND), groundnut (7,619 VND), soybean (5,368 VND), spring rice (6,236 VND) and winter maize (7,294) (Table 4).

Moreover, the greatest advantage of cashew is that this crop can be planted in poor and relatively dry soil.

Message from the Director

Beginning last year and continuing this year, a large part of the Asia and the Pacific region has been hit by harsh natural and socio-economic disasters.

First, the El Niño-related drought hit cereal production in China, the Philippines, Thailand, Papua New Guinea and the Pacific Rim. In Indonesia, more than 400,000 hectares of paddy field were reportedly damaged by heat and drought, and the rice production in 1997 decreased by 1.3 million tons. A delay in the onset of the rainy season would further interfere with timely harvests and the yield of rice in Indonesia this year.

Recently, the UN's Food and Agriculture Organization (FAO) warned that a near-record number of countries face food supply emergencies this year, mainly because of the effects of the El Niño weather phenomenon.

In addition, devastating forest fires, rampaged throughout the Indonesian archipelago, especially in Kalimantan and Sumatra, destroying not only immense natural resources but also many villages and farmers' estates.

Almost coincidentally, Asian economies have been hit by currency crises since the monetary turbulence started in Thailand in July last year. Drastic devaluation of the currency in several countries has retarded their economic activities, such as production and construction, investment and trade. In Indonesia, in particular, insufficient

supply and delayed distribution of basic commodities triggered a hike in prices of daily needs, such as rice, sugar, cooking oil, and wheat flour.

The Centre feels serious concern over the effect of the rise in commodity prices. Together with the decreased harvest last year. The price increases must severely damage the household economy in most small-scale farms, while a group of farmers, large-scale commercial rice growers for example, might benefit by the condition.

Farmers are always facing both nature and society. In other words, they depend on natural resources and phenomena in their agricultural activities, and, at the same time, they depend on socio-economic structures and relations in their daily and commercial life. Because of this situation, I find that farmers are always cautious, persistent, and clever in adapting themselves to adverse conditions.

Detailed study is crucial, despite turmoil in the involved countries, to clarify and analyse agricultural and economic conditions in rural areas. In addition, prospective scenarios that can overcome the problems and stabilize crop production and the rural economy must be provided to farmers.

The Centre will further strengthen its pivotal role and work with the member countries to solve problems in this difficult period.

HARUO INAGAKI

Table 4 Economical efficiency of different crops.

Parameter	Unit	Industrial Crops				Annual Crops			
		Cashew	Rubber	Coffee	Tea	Groundnut	Soybean	Spring Rice	Winter Maize
Value of production	'000 VND/ha	3,900	9,305	8,700	8,950	5,214	2,742	3,630	3,080
Net income	'000 VND/ha	1,200	2,420	1,472	1,472	998	217	431	503
Value per manday	VND/manday	19,800	18,500	12,000	12,000	7,619	5,368	6,236	7,294

Source: Agricultural Economics Institute, 1992-1993.

Marketing

The demand of cashew for the domestic market is still low. Less than 10% of the total production is for the domestic market, which means that more than 90% of the total production is for export.

Export volumes have varied over the years (Table 5). India was the biggest market for cashew export of Vietnam. Recently, China has also become a market for cashew export. From January to April 1996, Vietnam exported 287 tons of cashew to Hong Kong, 203 tons to USA and 131 tons to

Australia (Table 6). The USA is potentially a very important market for cashew nut exports of Vietnam.

Basically, the nutritious content of Vietnamese cashew nut is the same as that of cashew from other countries. However, because of post harvest and processing technology, the quality of Vietnamese cashew products is not high. This results in a low export price. For example, in May 1993, the price of cashew nut in the international market was US\$ 800 to 830/ton while the cashew export price of Vietnam was only US\$ 730 to 790/ton.

Table 5 Cashew export of Vietnam from 1990 to 1995.

Year	Volume (tons)	Value (US\$)
1990*	24,700	
1991*	30,600	
1992**	43,886	30,706,200
1993**	39,285	54,331,155
1994**	47,961	47,193,624
1995**	16,588	37,594,482

Source: * Statistical Year Book, 1994. General Statistical Office. Statistical Publishing House, 1995.

** General Bureau of Customs, 1996.

Table 6 Cashew nut export of Vietnam from January to April, 1996.

Country	Volume (tons)	Value (US\$)
Hong Kong	287	1,219,589
USA	203	865,843
Australia	131	558,692
Canada	91	412,152
Netherlands	58	250,076
Japan	26	112,630
England	14	38,222
Philippines	11	47,406
Lebanon	4	13,502

Source: General Bureau of Customs, 1996.

Constraints

- Cashew is not yet intensively farmed. Therefore, cashew productivity is still low.
- There is a lack of high yielding cultivars and uniform planting materials.
- These problems result in small sized, non-uniform cashew nuts.
- Only 40-45% of total capacity of cashew nut processing plants has been utilized.
- There is strong competition in buying raw material for processing.

- Market information is not always available for exporters, processors and farmers.
- Cashew nut price in the international market fluctuates over time.
- There is also strong competition among exporters in the export cashew nut.
- The cashew export price of Vietnam is lower than that of other countries in the international market.
- Not much attention has been given to cashew with respect to varietal improvement, cultural practices, socio-economic aspects and marketing.
- There is a lack of budget for research on cashew.

Government policies

- Low interest rate loans have been given to cashew farmers.
- The government of Vietnam has established Program 327, which provides green cover for hilly areas. Over 1991-1995, hundreds of billions of VND were invested in this program, which will continue until the year 2000. Farmers can obtain credit to expand the treed area, including cashew to cover the marginal land.
- The government invested in the construction of a series of cashew processing plants during past 15 years. At present, there are 52 cashew processing plants with around 50,000 workers who are mainly women.

Production and market potential

In South Vietnam, hundreds of thousands of hectares of marginal land can be planted to cashew. Cashew is an easy crop, so there is a great potential for development of this crop in Vietnam. With socio-economic development, it may be expected that the demand for domestic consumption of cashew will increase. Furthermore, during recent years, cashew demand of the world market has increased, so there is a great potential for cashew development in Vietnam. It is expected that USA will be a very important market for cashew from Vietnam.

Cassava dry chips

Cassava is important in Vietnam not only as a food crop, but also as a supply of raw material. Cassava is highly perishable and preprocessing is

therefore beneficial because it reduces the time constraints on onward marketing.

Cassava production

Cassava is an important food crop in Vietnam. However, the total production area decreased from 442,900 ha in 1980 to 256,800 ha in 1990 and then increased up to only 277,500 ha in 1995. Correspondingly, the total production decreased from 3,323,000 tons in 1980 to 2,211,500 tons in 1995.

The fluctuation of production was due to the major constraints such as low profitability, limited market demand, fluctuation in price and poor soil. However, with considerable improvement in the processing industry and market development recently, cassava production has increased, especially in the South of Vietnam.

Cassava processing

Cassava is buffer food crop in Vietnam. In the case of a rice crop failure, people consume more root crops including cassava and sweet potato. When farmers have successful rice crops, most of the cassava and sweet potato is used for animal feed.

Traditionally, cassava has been simply processed into many kinds of cakes, boiled cassava and other forms at the household level. Recently, with the great improvement in rice production, the proportion of cassava utilized directly for food consumption for humans has decreased.

Approximately 50% of the cassava produced is processed into dry chips. In most areas, cassava is thinly sliced and then dried by sunlight for 2 to 3 days. Despite the introduction of various kinds of chipping machines, farmers prefer to use a simple chipping knife. The reason is that the average cassava production area per household is only 0.27 ha so this simple processing way is more convenient and economical.

Village scale cassava processing is characterized by the organization of production and consumption of products at the village scale. With village scale cassava processing, cassava is processed into wet starch, dry starch, maltose, noodle, alcohol, and cassava flour. There are a number of cassava processing villages such as, Duong Lieu (for starch, noodle and maltose), Laphu (maltose), Van Ha (alcohol) in the North and Tra Co (for starch and flour) in the South.

Cassava processing industry

At present, there are several cassava processing plants in Vietnam. The cassava processing plant in Dong Nai is the largest. This plant, built in 1994 with investment from Taiwan, has a capacity of 800 tons of fresh cassava root per day. A series of products are produced by this plant including starch and monosodium glutamate.

A cassava processing plant was build in Anke as a joint venture between Vietnam and Thailand. The capacity of this plant is 200 tons fresh cassava root per day. In Tay Ninh, there is also a cassava processing plant build by joint venture between Thailand and Vietnam. This plant also has a capacity of 200 tons fresh root a day. There is another cassava processing plant in Tay Ninh with a capacity of 400 tons fresh root per day.

In Kon Tum, there is one cassava processing plant with a capacity of 2,500 tons of cassava pellet per year.

Equipment investment for dried chip processing is very low. The equipment involves very simple tools such as a chipping knife, storage baskets, drying facilities, etc. Of all the kinds of cassava processing, dried chip processing is the most simple. Raw material (fresh root) accounts for 79.1% of the investment in dried chip processing.

Dried chip processing is the most popular processing method in Vietnam. As mentioned previously, it has been estimated that around 50% of the total cassava production is usually processed into dried chips. The reason is that the majority of cassava farmers in Vietnam are small and poor. Dried chip processing is the simplest low cost technology suitable for them.

Fortunately, with export market developments, the dried chip export has increased recently. The volume and value of cassava exports were 5,598 tons worth US\$ 688,796 for 1992 and 66,602 tons worth US\$ 8,524,280 for 1995 respectively. The cassava export was mainly based on cassava dried chips.

Marketing of cassava dried chips

In the local market, dried cassava chips are sold for household consumption for both human food and animal feed. During the rice shortage years, dried cassava chips are cooked in rice for food. Recently, because of the surplus rice production, most dried cassava chips have been used for animal feed and other purposes.

Dried cassava chips can also be processed into cassava flour and, from cassava flour, various kinds of cakes can be processed by farmers for their home consumption or for sale in the local market. In many villages, dried cassava chips are processed into alcohol for home consumption or for sale in the local market. In the past, dried cassava chips were stored and served as reserve food for farmers. This is of vital importance when farmers lose their rice due to natural calamity

EU, China, Philippines, Hong Kong are the major markets for cassava export of Vietnam.

Constraints

- In many areas of cassava production, the soil is poor. In the Northern Mountainous Region, soil erosion is a major problem, because cassava is planted in highly sloping land in many areas.
- Recently, investment for cassava processing has been limited only to South Vietnam.
- During harvesting time, in North Vietnam, there is lack of sunshine for drying cassava chips.
- Lack of market information and fluctuation in price are problems for cassava export.
- There is a lack of funding for cassava research in all aspects such as varietal improvement, cultural practices, socio - economic aspects, processing and marketing.

Government policies

- Farmers can obtain favorable interest loans from the government banking system such as the Vietnam Bank for Agriculture, the Bank for the Poor, etc.

Recently, investment for cassava processing has increased, and a series of cassava processing plants were recently build in South Vietnam.

Orange

Orange is one of the most popular fruit crops in Vietnam. With the renovation (*doi moi*) policy, the living standard of people has improved. This has resulted in an increase in demand for fruits for domestic consumption. Orange is very promising commodity for the domestic market.

Production

Total production of orange was 99,302 tons in 1985, increasing to 379,405 tons in 1995. From 1985 to 1995, annual growth rate of orange production was 15.8% (Table 7). Orange production of the North was 31,944 tons in 1991 and 72,022 tons in 1995 with an increment of 125%. At the same time production of the South was 89,150 tons in 1991 and 307,383 tons in 1995 with an increment of 245% (Table 8). The Mekong River Delta with a production of 301,308 tons in 1995 accounting for 79% of total production of orange was the biggest orange production region of the country in 1995.

Table 7. Area and production of orange in Vietnam, 1985 - 1995.

Year	Area (ha)	Production (tons)
1985	12,720	99,302
1986	14,212	112,024
1987	14,164	102,980
1988	14,454	103,163
1989	14,132	100,998
1990	14,458	119,238
1991	21,198	121,094
1992	25,529	160,111
1993	44,535	249,699
1994	55,433	285,614
1995	59,516	379,405
Growth Rate (%)	18.7	15.8

Source: General Statistical Office. Statistical Data of Agriculture, Forestry and Fishery 1985-1995. Statistical Publishing House, Hanoi 1996.

Processing

The orange processing industry has not yet developed in Vietnam. Most of the orange production is consumed in fresh form. Orange is popularly planted all over the country, since it is a good cash crop for farmers.

Table 9 shows that net income was 9,297,950 VND/ha for orange compared to only 4,942,000 VND/ha for banana. Net income of orange production was 98.0% higher than that of banana production. This is why total area and production of orange have dramatically increased.

Table 8 Orange production by region in Vietnam, 1991-1995.

Region	1991	1992	1993	1994	1995
Whole Country	121,094	160,111	249,699	285,614	379,405
North	31,944	32,295	46,319	58,639	72,022
North Mountain and Midland	10,862	11,968	14,084	20,012	24,871
Red River Delta	14,112	11,464	21,759	19,364	23,908
North Central Coast	6,970	8,863	10,476	19,263	23,243
South	89,150	127,816	203,380	226,975	307,383
South Central Coast	1,298	1,318	1,773	1,795	2,247
Central Highlands	345	393	266	277	359
North East South	2,455	3,754	514	3,530	3,469
Mekong River Delta	85,052	122,351	200,827	221,373	301,308

Source: General Statistical Office. Statistical Data of Agriculture, Forestry and Fishery 1985-1995. Statistical Publishing House, Hanoi 1996.

Table 9 Economical efficiency of orange production in comparison with banana production.

Item	Orange (VND/ha)	Banana (VND/ha)
Value of production	20,000,000	25,400,000
Total cost of production	10,702,050	20,458,000
Net income	9,297,950	4,942,000

Source: Derived from data of Vegetable and Fruit Research Institute.
US\$ 1 = 11,000 VND

Marketing

Traditionally, the former Soviet Union and Eastern Europe were the markets for orange exports from Vietnam. Until 1991, Vegetexco was the only company responsible for vegetable and fruit exports in Vietnam. After 1991, with the renovation policy, export of vegetables and fruits was opened up to other companies. However, export of vegetables and fruit has not been well developed.

Table 10 indicates that fresh orange exports from Vegetexco to the former Soviet Union and Eastern Europe decreased steadily from 1986. After 1992, there were no more exports of orange from Vegetexco to the Russian Federation and Eastern Europe, due to changes in the socio-economy of those markets.

In 1993, Vegetexco exported 12 tons of fresh orange to Hong Kong and Taiwan. After that, there was no further fresh orange export to these new markets by Vegetexco. Poor quality of the fresh orange and poor facilities of the export industry are the major limiting factors of fresh orange export to new international markets.

Recently, Vietnam imported a considerable quantity of fresh orange from China for domestic consumption. However, this import is unofficial.

There is strong growth in domestic demand for orange in Vietnam.

Vietnam can recover its export of orange to traditional markets and also others but the quality of Vietnamese orange needs to be improved.

During the past 5 years, in the process of social economic development, the living standard of the people has improved. Therefore, domestic demand of high quality food products has been increasing. This is also the case for orange.

The total orange production was 379,405 tons in 1995 with an increase of 282% in comparison to 1985. The orange export was insignificant. This means that all of the orange was for domestic consumption. Moreover, thousands of tons of orange are unofficially imported annually from China for domestic consumption. It is clear that there is strong growth in domestic demand for orange. Orange is a very promising commodity for domestic consumption.

Orange is usually sold at local markets for local consumption. A large quantity of orange is transported by traders from local markets to provincial markets and cities for consumption in urban areas. There is a strong market flow from Ho Chi Minh City or the Mekong River Delta to Hanoi and other cities of the North.

In the North, there is a strong market flow of orange from Northern Mountainous areas such as Ha Giang, Tuyen Quang to Hanoi and from North Central areas such as Thanh Hoa, Nghe An to Hanoi.

Seasonal fluctuation in price is very strong for orange. For example, at the peak of harvesting time from November to January 1995, the retail price of Ha Giang orange in Hanoi was 6,000 to 8,000 VND/kg, but at the end of harvesting time, February to March, it was 12,000 to 15,000 VND/kg.

Table 10 Export of fresh orange from Vegetexco, Vietnam.

Year	Export Volume (tons)	Market
1986	4,612	Former Soviet Union and Eastern Europe
1987	3,821	"
1988	5,809	"
1989	2,904	"
1990	1,481	"
1991	626	Russian Federation
1992	252	"
1993	12	Hong Kong, Taiwan
1994	0	
1995	0	

Source: Vegetexco, Vietnam 1996.

Constraints

- The existing orange varieties in production are not of sufficiently high quality for international markets.
- Propagation of planting materials for good varieties does not yet satisfy the requirements of production.
- Cultural practices are still poor for most production areas. Orange is not yet intensively farmed.
- In many areas, virus diseases of orange are still a big problem.
- All of these problems result in poor market quality of orange.
- The orange processing industry is poorly developed.
- Storage facilities are generally poor, and modern stores for orange are very limited.
- Long distances from production areas to consumption centers and poor road systems are major constraints for orange marketing.
- Not much attention has been given to research on orange. The budget for research is extremely limited.

Government policies

Through various development programs, low interest rate loans have been provided to farmers including orange farmers. In addition, the government established a long term program (Program 327) for greening of hilly areas. As noted in previously, during 1991-1995, hundreds of billions VND were invested for this program. Farmers can obtain credit for expansion of their orange plantings under this program.

Emerging Products and Markets for Upland Crops in the Philippines

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The promotion of agricultural crop production in the Philippines is undertaken by the Agri-business Division of the Department of Agriculture (DA). This division introduces agri-business opportunities to farmers to promote entrepreneurship in agriculture. The DA's Market Information Division, on the other hand, facilitates product marketing by bringing producers and buyers together. It also disseminates market information through a computer network.

The two divisions are assisted by the Agri-Business System Assistance Program (ASAP). ASAP is a joint undertaking of the DA and the United States Agency for International Development (USAID). An ad hoc organization, which was initiated by the DA's Bureau of Agricultural Research (BAR) for the commercialization of available technologies, ASAP was established in 1992 and will end in 1996. It maintains a special fund which provides counterpart funding to private entities for various activities, namely:

- policy research on agri-business issues and reform advocacy,
- technology transfer and training,
- product promotion, and
- other market development activities.

Export promotion of agricultural products is enhanced by ASAP in collaboration with the Center

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for International Trade Expositions and Missions (CITEM) of the Department of Trade and Industry (DTI).

The cut flower industry

Cut flowers are among the high value crops given priority attention by the government in its medium term development plan. Before the government promoted cut flower production, many farmers had shifted to cut flower growing or planted cut flowers in a mixed production system, since it is more profitable than the cultivation of crops they had traditionally grown. The cut flower industry in the Philippines, once a backyard hobby, has been becoming a promising money-making business, with full potential for growth. The steady growth of the cut flower industry is evidenced by the increasing number of major producing provinces in the main islands, namely, Luzon, Visayas, and Mindanao. In 1990 alone, the number of cooperatives dealing in cut flowers swelled by 70%. On a national scale, the area planted to cut flower production increased to 966 hectares in 1993 from 846 hectares in 1989 (Table 1). In 1992, production increased by 26% over the previous period, and a further 14% in 1993.

Table 1 Area harvested and volume of production of cut flowers, Philippines, 1989-1993.

Year	Area Harvested (hectares)	Production* (dozen spikes)
1989	846	3,122,896
1990	845	3,098,256
1991	897	2,757,825
1992	900	3,465,223
1993	966	3,959,406

Source: Bureau of Agricultural Statistics.

* Includes anthurium, orchids, roses, chrysanthemum, gladiola, daisies, baby's breath, azucena, aster, and statice.

Table 2 Production of cut flowers by species, 1994.

Cut Flower Species	Production* (dozen spikes)
Orchids (dendrobium and vanda)	375,000
Anthurium	766,000
Roses	5,800,000
Chrysanthemum	814,000
Gladiola	768,000

Source: Philippine Daily Inquirer, April 6, 1995, Manila.

* Includes selected provinces only.

Cut flowers possess high potential as a non-traditional export product with ready markets. Taking into consideration backyard cut flower production, the

quantity of production in 8 leading provinces alone registered a total of 8.52 million spikes. The breakdown of the aggregate production, by species, is presented in Table 2.

Foreign demand for cut flowers

Exports of cut flowers in 1989 through 1993 increased rapidly, posting a 539% increase over the period. From US\$ 73,079 in 1989, the value of exports grew to US\$ 611,117 in 1993, as shown in Table 3. In 1993, 96% of the cut flower exports were shipped to Japan. Small quantities were exported to Hong Kong, Taiwan, South Korea, Finland, Netherlands, United Arab Emirates, Singapore, and Guam.

Table 3 Volume and value of cut flower exports 1989-1993.

Year	Volume (metric tons)	Growth (%)	Value (F.O.B. US\$)
1989	19.88	-	73,079
1990	32.94	65.69	174,712*
1991	29.47	-10.53	141,765
1992	50.48	71.29	340,589
1993	126.97	151.52	611,117

Source: Foreign Trade Statistics, 1989-1993, NCSO.

* Includes dried flowers.

Domestic demand for cut flowers

The domestic market for cut flowers also has high potential since supply is always short of the demand during the peak months of May and November. In 1992, sale of flowers in Manila and Cebu alone reached 9.36 million dozen spikes, where the biggest consumers were institutional buyers, particularly hotels and banks. The country has to import flowers from Thailand, Malaysia, and Germany to meet the domestic requirement. Importation registered US\$ 47,192 in 1991, a significant growth from US\$ 1,338 in 1989.

The country's cut flower industry is perceived to develop into a viable industry as it is able to respond to the increasing demand in both the foreign and domestic markets for the following reasons:

- ideal climate conditions which range from tropical to semi-tropical temperatures, making it possible to raise a variety of horticulture crops, which in temperate countries require intensive capital to maintain greenhouses and controlled environments;
- cheap and trainable labour is easily available;
- strategic location of the Philippines: its proximity to the Asia-Pacific market where the major

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- importing countries include Japan, Hong Kong, Australia, and Singapore;
 - land availability with a wide range of altitudes to choose from; and
 - high biodiversity of indigenous plants that have yet to be developed.

Problems in the cut flower industry

The Philippine cut flower industry, although painted as a rosy business, is marred by a number of problems. Foremost among these are the high import duties and restrictive government regulations specifically imposed on planting materials. Further growth of the industry will depend greatly on the availability of additional good quality planting stocks that can be secured from neighbouring countries. The productivity of cut flowers is adversely affected by the deteriorated varieties used by growers. Rose and chrysanthemum growers have been cultivating the same planting stocks for the past two and a half decades. This problem is worsened by a complicated system of import and export procedures. The perishability of cut flowers has not yet been well considered by customs officials, especially for shipments arriving outside regular office hours. Another problem is the limited and inappropriate post-harvest technologies and facilities used by growers/traders which result in huge losses.

The industry is also adversely affected by the perennial problem of inadequate and insufficient infrastructure and transportation facilities, which delays deliveries of flowers from the point of origin to the destination. Unfortunately, cut flowers are the main crop for the wet season when unpaved roads are in their worst condition. Another problem is the lack of technical capabilities among growers in the proper diagnosis and control of plant pests and diseases, which hampers productivity.

Market information is also inadequate, so that growers usually have to depend on traders for information on prices. Hence, traders control the prices. Information on preferred varieties and quantity needed by the market is also inadequate. Although some of the necessary information is available, often it comes too late. Other major constraints are limited access to credit, lack of new technology, and inadequacy of planting materials.

Addressing the problems of the cut flower industry

There is no collaborative effort between the government and private sector aimed at promoting

the cut flower industry. It is necessary that the government lay down policies conducive to the cut flower industry's growth while the private sector provides the needed information for policy-making. The high tariff rates and freight charges are too restrictive, and it is essential to expedite the processing of shipment documents at the airport.

A more effective market information system covering proper cultural management of the plants, post-harvest handling technologies/practices, and market demand in both local and foreign markets should be installed. The lack of proper coordination among concerned government agencies in generating and disseminating data on prices at all market levels should be given attention. The intensification of research and implementation of development programs with the participation of both government and private institutions is necessary. As to credit schemes, the loan packages offered by the state-owned Land Bank of the Philippines should be further expanded, especially those short-term credits with low interest rates.

The government, together with the private sector, constantly provides technical training and marketing assistance. This helped in priming the cut flower industry to meet world demand in terms of efficiency, quantity and quality. But there is still a lot of work to be done to overcome the difficulties encountered in the industry as stated earlier. The government should give support in terms of expediting customs procedures, and provision of marketing and production techniques, among others.

Processed ubi

Ubi or yam, prepared into jams or sweets, is one of the country's favorite delicacies. The purple variety of yam (*Dioscorea alata*) is most preferred by consumers due to its attractive color and good taste although its binding property is low. Aside from being prepared into sweets, it is processed into puree or powder. When powdered, it has a shelf life of two years. Ubi is the largest selling flavoring in the local ice cream market. The biggest ice cream company in the Philippines uses ubi as flavoring for 60% of its local ice cream production. Ubi products are mostly sold in upper class and tourist markets. Orders for ubi products from foreign markets, including ubi-flavored ice cream, are increasing.

Production of ubi

The area planted to ubi from 1989 to 1993 averaged 4,656 hectares. In 1991, the area planted to ubi almost doubled to 5,335 hectares from that of the previous year, which could have been brought about by increasing demand in the export market. The country's total production during the 1989-1990 period rose, from 22,357 metric tons in 1989 to 26,572 metric tons in 1993 (Table 4). Production in 1990, however, declined slightly by 2.4% from the previous year, arising from the effect of a drought which hit the country that year. Most of the yam in 1993 was produced in Central Visayas, which is known to produce the best quality yam in the Philippines. Other regions with considerable volumes of production are the Cordillera Autonomous Region, Bicol, Eastern Visayas, Northern Mindanao, Southern Mindanao and Central Visayas (Table 5). These areas contributed a combined production of 6,265 metric tons in 1993, representing 24% of the total output.

Table 4 Area planted to yam (ubi) and volume of production, 1989-1993.

Year	Area (hectares)	Production (metric tons)
1989	3,565	22,357
1990	3,588	21,824
1991	5,335	25,468
1992	5,315	24,856
1993	5,475	26,572
Average	4,565	24,215
Annual compounded growth (%)	8.96	3.51

Source: Bureau of Agricultural Statistics.

Price of ubi

In 1993 and 1994 processing companies bought ubi at a price ranging from 36.70 to 51.38 cents per kilogram, depending on the season of the year. During lean months (March to October), the buying price by processors went as high as 55.04 cents per kilo. Retail prices in the predominantly ubi-producing area in 1994 varied from 34.62 to 50 cents per kilo, which was slightly lower than the Manila price of 50 to 62 cents per kilo, for the ordinary purple variety.

Domestic demand for ubi

Ubi is mainly consumed as food, accounting for 85% of the total gross supply. Ten percent is used for seed while 5% goes to feed and waste. The biggest buyers of ubi in the domestic market are the food

manufacturers which process the root crop into powder or puree to supply the requirements of the ice cream companies. Other ice cream producers are direct buyers of the root crops.

There are no national data on the requirement for ubi by big processors and ice cream makers. The volume required is apparently large as indicated by the volume required by the biggest food processing company in the Philippines. The volume of ubi required by this company is 1,000 to 5,000 metric tons per year which is mainly used for ice cream flavoring. Individual households are also substantial consumers of ubi products.

Table 5 Yam (ubi) production by region, 1993.

Region	Production (metric tons)	Share of Total Production (%)
Cordillera Administrative Region (CAR)	1,042	3.92
Ilocos	41	0.15
Cagayan Valley	72	0.27
Central Luzon	49	0.18
Southern Luzon	499	1.88
Bicol	572	2.15
Western Visayas	1,220	4.59
Central Visayas	19,479	73.31
Eastern Visayas	864	3.25
Western Mindanao	165	0.62
Northern Mindanao	1,050	3.99
Southern Mindanao	618	2.33
Central Mindanao	890	3.35
Total	26,572	100

Source: Bureau of Agricultural Statistics.

Export markets for ubi

Ubi was introduced into the export market in 1990. The export of ubi started when processors adopted storage and processing techniques developed by PRCRTC. Ubi, in fresh, dried and powdered forms is now exported to 27 countries. The major buyers in 1993 were the United States and Canada, which imported 76% and 13% respectively of the total export. The rest was shipped to Australia, Japan, and other countries in Asia and the Pacific, Europe and the Middle East. There is a growing demand from abroad for ubi products, which the ubi exporters can barely meet. As shown in Table 6, exports of fresh and dried ubi for 1990 to 1993 averaged 98 metric tons annually. Exports of processed ubi amounted to 39 metric tons per year on average. These amounts of yam exports are not too high, but the growing interest in the foreign

markets for the products signals a bright market potential for ubi.

Table 6 Export of yam (ubi) products, 1990-1993 (tons).

Year	Fresh and Dried	Value (F.O.B.US\$)	Powder/ Meal	Value (F.O.B.US\$)
1990	101.78	192,150	20.36	126,453
1991	78.72	151,222	20.97	143,886
1992	88.22	168,524	91.27	143,617
1993	122.15	238,178	23.67	160,654
Average	97.72	187,718	39.07	103,529

Source: Foreign Trade Statistics, 1990-1993 Manila, Philippines.

Problems/constraints in the ubi industry

The ubi industry has the potential to develop fully, owing to the product's aroma and delicious taste which appeal to both domestic and international consumers' palates. However, there are many problems facing the industry which should be addressed immediately to propel its development. For one, technology transfer on ubi growing should be accelerated as many farmers practice extremely poor production and management systems. There is also a need to step up research and development activities with a focus on the production of quality planting materials and on post-harvest technologies to minimize post-harvest losses. Equally important is the establishment of nurseries to increase the supply of viable planting materials which has always been limited and costly. Productivity should also be improved to increase farmers' income and volume of output.

Another problem encountered by ubi farmers is the seasonality of production which peaks only from November to February, resulting in wide fluctuation in price. The government should give farmers' access to post-harvest facilities and encourage them to venture into semi-processing of ubi to prolong its shelf-life, thereby minimizing price fluctuations and post production losses.

Fresh young coconuts

The Philippine coconut industry occupies a prominent position in the agricultural sector, next to maize, in terms of value of production which is placed at an annual average of P20.5 billion equivalent to US\$ 810.42 million in 1989 to 1993. However, the area planted to coconuts has been diminishing (Table 7) because of (i) the insufficiency of supply of coconut high-yielding varieties for replanting, (ii) the peace

and order situation which has deteriorated in some areas of the country, and (iii) implementation of the land reform program in which landowners are obliged to sell some areas of land to their tenants, retaining only 7 hectares. These dampened the farmers' initiative to plant or rehabilitate their coconut farms. Nevertheless, the rehabilitation of coconut farms is still a priority in the development agenda of the government for the medium term.

Various products used for food and non-food manufacture are derived from coconuts. In the Philippines, coconuts are generally processed into cooking oil/shortening and into raw materials for the manufacture of soaps, shampoos and other detergents. As traditional exports, the dominant products are coconut oil, copra cake/meal and desiccated coconut. These coconut products combined lead the country's agricultural exports. In 1993, the value of coconut product exports reached US\$ 486.65 million (F.O.B.).

Table 7 Area planted, volume and value of coconut production, 1989-1993.

Year	Area (hectares)	Quantity ('000 tons)	Value (US\$ million)
1982	3,203.7	13,145.7	718.10
1983	3,201.3	12,368.3	729.30
1984	3,222.9	11,737.6	723.18
1985	3,270.3	12,827.8	952.29
1986	3,284.0	14,334.9	599.49
1987	3,251.6	13,730.5	727.79
1988	3,221.8	12,481.8	912.51
1989	3,221.8	12,481.8	884.26
1990	3,110.4	11,810.4	920.61
1991	3,112.0	11,940.4	669.43
1992	3,093.3	11,290.9	732.35
1993	3,076.7	11,404.9	845.43

Source: Philippine Statistical Yearbook 1993 and 1994.

Export markets for young coconuts

Fresh young coconuts from the Philippines were first shipped to foreign markets in 1991, when 1.9 million nuts worth US\$ 1.1 million (F.O.B.) were sold (Table 8.). These were exported to nine countries. The quantity of young nut exports reached 2.7 million pieces in 1992, but slid to 2.4 million pieces in 1993.

Table 8 Volume and value of exports of fresh young coconuts, 1991-1993.

Year	Volume ('000 pieces)	Value (F.O.B. US\$)
1991	1,925.30	1,108,760
1992	2,673.96	1,502,924
1993	2,433.12	1,332,272

Source: Foreign Trade Statistics 1991- 1993.

In 1993, fresh young coconuts were exported to eight countries, primarily to Taiwan which imported 1.78 million pieces. Japan was the second biggest buyer, importing a considerable share of 19%, equivalent to 454,690 pieces (Table 9). The United States and South Korea imported 96,390 pieces and 79,800 pieces, respectively. Small quantities went to the United Arab Emirates, Canada, Thailand, and Guam.

Table 9 Philippine exports of fresh young coconuts by country of destination, 1993.

Country	Quantity (thousand pieces)	Share (%)
Taiwan	1,782.67	73.27
Japan	454.69	18.69
United States	96.39	3.96
South Korea	79.8	3.29
Others	19.39	0.79
Total	2,433.12	100

Source: Foreign Trade Statistics, 1993.

Young coconuts are exported before the pulp has developed, when they are six months old. The foreign demand started in 1991 when Taiwan placed orders for the nuts, which were consumed for their water or juice. Coconut water was established to have rejuvenating and medicinal properties. It was found to have a very high vitamin E content and to prevent and control gallstones.

One advantage of selling young coconuts is that it takes a shorter period for them to be converted into cash and they command higher prices than mature nuts. In the province of Batangas (in Southern Luzon), for example, young coconuts fetch a farmgate price of P3.00 (11.54 cents) per piece, while mature ones are sold at roughly P1.00 per piece (3.84 cents). The coconuts are mostly bought by traders.

There is little problem in exporting young coconuts, except that the farmers have to meet quality standards strictly required by the importers. The quality standards cover regularity of size and shape and freedom from blemishes.

CGPRT Centre News and Activities

HRD/IS

In March 1998, a hands-on training seminar on Integrated Database Management for Agricultural Planning and Research was in Kandy, Sri Lanka.

The importance of integrated database management in agriculture is well established. The primary reason for this derives from fact that management is the key to success or failure of an organization. Deliberate sourcing, arrangement and production of information is not only useful but also critical in making the managerial decisions required in a research or government enterprise.

Considering the growing importance of database management, the seminar included topics ranging from management to appropriate analytical techniques, with special reference to agricultural planning and research, setting up a relational database and Geographic Information Systems (GIS). This was followed by hands-on training modules drawing from a wide range of software including a traditional relational database (Access), a spatial database (MapInfo), spreadsheets (Excel), operations research and simulation modeling

techniques (GAMS) and statistical analytic techniques (SPSS, SAS and Statistica). It is expected that participants will be able to recognize problems in their jobs that can be solved using the techniques explained.

TRADELIB

Project interim review meetings were held in Japan in January and in Malaysia February 1998. Dr. Boonjit Titapiwatanakun and Dr. Michio Kanai discussed matters related to the project with the national experts, researchers and officers in both countries.

Draft country reports for the first term of the project have been submitted by national experts. The report meeting for the first term and the planning meeting for the second term will be held in early May 1998.

Avenues for Agro-industrial Development in Southeast Asia- AVIND

The CGPRT Centre has started a new joint research programme, named "Avenues for Agro-industrial Development in Southeast Asia", in cooperation with ATO-DLO (the Agrotechnological Research Institute), one of the institutes under the Dutch Agricultural Research Department.

The Agrotechnological Research Institute, founded in 1989, is an organisation for fundamental and applied scientific research for agriculture and horticulture, trade and export and for the industries manufacturing food and non-food products on the basis of raw agro-materials. The objective of the institute's multidisciplinary research is to enhance the added value of agroproducts and to develop new technologies, applications and markets for raw agro-materials. In four key issues the institute covers the whole production and distribution

column, from primary raw material up to and including half-finished and end-products.

The aim of the joint research programme is to identify feasible postharvest technology and industrial development activities in Southeast Asia. The programme will cover a wide field in a short time span, and facilitate deeper follow-up studies covered by the DLO institutes in the agricultural development of Southeast Asia, thus extending the range of the programme to other aspects of agriculture. Final reports by agro-industrial commodity will focus on high payoff improvements.

Some agricultural commodities which are of major interest to the programme are cocoa, coffee, palm oil (mainly for cooking oil, but also the residue for animal feed), rubber and tea. A newcomer to this group will probably be fruit, for Indonesia is currently trying to reduce its deficit in fruit trade, although the industry is not very interested in this commodity. The project officer, Ir Bart W van Assen, is located in the CGPRT Centre, Bogor.

Announcements

International Course on Extension Management

**International Agricultural Centre
Wageningen, the Netherlands
June 14 - July 25, 1998**

The strategic objective of the course is to contribute to the improvement of staff performance in organizations involved in extension, be they government or non-government services. After completion of the course, participants should have acquired:

- adequate knowledge on the role and function of extension in rural development;
- skills in needs assessment and problem identification techniques;
- insights on general principles of Rapid Rural Appraisal (RRA) techniques;
- analytical skills and diagnostic capacity to assess the performance of agricultural knowledge and information systems and understand the interaction between perceptions and problem identification;

- skills to assess the quality of socio-economic data collection methods;
- enhanced understanding of the role and tasks of extension management.

For further information, contact:
International Agricultural Centre (IAC)
P.O. Box 88
6700 AB Wageningen, the Netherlands
Lawickse Allee 11
Telephone: +31-317-490111
Fax: +31-317-418552
E-mail: IAC@IAC.AGRO.NL
Telegram: INTAS
Telex: 45888-INTAS NL

28th International Course on Vegetable Production: Selected Topics in Vegetable Production

**International Agricultural Centre
Wageningen, the Netherlands
July 26 - October 31, 1998**

The course intends to extend and deepen participants' knowledge of vegetable growing and to

acquaint them with various production and post harvest aspects.

The course aims at providing participants with information, tools and insights on how to make farmers achieve the vegetable production potential and to acquaint them with post harvest aspects such as handling and marketing.

For further information, contact:
International Agricultural Centre (IAC)

4th Asia Pacific Conference on Agricultural Biotechnology

**Northern Territory University, Darwin, Australia
13 - 16 July 1998**

The Asia-Pacific Agricultural Biotechnology Conferences have now become one of the most important scientific events in the region. The first three conferences in China, India and Thailand were all successful and have set a high standard for this the Fourth Conference. We in Australia, as the host country, are confident that we have put together an exciting and relevant program. We have excellent plenary and invited speakers. The program has been designed to provide the opportunity to hear of the latest developments in both enabling biological science and in its applications into animal and plant production agriculture.

We will also have the chance to discuss intellectual property and regulatory procedures pertaining to the countries of our region. Together with the Crawford Foundation we have an exciting adjunct, a Biotechnology Workshop specially designed to give training and additional skills to younger participants from the region.

For updates of the program and other details, check the conference website:
<http://www.pi.csiro.au/conferen/index.htm>

Fourth International Scientific Meeting Cassava Biotechnology Network CBN IV

3 - 7 November 1998, Salvador, Bahia, Brazil

Cassava is a robust, productive crop of unfavored areas in the tropics, the staple food of

half a million rural poor. The Cassava Biotechnology Network (CBN) unites collaborators whose goal is to enlist biotechnology for enhancing cassava's food security and economic development value. CBN members develop and apply biotech tools for cassava, and work to make possible the desired impact of biotech innovations in poor rural areas.

Themes of CBN IV will be (i) contributions of biotechnology for conservation, understanding, and use of *Manihot* genetic diversity and (ii) biotechnology-assisted farmer participatory research in cassava.

For further information, contact:
Dr. Alberto Vilarinhos
National Research Center for Cassava & Fruit Crops (CNPMP/EMBRAPA), CP 07, Cruz das Almas, Bahia, Brazil
Telephone: 55 75 721 2120
Fax: 1118
E-mail: vila@cnpmf.embrapa.br

Computer Simulation of Crop Growth and Management Responses

Athens, Georgia, June 1 - June 12, 1998

This training program directed by Dr. Gerrit Hoogenboom will describe the practical approaches to simulating the effects of soil, climatic, management, and pest factors and their interaction with the input needs of crops. The program will demonstrate how the processes of crop growth and development, water use, uptake of nutrients and response to irrigation, fertilizer, and other management decisions can be simulated. The program will make extensive use of "hands on" practical sessions on personal computers that demonstrate the application of simulation models to cropping systems in various regions of the world. Together with these applications, the methods for assessing the economic risks and environmental impacts associated with agricultural production in real world problems will be discussed. Procedures for managing soil, crop, and weather data will be described.

For further information, contact:
Computer Simulation of Crop Growth 35991
Georgia Center for Continuing Education
The University of Georgia
Athens, Georgia 30602-3603
(706) 542-2134 or Fax: (706) 542-6596
(706) 884-1381 or Fax: (800) 884-1419
CGPRT Centre

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

Objectives

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

Programmes

1. Research, which entails the preparation and implementation of studies covering production, utilization and trade of CGPRT crops in the countries of Asia and the South Pacific.
2. Training of national research and extension workers,
3. Information and documentation which encompasses the collection, processing and dissemination of relevant information for use by researchers, policy makers, and extension workers.

Palawija News

Contributors are invited to submit concise summaries of significant social research related to CGPRT crops for publication. Figures (graphs or tables) may accompany the article. All articles are subject to editing to meet space limitations.

Please send all queries relating to articles in *Palawija News* to Publications Section, CGPRT Centre, Jalan Merdeka 145, Bogor 16111, Indonesia.

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