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The report documents the Thai vegetable seed industry and reports on the export market potential for Nepal-produced winter and temperate climate vegetable seed. Issues relating to costs, quality standards, import requirements, and <sup>ten</sup> activities of domestic and multinational firms are discussed in detail.

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**MARKET POTENTIAL IN THAILAND**  
**FOR**  
**NEPAL-PRODUCED VEGETABLE SEED**

by  
Tim Welsh  
Jamuna Kayastha

April 1990

**MARKET POTENTIAL IN THAILAND  
FOR  
NEPAL-PRODUCED VEGETABLE SEED**

**POSTHARVEST INSTITUTE FOR PERISHABLES**

**Collaborative Research Program Between  
USAID/Nepal, No-Frills Consultants, and AMIS  
(Agricultural Marketing Improvement Strategies Project)\***

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April, 1990

## FOREWORD

This report on the market potential in Thailand for Nepal-produced vegetable seed is one of several projects in a collaborative effort to develop markets for high-value commodities produced in the hill regions of Nepal. USAID/Nepal, No-Frills Consultants, the USAID Bureau for Science and Technology Agricultural Marketing Improvement Strategies Project (AMIS), and the University of Idaho's Postharvest Institute for Perishables (PIP) are the organizations leading this effort.

The primary objective of this research was to document the Thai vegetable seed industry and report on the export market potential for Nepal-produced winter and temperate climate vegetable seed. Radish, broadleaf mustard, and cauliflower seed received primary consideration, but potential for other seeds was also explored. Issues relating to costs, quality standards, import requirements, and the activities of domestic and multinational firms are discussed in detail.

This report is based on extensive review of available literature, field visits, and interviews with public and private sector participants in the Thai seed and vegetable industry. Earlier studies by Holtzman and Munankami (1989), Chilton and Shrestha (1988), Zaman (1988), and others provided valuable background. This research builds on those efforts in an attempt to develop more export markets and gather valuable information for Nepal's developing seed industry.

Mrs. Jamuna Kayastha of NFC Seed Company, Kathmandu and Tim Welsh of AgriSouce Ltd, Bangkok are the principal researchers and drafters of this report. Dr. Ramesh Munankami assisted and did additional research on the export market potential for Nepal-produced fresh and processed fruits and vegetables, particularly ginger, turmeric, apples, and garlic. His reports are forthcoming.

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# CONTENTS

- 1 VEGETABLE SEED TRADE
  - 1.1 The Thai Vegetable Seed Market
  - 1.2 Vegetable Seed Imports
  - 1.3 Vegetable Seed Exports
  
- 2 SEED POLICIES AND REGULATIONS
  - 2.1 Policies
    - 2.1.1 National Seed Policy
    - 2.1.2 Investment Policy
    - 2.1.3 Trade and Commercial Policy and Import Duties
  - 2.2 Regulations
    - 2.2.1 Plant Variety Protection
    - 2.2.2 The Seed Law and Seed Certification
  
- 3 THE THAI SEED INDUSTRY
  - 3.1 History
  - 3.2 Organization
  - 3.3 Private Sector Vegetable Seed Business
    - 3.3.1 Structure
    - 3.3.2 Relations between Companies and Growers
    - 3.3.3 Private Company Research
    - 3.3.4 Marketing and Distribution
  - 3.4 Foreign Investment
  - 3.5 Company Profiles
    - 3.5.1 Chia Tai Company Ltd.
    - 3.5.2 Chia Kwang Seng
    - 3.5.3 Seng Heng Huat Ltd.
    - 3.5.4 East-West Seed Co.
    - 3.5.5 Hsin Seeds
    - 3.5.6 Known-You Seed Co.
    - 3.5.7 Upjohn/Asgrow Seed Company
    - 3.5.8 Adams International/Adams Enterprises
    - 3.5.9 Horthai Co. Ltd.
    - 3.5.10 Thai Seed Agriculture Co. (TSA)
    - 3.5.11 Other Companies
  - 3.6 Trends in the Thai Vegetable Seed Industry
  
- 4 THE OUTLOOK FOR NEPAL-PRODUCED VEGETABLE SEED IN THAILAND
  - 4.1 Leaf Mustard
  - 4.2 Chinese Cabbage
  - 4.3 Chinese Radish
  - 4.4 Cauliflower
  - 4.5 Edible Rape
  - 4.6 Chinese Kale
  
- 5. SUMMARY AND RECOMMENDATIONS
  - 5.1 Strive to Lower Export Prices and Improve Quality
  - 5.2 Maintain Close Contact with Thai Buyer

## **LIST OF TABLES**

- |         |   |
|---------|---|
| Table 1 | Thailand's Imports of Vegetable Seeds                                 |
| Table 2 | Exports of Vegetable Seeds From Thailand                              |
| Table 3 | Thailand's 1988 Imports of Five Selected Seed Species By Country      |
| Table 4 | Major Seed Import Months, Volumes, and Values of Selected Crops, 1988 |

## **LIST OF APPENDICES**

1. Team Itinerary
2. List of Thai Vegetable Seed Companies and Other Contacts
3. Map of Thailand
4. Thailand's Seed Club Committee
5. Seed Standards for Extension Seed Sold to Farmers
6. Seed Distribution by Seed Division, 1984-86
7. DOAE Vegetable Seed Standards
8. Seed Law and Regulations
9. Known-You Seed Company Price List
10. Lam Nam Oon Irrigation Project Information

# **1 VEGETABLE SEED TRADE**

## **1.1 THE THAI VEGETABLE SEED MARKET**

The market size for all vegetable seeds in Thailand is estimated to be about 1,900 Mt, or 150-200 million Baht (US\$5.9-7.8 million), by the Department of Agricultural Extension (DOAE) Seed Division. Total area planted is estimated at 125,000 ha. Of the total demand, it is estimated that only about 50% is supplied by cash sales. The other half is filled by open-pollinated (OP) farmer-saved seeds. Therefore, the effective cash market size for vegetable seeds is about 950 Mt.

Annual imports averaged 484 Mt between 1983 and 1988, so roughly half of the total demand is being met by imports. In some years, imports have climbed well over 600 Mt, so actual demand for imported seed may be closer to 60% of the total demand.

Using average import statistics from 1983-1988 as a guide, open-pollinated seeds make up more than 80% of the import volume and over 50% of the value.

## **1.2 VEGETABLE SEED IMPORTS**

Table 1 shows imports of various species of vegetable seeds for 1983-1988. Although import volume has varied over the period, value has tended to increase slightly nearly every year. Since 1986, total vegetable seed import value has climbed from about US\$2.9 million to US\$3.8 million in 1988 (assuming a constant exchange rate of 25.5 Baht = US\$1.00). With the demand for fresh and processed vegetables increasing steadily, seed demand is likely to continue increasing.

Table 2 shows vegetable seed imports by country for 1988. According to trade sources, these figures are also indicative by country of origin for recent years. New Zealand, Australia, the USA, Taiwan, and China supply most of the import volume, while Japan and the USA command the majority of the value.

Japan has a major share of the hybrid cabbage seed import market. According to Table 1, cabbage seed comprised nearly one third of the average value of imported seed since 1983, followed by radish (18%), Chinese cabbage (11%), and Chinese kale (8%). Chinese kale, morning glory, edible rape, and radish comprised most of the volume over the same period at 23, 16, 13, and 13% respectively.

**Table 1:**  
**Imports of Vegetable Seeds into Thailand 1983-1988**  
 Q = quantity (Mt); V = value (million baht)  
 (25.6 Baht = US\$1.00, January, 1990)

Item	1983		1984		1985		1986		1987		1988	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
1. Leaf mustard	10.0	0.7	33.0	2.3	59.0	3.4	7.2	0.4	13.9	1.0	52.8	3.1
2. Chinese cabbage	14.0	6.8	70.0	9.2	40.0	7.1	22.6	9.1	10.1	9.9	49.5	12.3
3. Radish	11.0	3.7	69.0	5.5	60.0	55.4	51.6	6.2	69.4	6.9	142.9	9.9
4. Morning glory	100.0	4.3	127.0	4.0	116.0	2.6	53.3	1.8	77.9	2.7	5.2	0.3
5. Chinese kale	34.0	2.0	150.0	6.8	139.0	7.7	124.4	6.7	103.8	4.9	163.6	8.3
6. Tomato	1.0	1.0	3.0	1.9	1.0	1.0	1.4	1.1	1.2	1.0	4.0	3.4
7. Chili	1.0	0.4	1.0	0.5	-	-	0.8	0.5	0.6	0.3	0.6	0.3
8. Garden pea	61.0	0.8	104.0	1.7	46.0	1.4	31.6	0.7	25.8	0.8	47.1	1.2
9. Cauliflower	-	-	9.0	4.5	4.0	2.8	4.6	4.2	9.8	6.4	9.9	6.5
10. Cabbage	-	-	8.0	9.9	16.0	19.4	14.6	25.5	13.1	25.2	14.0	32.1
11. Edible rape	-	-	70.0	2.4	40.0	1.7	42.0	1.8	77.6	2.7	109.4	4.5
12. Broccoli	-	-	-	-	0.2	0.7	0.2	0.7	0.4	1.0	0.3	0.8
13. Lettuce	-	-	3.0	0.7	1.0	0.1	2.0	0.5	2.0	0.6	2.9	0.8
14. Watermelon	-	-	21.0	4.6	18.0	4.8	24.4	4.5	29.8	6.7	24.5	5.5
15. Onions	-	-	2.0	1.9	4.0	4.2	4.4	5.8	5.0	6.8	6.0	8.5
16. Sweet maize	-	-	-	-	1.0	0.2	0.1	<0.1	0.2	<0.1	0.5	0.1
<b>Totals</b>	<b>232.0</b>	<b>19.7</b>	<b>670.0</b>	<b>55.9</b>	<b>545.2</b>	<b>112.5</b>	<b>385.2</b>	<b>69.6</b>	<b>440.6</b>	<b>77.0</b>	<b>633.2</b>	<b>97.6</b>

**Table 2:**  
**Exports of Vegetable Seeds From Thailand 1983-1988**  
 Q = quantity (Mt) ; V = value (million baht)  
 (25.6 Baht = US\$1.00, January, 1990)

Item	1983		1984		1985		1986		1987		1988	
	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
1. Leaf mustard	-	-	-	-	-	-	0.6	-	2.9	-	3.6	0.3
2. Chinese cabbage	-	-	-	-	-	-	<0.1	-	0.2	-	2.2	0.5
3. Radish	-	-	-	-	-	-	-	-	1.0	-	1.4	0.3
4. Morning glory	-	-	160.0	4.1	97.0	2.3	90.8	-	208.8	-	334.0	6.2
5. Chinese kale	-	-	-	-	70.0	1.3	0.1	-	0.8	-	0.6	<0.1
6. Tomato	-	-	-	-	-	-	5.6	-	6.9	-	9.9	25.5
7. Chili	-	-	-	-	-	-	0.1	-	0.1	-	<0.1	<0.1
8. Garden pea	-	-	-	-	-	-	-	-	-	-	2.8	0.1
9. Cauli- flower	-	-	1.1	0.1	-	-	0.4	-	0.6	-	0.1	0.1
10. Cabbage	-	-	-	-	-	-	-	-	0.2	-	0.6	1.8
11. Edible rape	-	-	-	-	-	-	-	-	1.2	-	0.7	<0.1
12. Broccoli	-	-	-	-	-	-	-	-	-	-	-	-
13. Lettuce	-	-	-	-	-	-	0.5	-	1.1	-	1.0	0.1
14. Water- melon	-	-	4.0	0.4	7.0	0.8	32.1	-	63.8	-	130.7	41.9
15. Onions	-	-	-	-	-	-	-	-	-	-	-	-
16. Sweet maize	-	-	-	-	-	-	3.7	-	14.2	-	15.9	0.7
<b>Total</b>	-	-	<b>165.1</b>	<b>4.6</b>	<b>174</b>	<b>4.4</b>	<b>134</b>	-	<b>301.8</b>	-	<b>503.0</b>	<b>77.8</b>
<b>Export volume as % of imports</b>												
			<b>1983 - 24.6%</b>	<b>1984 - 32%</b>	<b>1985 - 35%</b>		<b>1986 - 68%</b>		<b>1987 - 79%</b>		<b>1988 - 80%</b>	

Chinese radish, leaf mustard, Chinese cabbage, and edible rape are all OP types. According to Thai seed traders, these are some of the best species for market development by Nepalese exporters. Some large-headed OP cauliflower varieties may also have potential. These market prospects are discussed more in Chapter 4 below.

### 1.3 VEGETABLE SEED EXPORTS

Thailand is not self-sufficient in most species of vegetable seed used domestically, but exporters are making progress in finding overseas markets to offset the growing seed import costs. As shown in Table 2, export tonnage has increased almost every year since 1983. The volume of exports as a percentage of imports has climbed from about 25% to 80% over the period. Values for the entire period are not available, but 1988 figures show import value was just under 80% of the export value.

In analyzing the table more closely, there are interesting trends taking place in some species which are worth noting by Nepal seed companies looking at Thailand. Of most interest is the steady climb in exports of tomato and watermelon seed. These exports have developed in just the past 4-5 years, mainly because of international firms shifting their production operations from Taiwan and other locations to northeast Thailand. Production of these seeds is based on low cost labor for hand pollination of flowers to produce hybrid seeds. While volume is not large, the unit value of this seed is high and its production offers good returns for small scale farmers during the off-season in the northeast production zones. Such a system may offer potential for Nepalese farmers and seed companies. This is discussed further in Chapters 3 and 4.

Table 2 and information gathered from trade sources show that hybrid watermelon seeds earned about 42 million Baht (US\$1.6 million) of foreign exchange in 1988, followed by hybrid tomato seed with 25.5 million Baht (US\$1 million), and morning glory with 6.2 million Baht (US\$243,000). A major share of the watermelon seed appears to be destined for markets in mainland China, since 107 of the 130 Mt of exports in 1988 were shipped to Hong Kong. Another 17 Mt went to Taiwan.

About 90% of the hybrid tomato seed is exported to the US. Small amounts are also shipped to Taiwan and the Netherlands. Morning glory seed exports have shown strong growth since 1988. The market for nearly 70% of this seed is in Singapore and Malaysia, with Hong Kong and the US importing smaller quantities.

## **2 SEED POLICIES AND REGULATIONS**

### **2.1 POLICIES**

#### **2.1.1 National Seed Policy**

The Royal Thai Government develops a comprehensive national plan every five years which includes an agricultural development plan, and within that, addresses seed policy. Currently in the Sixth Plan, the government has continued to develop and implement its policies through the National Seed Committee. The committee is represented by several branches of the government. Its official role is to guide seed policy but its most important function has been to search for and manage public funding for the industry.

The operating-level seed policy is to:

- promote farmer use of high-quality seed of improved varieties to increase productivity and farm income.
- multiply high-quality seed of improved, higher-yielding varieties developed by the Department of Agriculture (DOA) and other research institutions. This seed will be used in government relief programs.
- encourage farmers, agricultural institutions, and the private sector to produce high-quality seed for distribution in both domestic and foreign markets.

The policy also stresses the need to "encourage the private sector to play a greater role in the production of higher-yielding seed. The government will avoid the production of seed which the private sector is already producing, such as maize, and will find incentives to encourage the private sector to invest in the production of other seeds in order to lower the burden for the government which will be able to concentrate on other issues."

#### **2.1.2 Investment Policy**

The Prime Minister is the chairman of the Thai Board of Investment (BOI), the main government body which directs investment policy. In the BOI publication, A Guide to Investing in Thailand, details are provided on Thai government incentives for investment in "multiplication of vegetable seeds". To receive the various tax incentives, guarantees, and protection measures offered, investing companies must capitalize their firms with a minimum of 5 million Baht (about US\$200,000). In addition, grading machines and hybrid planning and research programs must be approved by the board. Several large multinational seed companies are taking advantage of these privileges, including East-West Seed Company.

### **2.1.3 Trade and Commercial Policy and Import Duties**

With the exception of import tariffs on some types of seed, Thailand has a fairly free policy for seed trade. Customs Department information states that vegetable seeds are subject to import duties of 40-60%. However, interviews with seed traders revealed that there are no import duties on vegetable seeds. Legumes and other seeds that may be consumed are the only exception. These are subject to the duties. Imported seed which is subject to duties is often under-invoiced by importers in order to reduce the charges.

According to the private seed traders interviewed, all of the seed types from Nepal with potential for export to Thailand are free of import duties. Regulations stated in the Seed Law (see Appendix 8) and various trade policies set by the Ministry of Commerce also prevail at the operating level.

## **2.2 REGULATIONS**

### **2.2.1 Plant Variety Protection (PVP)**

There is no PVP law in Thailand. Both government and private interests see little advantage to having such a law at this stage, especially considering the costs of enforcement. As a consequence, most private companies are concentrating on hybrid rather than OP varieties in their research programs. It does not appear likely that PVP will be introduced in the near future.

### **2.2.2 The Seed Law and Seed Certification**

Appendix 8 shows the Seed Law in detail, including the types of licenses required by private companies to operate and a list of "controlled seeds". Seed Certification regulations are discussed in Chapter 4 of the Law. There is no seed certification requirement; the Law provides only for the quality requirements of "controlled" seeds. Seed sold in the market does not have to be certified by any government authorities, but the option is available if a company desires. At one point, seed certification rules were enacted and attempts were made to implement them by the Ministry of Agriculture and Cooperatives (MOAC). Manpower was too limited, so the MOAC has shelved those plans in favor of the current voluntary system. There may be some type of seed registration system enacted in the future, however. According to MOAC officials, currently sold seed would be "grandfathered" under any new provisions.

### **3 THE THAI SEED INDUSTRY**

#### **3.1 HISTORY**

Traditionally, seed needs in Thailand have been met by farmer-saved seeds or by local traders and shopkeepers who retain and sell seed stocks purchased from other farmers. Seed development began as early as 1916 when King Rama V established a rice experiment station. The predecessors of today's DOA continued those early efforts. In the 1940's, the government actively concentrated on corn and rice improvement with the goal of increasing national yields and assisting farmers through a multipurpose research program.

The modern era of seed improvement began in 1972 when the government initiated the Seed Production Project in the Department of Agricultural Extension (DOAE) of the MOAC. This was a USAID-supported project to establish a soybean seed processing, testing, and training facility at Phitsanulok in the lower northern region. The project was expanded on a national scale four years later when the Seed Development Project was created.

The intent of the project was to establish a National Seed Program that would link government agencies and support private seed company development. A National Seed Committee (see Appendix 4) was formed to direct implementation of the policies set forth by the central government. Varietal development, foundation seed production, supply of legume seed inoculants, training, and multiplication and distribution of improved seed were all goals of the program. Since 1977, twenty centers similar to the original Phitsanulok project have been established and two more are on the way. This large-scale program was supported heavily by international aid agencies, particularly USAID and implemented by Mississippi State University.

Development of the private seed industry began in the early 1920's when Chia Thai, the forerunner of today's Asian agribusiness giant, Charoen Phokaphan (CP), began importing vegetable seeds from China and reselling to local farmers. This Chinese-Thai group has grown into one of the largest agribusiness conglomerates in Asia. Chia Tai is the vegetable seed trading and marketing arm. Other group companies market field crop and other seeds and chemicals, trade commodities, and operate numerous integrated feed and food businesses.

Little progress from this concept was made by other private firms until 1975 when Suwan 1 corn seed was released by Kasetsart University with support from the Rockefeller Foundation and USAID. This was an open-pollinated "synthetic" hybrid which was higher yielding than

local varieties and, most important, was resistant to downy mildew. This variety was a catalyst for the startup of private companies. By 1977, three large international seed companies (Pacific Seeds, CP, and Cargill) were established, and by the mid 1980's, over 200 firms were registered.

Generally, the field crop seed business has gotten the most attention from foreign investors, but in the past five years, several foreign firms have successfully invested in the vegetable seed business. Several of these firms are described in the profiles below.

Many factors came together at the right time to make Thailand's seed industry develop with such success. Internationally, it is seen as a model for other developing countries. It is continuing to evolve and become more competitive and sophisticated. The Seed Development Project has united many interests toward national seed goals. Both the government and private companies are involved in this effort. The next section describes the structure of these two segments of the industry.

### **3.2 GOVERNMENT ORGANIZATIONS**

Several government groups play important roles in the seed industry. These are:

#### **3.2.1 Universities**

Kasetsart University near Bangkok, Chiang Mai University and Mae Joe Institute of Agricultural Technology in the north, Khon Kaen University in the northeast, Prince of Songkla University in the south, and other agricultural institutes and colleges throughout the country provide mainly research and variety development support and germ plasm exchange. Plant breeders and other specialists at these institutions supply breeder and foundation seed or specific research support to other government agencies or private companies. Kasetsart and Mae Joe take the lead among these institutions in vegetable seed research due to their proximity to the major production regions.

The universities are education and research oriented with the majority of the hands-on seed-handling training being done by the MOAC/DOAE Seed Division. Unofficially, many university personnel are involved in the seed industry as shareholders in the seed companies and other agricultural enterprises. University salaries are low and involvement with the seed companies can increase professors' incomes while providing status, information and technology to the private firms.

### **3.2.2 Ministry of Agriculture and Cooperatives (MOAC)**

#### Department of Agriculture (DOA)

The DOA parallels the universities in research and development. There is often competition between the two groups for funding, in which DOA usually loses out since it is part of the government and subject to more regulations. In spite of some limitations, the DOA plays a valuable role nationwide. Like the universities, the agency provides breeder and foundation seed and also supports farmers, private seed companies, and other government agencies through its various departments such as the Department of Plant Pathology and Seed Regulatory Division.

#### Department of Agricultural Extension (DOAE)

The DOAE transfers technology from universities, DOA, and other sources to farmers and private companies. After the Seed Development Project (SDP) was initiated in 1976, the Seed Division was established in 1977 as a permanent part of the organizational structure of the DOAE. Its purpose is to implement and coordinate the SDP and ensure long-term continuity of seed supply. It not only produces seed for government programs, but also plays the key leadership role in developing and organizing a complete seed industry. Its role is not to compete with the private sector, but mainly to supply government relief programs. Only 3.3 % of total DOAE sales are to farmers. Annually, it supplies only about 10% of the total seed sold in Thailand. It mainly supports and monitors agencies and private companies involved in supplying seed. The division includes 22 seed centers throughout the country which were developed and supported by international development assistance loans and grants, including USAID.

Seed Center Number 7 in Chiang Mai is the key facility for vegetable seed production and processing. One of the largest vegetable seed processing centers in Asia, it is capable of conditioning about 60 Mt of vegetable seed annually but has been operating far below capacity and is not competitive with private seed firms. The center serves farmers in three northern provinces and is the main multiplication, conditioning, and quality control facility for other DOAE seed centers throughout Thailand which handle vegetable seeds. Details of the center are found in the appendix.

### **3.3 PRIVATE SECTOR VEGETABLE SEED BUSINESS**

#### **3.3.1 Structure**

There are many companies (some sources say over 100) involved in the vegetable seed business, but approximately 75 firms are considered to be solely vegetable seed companies. Most of these can be classified into four categories:

1. Buying or contracting domestically and selling in Thailand
2. Importing and buying/contracting domestically for sale in Thailand
3. Buying/contracting domestically for export
4. Importing and buying/contracting domestically for domestic and export sale

In spite of the large number of companies in the business, six firms share an estimated 90% of the domestic vegetable seed sales. These are Chia Tai, Chia Kwang Seng, Seng Heng Huat, East-West Seeds, Chua Yong Seng, and Nam Tai Chiang. Most of them could be classified in group two, but some, such as Chia Tai and East-West Seeds could be placed in group 4 as well. Chia Tai is the largest and oldest of the firms and holds about 60% of the domestic vegetable seed market. Their share may be declining in recent years as foreign firms have invested in the business, bringing new research and technology with them.

The third group listed above, companies buying and contracting for the export market, may be of particular interest to Nepal seed companies. As mentioned in Chapter 1 concerning exports, hybrid watermelon and tomato seeds are the main species exported by these firms. Asgrow, Hsin Seeds, Adams International, and Known-You Seeds are the primary exporters, but others, such as TSA, Universal Agriculture, Universal Seed Co., and Horthai, are also involved as subcontractors.

More details on these firms will be provided in the company profiles below.

#### **3.3.2 Relations between Companies and Growers**

Seed companies produce some of their own seed on company-owned farms, but generally they contract seed production from individual growers. Prices and volumes are usually specified in contracts, and generally, price levels are established in advance for volumes in excess of the contract.

For in-Thailand production, inputs are usually provided by the farmer, except for special inputs such as seed, which are provided by the company. Extension provided by company

personnel is a key part of contract seed production. High quality, reliable production is based on long term relations of trust and mutual benefit between the farmers and companies.

Overseas production for Thai companies is based purely on price, with no consideration of inputs for the production. U.S., Australian and other contracting companies provide their growers with whatever inputs and extension are needed to get the required volume at the contract price.

### **3.3.3 Private Company Research**

Although many local firms have had research and production farms for many years, most do not have active breeding and varietal development programs for hybrid varieties. Since hybrids require more sophisticated research and production techniques, most firms rely on imported hybrids, either directly from international seed supply companies, or from contract growers in the U.S., Australia, New Zealand, or Europe. Until the 1980's, local efforts were concentrated in marketing seeds, especially through brand establishment and competitive prices.

Eventually, local firms established their own experimental plots and began some varietal improvement. East-West Seeds, one of the newest entries in the business, set new standards for research by developing hybrids for the domestic market. This effort, combined with new genetics and production expertise of the hybrid tomato and watermelon seed companies, stimulated more research investments by established local companies. Even with this growing research effort by Thai companies, there is still a large amount of imported hybrid seeds on the market.

### **3.3.4 Marketing and Distribution**

Brand establishment is a key factor for seed marketers in Thailand. Growers are becoming more sophisticated and buy based on quality and objective yield data, but brand loyalty is still very strong.

There are about 50 different imported and domestic commercial brands available to farmers. One shop visited in Chiang Mai sold seeds from more than 20 companies. The ability of Chia Tai to maintain 50% or more market share in spite of efforts by other firms is evidence of this strong brand loyalty.

Growers tend to stay with one brand of seed because vegetable production requires somewhat more skill compared to other crops. Continually changing seeds may require changes in growing techniques, which can be risky even for established small farmers.

Marketing strategies are similar among the major seed companies. The essential element of marketing is to have seed on the shelf at local seed and farm supply shops. Company sales representatives usually are assigned territories to establish relationships with wholesale or regional dealers in major production areas. Large growers may be serviced directly by the companies if it does not conflict with local dealers. Larger dealers often resell seed to smaller shops in more remote areas. Throughout this sales process, wholesale or retail prices are seldom set by the original seed company. Free market forces determine prices.

Demonstration plots are the most widely used means to introduce the quality of new varieties to farmers. Often, these plots are planted by respected growers who will promote the seed with other farmers in the area. Trials are backed up by advertising and promotions. Companies are also providing more technical information in the form of publications and dealer education.

Companies advertise and communicate with growers in a number of ways. Four-color flyers in the Thai language are the most common, targeted both to middlemen and the farmers. Seed catalogs are available in Thai to middlemen and farmers. Radio is surprisingly common. TV is becoming more popular as Thai farmers living in villages and small towns are steadily gaining access to electricity and buying luxuries like TVs. (When they get extra cash, like their U.S. counterparts, they buy new pick-ups.) Up-country dealers are often targeted by the promotions since they are the go-betweens to the farmers. Some hats, pens, and other give-always are also used.

### **3.4 FOREIGN INVESTMENT**

Because of complex and confidential business relationships between local and international firms, as well as incomplete trade data, it is difficult to determine the extent of foreign investment in the Thai vegetable seed business. Available information and discussions with people in the business suggest that Chia Tai, Chia Kwang Seng, Seng Heng Huat, and other established Thai companies still hold over 80% of the vegetable seed import volume and value, and perhaps as much as 75% of the export volume. Foreign firms, mainly those in the high-value/low-volume hybrid and melon seed business such as Hsin Seeds, Known-You, and Asgrow, handle up to 60% of the export value.

For reasons of confidentiality, none of the firms provided much detail concerning their contracts with local or foreign producers or companies. Details of links with international firms are reported in the company profiles below.

### **3.5 COMPANY PROFILES**

Following are profiles of the major vegetable seed companies active in Thailand. Complete addresses and individuals to contact are found in Appendix 2.

#### **3.5.1 Chia Tai Company Ltd.**

Chia Tai is one of the oldest seed companies and commands at least half the market share through its "Airplane" and "Rabbit" brands. It is the seed from which grew the Charoen Phokaphan Group of companies.

Chia Tai has been working to establish better research and varietal development through research farms in Chiang Mai and Kanchanaburi. In 1988, the company imported 174 Mt of seed worth 31.4 million Baht (US\$1.2 million), making them the second largest seed importer of all seeds. A large share of this was OP mustard, radish, kale, and edible rape seed which was grown under contract in Australia, the US, New Zealand, or Europe. Hybrid and improved OP seed from foreign companies was also imported for repackaging in Chia Tai packs or for upcountry sale.

Chia Tai is interested in seeds from Nepal, particularly the brassicas and crucifers which could be grown under contract with stock seed from Thailand. Nepali exporters would need to be competitive in price with other contract growers.

#### **3.5.2 Chia Kwang Seng**

Chia Kwang Seng, an independent local company, has been established in the seed business since the early 1900's. As the name implies, it is a Chinese-Thai company. Most of its operations are in foreign contracting, importing and domestic marketing of OP brassica and crucifer crops. In 1988, the company was the second largest seed importer with 98.5 Mt worth 5.66 million Baht (US\$220,000). Some local production is done in Loei province on the firm's research farm and with local contract growers. However, most of this production is for stock seed which is supplied to foreign contract growers.

Mr. Pong Marutalart is interested in importing from Nepal if prices and quality are competitive with Australian and other origins. He was supportive of Nepal's efforts and provided seed for trials, as well as valuable technical and market information to the team. Much of this is included in the following chapter.

### **3.5.3 Seng Heng Huat Ltd.**

Seng Heng Huat is a well-established Chinese-Thai seed company which has traditionally imported and marketed seed under its "Two Fishes" brand. Like Chia Tai and Chia Kwang Seng, the company relies on contract seed growers in Australia, the US, New Zealand, and Europe for much of its supply. Other foreign brands are imported in retail packs and sold to upcountry dealers. A 40 rai (6.4 Ha) research and production farm is located in Chiang Mai, mainly for stock seed production of the OP kale, radish, mustard, rape and other crops. Contract production is also done in other provinces throughout Thailand depending on the season and type of growing conditions needed.

Seng Heng Huat was the sixth largest seed importer to Thailand in 1988, taking 4% of the volume (56 Mt) and over 12% of the value worth (US\$545,000). Mr. Somsak Srirawewongsa, the Managing Director, is very receptive to imports from Nepal and will provide seed for trials. Like the other importers, he emphasized price and high quality as being critical to compete with other suppliers.

### **3.5.4 East-West Seed Company**

East-West Seed Company focuses on developing seed for local markets. They are not seed traders like traditional Thai firms; operations in other SE Asian countries also focus on their own domestic markets. The various country branches interact by exchanging germplasm or seed for increase if it is adaptable, but they do not make a practice of moving seed between countries unless it makes economic sense and the seed is well adapted.

East-West is the pioneer company in Thailand to develop hybrid varieties of locally grown and consumed vegetables. Since setting up operations in 1985, the firm has invested considerable time and money in research to breed and develop varieties acceptable to local growers. Their products have entered the market in the past 2 - 3 years. It is clear they produce quality seeds and are gradually taking market share from larger competitors. East-West has a large range of seeds and is now doing some flower seed production for foreign companies. The head office and cleaning/packaging operation is near Bangkok, but

the main research farm is near Chiang Mai. Contract production is done throughout the country.

Mr. Simon Groot, a third-generation seedsman from the Netherlands, has also established operations in the Philippines and Indonesia, and is working on similar ventures in other Asia countries. He was contacted in advance of the team's visit and is open to considering Nepal as a possible country for investment. His philosophy of breeding and producing for large local markets and concentration on current, fast-growing operations means that Nepal will be a lower priority, however.

Because of its local market orientation, East-West is not a large importer or exporter of seed. Imports are mainly from company operations in the region and destined for sale in Thailand or foundation seed for research. Exports are to/for other international companies for which East-West produces or increases seed under contract. Import volume in 1988 totaled 23.29 Mt worth 1.2 million Baht (US\$47,000).

### 3.5.5 Hsin Seeds

Located in Khon Kaen in the heart of the arid northeast, Hsin Seeds is one of the leading companies producing hybrid tomato and melon seed under contract with Thai farmers for export. They were the fifth largest seed exporter in Thailand in 1988 (including field crop seed firms) and the largest exporter on a value basis. Exports totalled over 84 Mt, while value was 25.3 million Baht (nearly US\$1 million). Ownership of the company was not revealed (It is believed that Hsin Seeds is an investment by a Taiwanese seed company since the general manager was educated in Taiwan and much of the equipment and techniques originated from there).

Hsin Seeds contracted with more than 2,000 farmers on over 5,000 rai (800 ha) in 1989 throughout the northeast. Irrigated farms in Kalasin and Ubon provinces are their largest production areas. International firms in the US (Northrup King) and Europe (Zaadunie in the Netherlands and French and Italian companies) are their main customers.

Hsin Seeds is interested in cooperating with Nepal seed companies and provided much valuable information about small scale seed cleaning equipment for small-seeded vegetables. They also provided introductions to the local manufacturer in Khon Kaen who is providing blueprints of the machine. Seed for trials was exchanged and the firm is interested in contacting more seed companies in Nepal.

### **3.5.6 Known-You Seed Co. (Thailand) Ltd.**

Known-You is another Taiwan company which has set up in Thailand to produce hybrid tomato and melon seed. It is affiliated with Known-You Seed Co. of Taiwan and also has connections with Adams International, another Thai seed operation. Most of Known-You's production is centered in the northeast around Sakon Nakorn, but research and some production is done in the north at Chiang Mai. Production and marketing is under contract with local farmers who are supported by company extension agents providing needed technical information.

Accurate statistics for the company's exports and imports are not available due to its connections with other firms, but it is believed that Known-You commands a major share of the seed export volume and value. A copy of the firm's catalog variety and price list is attached as Appendix 9.

Cooperation with Nepal seed companies is of interest to Known-You and they are willing to provide varieties for testing.

### **3.5.7 Upjohn/Asgrow Seed Company**

Asgrow Thailand is a subsidiary of Asgrow USA, one of the largest seed companies in the world. Asgrow is owned by Upjohn, a multinational chemical and pharmaceutical firm. Asgrow's operations in Thailand are supported by the Upjohn parent company and are centered on producing hybrid tomato, cantaloupe, and melon seeds for export to the US. Most of the production is done in the Lam Nam Oon Irrigation Project in the northeast, but contract production in other areas of Thailand is also underway. In 1988/89, Asgrow wrote nearly 1,000 contracts totaling 755 rai (120 ha) at Lam Nam Oon. Their exports that year were 2,450 kg worth 4.8 million Baht (US\$188,000), mainly to the US.

Asgrow representatives were interested in Nepal's vegetable seed industry, but local managers are occupied with current operations and leave regional business development to senior managers. Information about seed production and exports from Nepal will be relayed to senior management for followup.

### **3.5.8 Adams International/Adams Enterprises**

Adams International and Adams Enterprises are part of a Chinese-Thai family agribusiness group that pioneered contract farming among small scale farmers in Thailand in several crops, including tobacco, processing tomatoes, and seeds. The company has strong

connections among the Chinese business community in Hong Kong, the PRC, Taiwan, and the US and owns several businesses in those countries.

With support from American consultants and Peto Seeds of the US, Adams introduced hybrid tomato production to Thailand at Lam Nam Oon in 1985. Their production grew quickly. It also proved to other firms, such as Known-You and Asgrow, that hybrid production was possible in Thailand. These firms quickly followed (with help from Adams in some cases) and have gradually surpassed Adams' strong start, mainly because of management changes and misdirection at Adams. With only 15 contracts on 7 rai (1 ha) at Lam Nam Oon in 1988/89, they have now hired a full time breeder with a PhD for work on peppers and other vegetables. The firm seems to be making a comeback.

In spite of their management problems, Adams exported over 4,650 kg of seed in 1988 worth 11.7 million Baht (US\$458,000). It is likely that Adams will remain a player in Thailand's seed and agribusiness industries. Whether or not they will continue their prominent role is uncertain. The company showed interest in cooperation with Nepal firms.

#### **3.5.9 Horthai Co. Ltd.**

Horthai is a local custom seed and research company operating mainly at Lam Nam Oon in the northeast. They have no direct affiliation with international companies but do contract with Thai farmers for export. Their main crops are hybrid and OP tomato seed, flower seed, and other commercial fruit and vegetable crops. Investments or cooperative arrangements with Nepal's seed business is not likely.

#### **3.5.10 Thai Seed Agriculture Co. (TSA)**

TSA is similar to Horthai as a small custom seed producer in the northeast. They operate mainly in Udorn Thani province and are known to produce for Sluis and Groot Seed Co. of the Netherlands, but have no direct affiliation with this or other international companies.

#### **3.5.11 Other Companies**

At least three other firms have been involved in the Thai vegetable seed industry through affiliation with other Thai or international seed companies. However, their activities are not extensive and little information is available about their current operations. The companies and their foreign affiliates are Universal Seed Co. (Asgrow); Devaporn Agriculture (partnership with Sluis and Groot, Netherlands); and Universal Agriculture (subsidiary of Adams International).

Two other seed local seed companies involved in tomato and melon seed production are Phion Kaset Co. Ltd. in Chiang Mai and Agro Seed Co. Ltd. in Sakok Nakhorn. Affiliations of these firms with foreign companies is unknown.

### **3.6 TRENDS IN THE THAI VEGETABLE SEED INDUSTRY**

As a result of meetings with public and private participants in the vegetable seed industry, several trends were noted.

1. There is increasing emphasis on productivity and quality. Higher prices for most crops, greater domestic purchasing power for high quality foods, and increasing land values, all brought about by more foreign investment and the resulting economic boom, have highlighted this need. As a consequence, more farmers are planting hybrids, many of which are imported. Seedsmen are relying on germplasm and better seed technology from many international sources to remain competitive.
2. Private companies, particularly multinationals with access to quality research and germplasm, are investing more in the seed industry. Their target markets are with species where hybrids have a clear advantage in the Thai domestic market, or in high value export markets such as melon and tomato seeds. The OP market receives relatively little research attention by these firms in the domestic market because of the lack of PVP laws.
3. Some OP species, such as leaf mustard, Chinese radish, Chinese cabbage, edible rape and Chinese kale, are exceptions. In these cases, some Thai firms are supplying OP parent seed to Australian, New Zealand, or US contract seed producers for multiplication. The seed is then imported back to Thailand for domestic sales. There is significant volume in this trade and it offers the best opportunities for Nepal seed exporters to tap the Thai market.
4. Greater private investment by foreign firms and introductions of improved germplasm and technology are making the industry more competitive and specialized, especially for long-established firms which have relied upon imported seed and brand recognition for their share of the market. This is gradually upgrading the entire seed industry and forcing participants to compete with better research and seed technology.
5. More competition with better varieties is resulting in greater product differentiation in the market. With many brands competing, seed companies are spending more money on marketing and promotion, with emphasis on quality and higher yields.

6. Thailand is gradually offsetting its large seed import bill with seed exports. Export volumes, mainly of morning glory and hybrid tomato and melon seeds, jumped three-fold between 1983-86 and 1988. Statistics on value are not complete, but show similar trends. It is unsure whether or not this trend can be maintained.

7. Hybrid tomato and melon production depends on skilled low-cost labor for hand pollination, which is now available in northeast Thailand. However, if labor costs escalate because of rapid industrial growth or competition for labor from other crops, it is conceivable that this production could shift out of Thailand to other Asian countries as fast as it entered. This situation brought Taiwan firms to Thailand. With other countries in Asia opening their doors to investment, seeking foreign exchange and promoting low labor costs, Thailand may have a difficult time holding onto this lucrative export trade in the future. If Nepal were to welcome foreign investment, and prove to be a workable and economically viable environment in which to produce hybrids, it could be well positioned to benefit from this emerging trend.

#### **4 THE OUTLOOK FOR MARKETING NEPAL-PRODUCED VEGETABLE SEED IN THAILAND**

There are six vegetables with open-pollinated seeds which Nepal may potentially be able to produce for the Thai market. These are leaf mustard, Chinese cabbage, Chinese radish, cauliflower, edible rape, and Chinese kale. The long-established Chinese-Thai seed companies such as Chia Tai, Seng Huat, and Chia Kwang Seng are the main buyers. Any interest in seed for trials or sales would best be directed to these firms. Tables 3 and 4 provide data on competitive suppliers and seasonality in 1988, a major volume import year.

##### **4.1 LEAF MUSTARD**

Annual imports of this seed have varied considerably, but average volume is nearly 30 Mt annually since 1983. Contract growers in the US, Australia, and New Zealand dominate sales and are able to supply Thai companies good quality at US\$1.50-2.50/kg. The Thai contractors supply the parent seed, so interested Nepal seed companies could contact them for seed for trials. As Table 4 indicates, February, June, and December were the main import months, so there appears to be no seasonal pattern. The crop is produced throughout the year in Thailand and is consumed as a vegetable for cooking.

#### **4.2 CHINESE CABBAGE**

Like leaf mustard, import volumes of Chinese cabbage, vary considerably but average over 30 Mt annually. The US, New Zealand, China, Denmark and Australia currently supply most of the imports at prices ranging from US\$1.50-2.80/kg. Parent seed is supplied for contract production and quality specifications are set by the importer in advance. In 1988, August, December, and February were the main import months. Production is year around in Thailand. The crop is consumed as a cooked vegetable.

#### **4.3 CHINESE RADISH**

Thai importers buy about 70 Mt of this seed each year, mainly from contract growers in Australia, New Zealand, China, and Taiwan. Australia and New Zealand supply most of the volume at prices of US\$1.50/kg or less. The preferred varieties are white types. Bangkok consumers prefer large diameter, longer varieties of 30 cm or more, but upcountry buyers like smaller diameter varieties. Planting is mainly from May until August and harvest is from December through March. In 1988, most of the seed was imported during the summer months of August, June, and September.

#### **4.4 CAULIFLOWER**

Most of Thailand's cauliflower imports are expensive hybrid varieties from the US, Taiwan, or Japan. Thai buyers expressed interest in large-headed OP cauliflower from Nepal if it was early-maturing (well under 6 months) and competitive in price. Early Patana varieties from India were popular in Thailand 20 years ago but Taiwan suppliers now provide most of the seed. June, July and August were the main import months in 1988.

#### **4.5 EDIBLE RAPE**

This crop is also consumed as a cooked vegetable and is grown throughout the year in Thailand. New Zealand, Chinese, Taiwanese, and Australian suppliers grow for Thai buyers and sell at US\$1.40-2.00/kg CIF Bangkok. Volume is about 40-50 Mt in most years, but can be variable depending on stocks available. There is little seasonality to imports. August, December, and July were the main import months in 1988.

**Table 3:  
Thailand's 1988 Imports of Five Vegetable Seed Species By Country**

Country Kale	Leaf Mustard			Chinese Cabbage			Chinese Radish			Cauliflower			Edible Rape			Chinese		
	kg	Baht	\$/kg	kg	Baht	\$/kg	kg	Baht	\$/kg	kg	Baht	\$/kg	kg	Baht	\$/kg	kg	Baht	\$/kg
USA	28,179	1,398	1.94	5,327	381	2.80	6,179	342	2.17	1,570	329	8.22	7,809	443	2.22	38,803	2,065	2.09
China	3,521	403	4.49	4,570	217	1.86	24,278	1,423	2.30	-	-	-	30,909	1,245	1.58	4,250	217	2.00
Taiwan	602	115	7.48	2,641	314	4.56	17,199	992	2.26	6,799	3,103	17.90	19,252	1,070	2.18	37,811	2,933	3.04
Japan	-	-	-	8,916	9,571	42.10	4,362	3,829	34.42	1,509	3,111	80.85	110	73	26.02	-	-	-
Australia	14,305	905	2.48	3,404	109	1.26	33,332	1,231	1.45	-	-	-	10,020	391	1.53	42,028	1,706	1.59
New Zealand	5,744	202	1.38	21,054	803	1.50	57,405	2,094	1.43	-	-	-	36,421	1,142	1.23	29,962	1,153	1.51
Denmark	-	-	-	2,625	135	2.02	-	-	-	-	-	-	4,732	134	1.11	4,513	232	2.02
Italy	-	-	-	-	-	-	14	1	2.80	-	-	-	177	2	0.44	-	-	-
Korea	-	-	-	901	734	31.95	-	-	-	-	-	-	-	-	-	-	-	-
Hong Kong	400	56	5.49	72	19	10.35	-	-	-	-	-	-	-	-	-	250	17	2.67
Total	52,571	3,079	2.30	49,510	12,283	9.73	142,769	9,912	2.72	9,878	6,543	25.96	109,430	4,500	1.61	157,617	8,325	2.07

Source: Seed Regulatory Div., M.O.F.

Note: US\$1.00 = 25.5 baht

**Table 4:**  
**Major Seed Import Months, Volumes and Values of Selected Crops, 1988**

Items	Various Months			
Leaf Mustard		February	June	December
	Quant (kg)	20,429	14,638	7,371
	Value (US\$)	917,932	909,462	649,498
	\$US/kg CIF.	1.76	2.54	3.46
Chinese Cabbage		February	August	December
	Quant (kg)	5,921	18,601	8,314
	Value (US\$)	3,250,092	1,159,449	909,586
	\$US/kg CIF.	21.52	2.44	4.29
Chinese Radish		June	August	September
	Quant (kg)	19,236	63,253	16,014
	Value (US\$)	1,541,841	2,673,246	1,581,408
	\$US/kg CIF.	3.14	1.66	3.87
Cauliflower		June	July	August
	Quant (kg)	1,995	2,191	3,461
	Value (US\$)	831,547	887,974	3,497,802
	\$US/kg CIF.	16.35	15.89	39.63
Edible Rape		July	August	December
	Quant (kg)	19,927	41,644	23,792
	Value (US\$)	753,719	1,770,435	1,120,708
	\$US/kg CIF.	1.48	1.67	1.85
Chinese Kale		June	August	December
	Quant (kg)	39,716	22,482	27,127
	Value (US\$)	2,152,163	1,292,270	1,561,853
	\$US/kg CIF.	2.12	2.25	2.26

Source: Seed Regulatory Div., M.O.F.

Note: US\$1.00 = 25.5 baht

#### **4.6 CHINESE KALE**

Chinese Kale is one of the largest volume seed imports to Thailand. The crop is grown in about 50 days and produced throughout the year. It is consumed as a fresh vegetable. To produce large amounts of good quality seed, the crop requires 30-40 days with temperatures of about 10 degrees Celsius at flowering. Contract growers and exporters in the US, Australia, New Zealand, and China supply most of the seed. The Australian season is from June/July through December/February and the US season is from April until August/ September. Annual imports are usually over 100 Mt, but like the above crops, this can vary depending on how much stock Thai buyers are holding. Import prices are usually under US\$2.00/kg CIF Bangkok. June, December, and August were the main import months in 1988.

### **5. SUMMARY AND RECOMMENDATIONS**

The following recommendations are made to encourage seed trade between Nepal and Thailand and to support the continued development of the Nepal seed industry:

#### **5.1 STRIVE TO LOWER PRODUCTION COSTS AND IMPROVE QUALITY**

It is clear from discussions with Thai seed importers for Nepal-produced seeds are nearly twice as expensive as supplies from Australia, New Zealand, the U.S. and other sources. In fact, farmgate prices in Nepal are about on par with CIF Bangkok prices from these other countries. In order to penetrate the Thai market, Nepal's prices must be lowered. Lowering production costs and international transportation costs appear to be the quickest routes to accomplish this.

Nepal seed companies may want to observe their Thai counterparts, particularly the tomato and melon seed companies, for ways to work with farmers to cut farm prices yet maintain incomes through higher yields. More use of fieldmen, grower training sessions, as well as conducting trials and providing better quality stock seed would be useful.

Reducing transport costs may be beyond the control of seed suppliers and is recognized as being a major internal problem in Nepal. However, any reductions through lower air freight, or possibly a land-sea freight combination, would help. Perhaps the industry could unite on this issue and work with government and transport agencies to obtain more competitive freight rates.

Similarly, although it was beyond the bounds of this study, Nepal should look carefully at its exchange rate and the availability of foreign currencies. To the extent that the Nepal rupee might be overvalued or not readily exchangeable, this would make Nepali seed less competitive in Thai markets. Maintenance of appropriate exchange rates is an important government contribution to developing international competitiveness.

Improvement of quality is also essential. Better support to farmers to improve yields would pay dividends in better quality. Machine grading using low-cost, small-scale cleaners like those seen at Hsin Seeds would

## APPENDIX 1

### Thailand Vegetable Seed and Commodity Market Study

Travelers:	Mrs. Jamuna Kayastha, NFC Seed Co., Kathmandu Mr. Tim Welsh, AgriSource Ltd., Bangkok
January 9	Arrival in Bangkok
January 10	Orientation, review of project objectives, plan research
January 11	Mr. Pong Marutalart, Chia Kwang Seng Seed Co., Bangkok Pak Klong Talad Vegetable Market, Bangkok Mr. Mogens Lemonius, FAO Regional Seed Specialist, Bangkok Department of Agricultural Extension Seed Division, Bangkok Department of Agriculture Plant Pathology Division, Bangkok
January 12	Marketing Organization for Farmers, Bangkok Rangsit Vegetable and Fruit Market, Bangkok Asian Institute of Technology, Bangkok
January 13	Visits to other Bangkok area markets
January 14	Free day
January 15	Department of Export Promotion, Bangkok Bangkok retail seed and vegetable shops
January 16	Travel to Chiang Mai
January 17	East-West Seed Co. Prapat Fruit Farm Known-You Seed Co.
January 18	Sae Ua Seed Co. retail shop Wararot Vegetable Market Seed Division Seed Center No. 7
January 19	Royal Projects Vegetable Packing House Chiang Freight Forwarders
January 20	Known-You Seed Co. Research Farm
January 21	Free day
January 22	Return to Bangkok
January 23	Mr. Somsak Srirawewongsa, Seng Heng Huat Seeds, Bangkok Travel to Sakon Nakhon Meet with Lam Nam Oon Irrigation Project staff; tour Asgrow Seed Co.
January 24	Travel to Bangkok via Khon Kaen Hsin Seed Co., Khon Kaen Saengsawang Machine Shop, Khon Kaen Adams International Seed Co.
January 25	Report writeup/followup data collection
January 26	Report writeup/followup data collection
January 29	Team departure

## APPENDIX 2

### LIST OF THAI VEGETABLE SEED COMPANIES CONTACTED

Company Name	Contact Person	Title	Address/Tel/Fax/Telex
Adams International	Wing F. Chung	Vice Chairman	Adams International Bldg., P.O. Box 844 5/26-29 Saladaeng Rd. Silom Bangkok 10500 Tel: 2341577, 2341494, 2334886, 2335092, 2339818, 2339819 Telex: 82792 ADAMINT TH
Asgrow Seed Co. (Upjohn)	Visut Chompradit	Production Manager	White Group Bldg. 6th floor 75 Soi Rubia Sukhumvit 42 Bangkok Tel: 3811363-5, 3901377-8, 3918064-5
Chia Kwang Seng R.O.P.	Pong Marutaralet	Managing Director	29 Soi Thaklang Ban Moh Sai Nai, Pak Klong Talad Bangkok 10200 Tel: 2216988, 2216027, 2232074, 2232075 Fax: 2256930 Telex: 87682 LIONSEEDS TH
Chia Tai Co., Ltd.	Vinich Chuanchai	International Manager	299-301 Songsawad Rd., Bangkok 10100 Tel: 2338191-9 Telex: 82015 CHIATAI TH
East-West Seed Co.	Peter La Ramee Simon Groot Simon J. de Hoop Chantravipha Dhanasobhon	Deputy Managing Director Managing Director Research & Development Manager General Manager	P.O. Box 3, Bang Bua Thong Nonthaburi 11110 Tel: (01) 2112781 Fax: (02) 2366025 Attn: East-West Telex: 22109 ASTAR TH Attn: East-West
Horthai Co., Ltd.	Somkiat Chankrachang	Managing Director	71/12 Soi Pongdamri 3 Ngamwongwan Rd. Bangkok 10210 Tel: 5895074
Hsin Seeds Co., Ltd.	Watcharawut Sawamis	General Manager	No. 231/15 Soi Yimsiri Srichan Rd. Khon Kaen 40000 Tel: (043) 236374 Fax: (043) 241659
Known-You Seed Co., (Thailand) Ltd.	Cheng Shi-Kuen	General Manager	72/6 M001 Rimclongchonpratan Rd., Chang Puak Amphur Muang, ChiangMai 50000 Tel: (053) 211810, 217180 Fax: (053) 217181
Seng Heng Huat Ltd., Part	Somsak Srirawewongsa	Managing Director	64 Chakrapetch Rd. Pak Klong Talad, Bangkok 10200 Tel: 2237636, 2217524 Fax: (662) 2258358
Thai Seed Agriculture Co.	Chamrian Nilprapai	Manager	Bangkok Tel: 5113446

23

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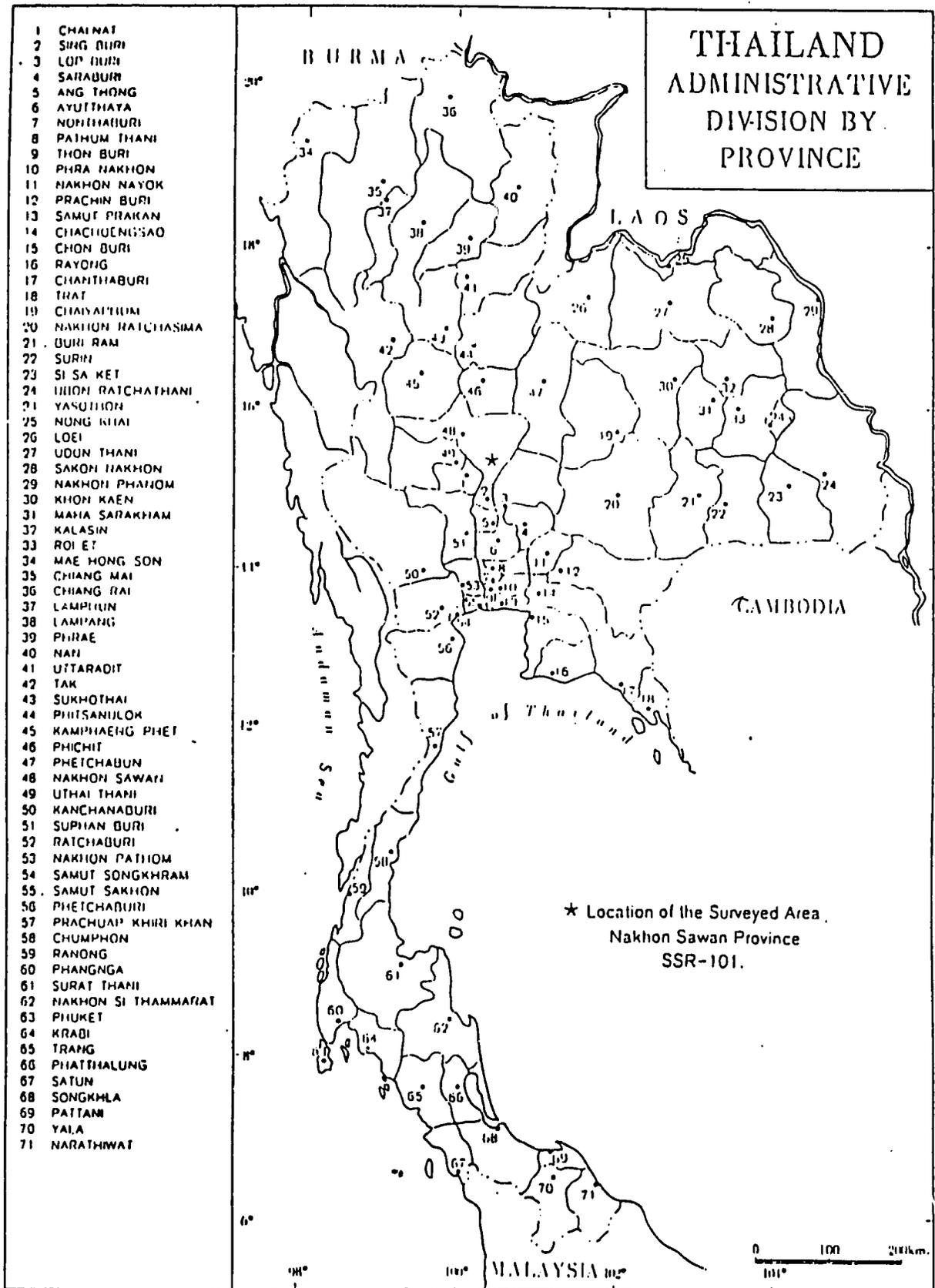
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# APPENDIX 3



25

## APPENDIX 4

### Seed Club Committee (1988-1990)

Names	Office	Telephone
Mr.Phetcharat Wannapee	Sub-director of DOAE	Off: 5793021 Home: 5395422-3
Mr.Chunhatap Pongsaroyphet	Dir. of Plant Propagation (DOAE)	Off: 5793009 Home: 5102744
Mr.Kaingsak Suwantharadol	Ciba-Geigy Co.Ltd.	Off: 5511046, Takli (056)261854
Mr.Pong Marutaralerns	Cheay Kuang Sang Coor.Ltd.	Off: 2216933,2216027, 2232074-5
Mr.Sukasani Chettasing	Pacific Seeds Co.Ltd.	Off: 2350880-4 (036)266097, 266316-9
Mr.Sakhon Trephetpisal	Cargill Seeds Co.Ltd.	Off: 2601170,2530520
Mr.Sumathi Deayosani	CP Produce. Co.Ltd.	Off: 2119463-4
Mr.Chuchat Tun-angsadul	Uniseeds Co.Ltd.	Off: 3740083-5
Mr.Vinit Chunchai	Chia Tai Co.Ltd.	Off: 2338191 Home: 4124198
Miss.Chantaravipa Tanasopon	East-West Seeds Co.Ltd.	Off: 2112731 Home: 2713399
Mr.A-nage Silapapun	Charoen Tanyapreech Co.Ltd.	Off: 2111561 Home: 5130509
Mr.Sompong Mc-clary	Malpro Co.Ltd.	Off: (056)261354 Home: 5511046
Mr.Kritis Chit-e-sial	Bangkok Seeds Industry Co.Ltd.	-
Mr.Thavesak Pue-halum	Pioneer Overseas Co.Ltd. Ext.117	Off: (036)221666
Mrs.Changchant Daungpatta	Fac. of Agronomy Kasetsart University	Off: 5793130 Home:5132183
Mr.Suphot Faengfupong	Fac. of Agronomy Kasetsart University	Off:5793130 Home: 5770460
Mr.Sarun Wantanachariya	Dept. of Agriculture Economy, Kasetsart University	Off: 5791544 Home: 5105021
Dr.Sutavee Supprakran	Dept. of Horticulture Kasetsart University	Off:5790303 Home: 5791951
Mr.Charun Wgansanit	Plant Propagation Center 2 Nakhonratchasima	Off: (046)244859 Home: 4120952
Mr.Kasam Tunsatun	Plant Propagation Center 3 Lampang	Off: (045)218865
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Mr.Chuavalit Saongkhobol	Plant propagation Center 6 Phattalung	Off: (074)611792-3

## APPENDIX 5

### Seed Standards for Extension Seed Sold to Farmers by the Seed Division

Crop	Germination	Pure seed	Inert matter	Other seed	Moisture content (Max %)		Shelling
	Min %	Min %	Max %	Max %	Open	Sealed	Min %
<b>FIELD CROPS</b>							
Rice	80	98	2	0.2	14	-	-
Corn	75	98	2	0.2	13	-	-
Sorghum	75	97	3	0.2	13	-	-
Mungbean	75	98	2	0.2	12	-	-
Soybean	70	97	3	0.5	12	-	-
Peanut	70	95	5	0.2	10	-	70
Cotton	70	98	2	0.2	12	-	-
<b>VEGETABLES</b>							
Sweet Corn	75	98	2	0.5	10	8	-
Sweet pea	75	98	2	0.5	11	7	-
Yard long bean	75	98	2	0.5	11	7	-
Chilli	60	98	2	0.5	10	6	-
Tomato	75	98	2	0.5	10	5.5	-
Eggplant	70	98	2	0.5	10	6	-
Chinese radish	75	98	2	0.5	10	5	-
Chinese cabbage	75	98	2	0.5	10	5	-
Chinese kale	75	98	2	0.5	10	5	-
Broccoli	80	98	2	0.5	10	5	-
Lettuce	75	98	2	0.5	10	5.5	-
Kang kong	60	98	2	0.5	10	6	-
Cucumber	75	98	2	0.5	10	6	-
Watermelon	75	98	2	0.5	10	6	-

## APPENDIX 6

### SEED DISTRIBUTION, 1984-1986

YEAR	CROP	SEED IN STOCKS (kg)	SEED SOLD		DISTRIBUTION CHANNELS					
			AMOUNT (kg)	VALUE (baht)	CHIANG MAI SEED CENTER		ORDER THROUGH SEED DIVISION		USED AS STOCK SEED	
					kg	% <sup>1/</sup>	kg	%	kg	%
<b>FIELD CROP</b>										
1985	TOTAL	270,450 <sup>2/</sup>	270,450	1,890,039	140	0.1	269,160	99.5	1,150	0.4
1985	RICE	270,450 <sup>2/</sup>	270,450	1,890,039	140	0.1	269,160	99.5	1,150	0.4
1986	TOTAL	811,061	811,061	8,338,728	1,000	0.1	782,356	96.5	27,705	3.4
	RICE	357,625	357,625	2,503,375	0	0.0	357,625	100.0	0	0.0
	SOYBEAN	453,436 <sup>3/</sup>	453,436	5,835,353	1,000	0.2	424,731	93.7	27,705	6.1
<b>VEGETABLE</b>										
1986	TOTAL	3,505.1	2,473.6	138,121.3	917.6	37.1	1,272	51.4	284	11.5
	SWEET PEA	313.0	163.0	6,630.0	153.0	93.9	0	0.0	10	6.1
	YARDLONG BEAN	553.0	140.5	24,547.0	140.5	100.0	0	0.0	0	0.0
	TOMATO	29.0	0.1	40.0	0.1	100.0	0	0.0	0	0.0
	GREEN PAK CHOY	84.5	0.5	27.0	0.5	100.0	0	0.0	0	0.0
	CHINESE RADISH	25.8	4.5	28.3	0.5	11.1	0	0.0	4	83.9
	SWEET CORN	2,477.0	2,165.0	106,849.0	623.0	28.8	1,272	58.8	270	12.4
	EGGPLANT	5.8	0.0	0.0	0.0	0.0	0	0.0	0	0.0
	CHILLI PEPPER	17.0	0.0	0.0	0.0	0.0	0	0.0	0	0.0

1/ = % of amount sold

2/ and 3/ = including 80,000 and 139,221 kg extra purchase for emergency projects

# APPENDIX 7

## DOAE VEGETABLE SEED STANDARDS

CROP	SEED CLASS	GERMINATION (MIN %)	PURE SEED (MIN %)	INERT MATTER (MAX %)	OTHER SEED (MAX %)	MOISTURE (MAX %)	
						AIR DRY	SEALED
1. CHINESE RADISH CHINESE KALE PAK CHOY BROCCOLI	CONTRACTED	85	96	4	0.5	12	-
	EXTENSION	80	98	2	0.5	10	5
2. YARDLONG BEAN SWEET PEA	CONTRACTED	85	96	4	0.5	15	-
	EXTENSION	80	98	2	0.5	11	7
3. WATERMELON CUCUMBER	CONTRACTED	85	96	4	0.5	15	-
	EXTENSION	80	98	2	0.5	10	6
4. SWEET CORN	CONTRACTED	80	96	4	0.5	12	-
	EXTENSION	75	98	2	0.5	10	8
5. LETTUCE TOMATO	CONTRACTED	80	96	4	0.5	12	-
	EXTENSION	75	98	2	0.5	10	5.5
3. CHILLI PEPPER EGGPLANT	CONTRACTED	75	96	4	0.5	12	-
	EXTENSION	70	98	2	0.5	10	6
4. WATER CONVOLVULUS	CONTRACTED	75	96	4	0.5	15	-
	EXTENSION	70	98	2	0.5	10	6

16

## APPENDIX 8

### SEED LAW AND REGULATIONS

The Seed Act is an act to regulate the selling or exposing for sale of all agricultural seeds and to provide for the inspection thereof; name the enforcing agent and prescribe its duties; to fix penalties for the violation of this act.

The duty of enforcing this act and its provisions and requirements shall be vested in the Minister for Agriculture and Cooperatives, who shall have the authority to establish rules and regulations not inconsistent with the provisions of this act, and is hereby authorized to employ such agents and persons as in this judgment shall be necessary therefor.

The act shall take effect and be in force one day after being notified in the Government Gazette.

There are 8 chapters in the Seed Act:

1. Seed Committee
2. Controlled Seed Application and Issuance
3. Controlled Seed License Owner's Duties
4. Seed Certification and Control
5. Seed Inspector
6. Cancellation of License
7. Seed Statistics
8. Penalty

#### SEED ACT B.E. 2518 (A.D.1975)

Whereas, it is deemed expedient to establish a law on seeds.

Section 1. This Act is named as "Seed Act of 2518 B.E."

Section 2. This Act shall come into force one day after being notified in the Government Gazette.

Section 3. In this Act,

"Seed" means plant or any part of plants that can be propagated as seed source such as whole plant, stem, shoot, cone, branch, twig, bud, root, tuber, flower, fruit or seed which can be reproduced sexually or asexually

"Controlled Seed" means any seed which is officially notified as controlled seed by the Minister.

"Certified Seed" means any seed which were tested, checked or analyzed for their quality or properties and for which the Director-General has issued a certificate.

"Label" includes any picture, mark or wording shown on the container.

"Container" means any material used for holding or packing the seed.

"Aggregating" means collecting seed for selection or packing in the container.

"Sale" means to sell, distribute or exchange for the purpose of trading, and to have such seed for sale.

"Import" means to bring in or order any seed into the Kingdom.

"Export" means to take or to send seed out of the Kingdom.

"Bringing in transit" means bringing or sending through the Kingdom, of seed for the purpose of unloading or transshipment.

"Premise" means the place, building, part of the building, or the site of the building.

"Committee" means the Seed Committee.

"Seed Inspector" means a person appointed by the Minister for the execution of this Act.

"Director-General" means the Director -General of the Department of Agriculture.

"Minister" means the Minister taking charge and control of the execution of this Act.

Section 4. This Act shall not be applied to:

(1) Government Agencies under the Ministry of Agriculture and Cooperatives.

(2) The seller of controlled seed in the container packed by the license for the sale of such seed, and the selling of which is done without opening the container.

Section 5. The Minister of the Ministry of Agriculture and Cooperatives shall take charge and control of the execution of this Act, empowered to appoint Seed Inspectors, to issue Ministerial Regulations, prescribe fees not exceeding the rates annexed hereto, grant exemptions, and prescribe other activities for carrying out this Act.

Such Ministerial Regulations shall become effective upon their publication in the Government Gazette.

## CHAPTER I

### SEED COMMITTEE

Section 6. There shall be a committee named "Seed Committee" consisting of the Permanent Secretary of State of the Ministry of Agriculture and Cooperatives as chairman, Director-General of the Department of Agriculture, Director-General of the Department of Agriculture Extension, and nine qualified persons appointed by the Minister as Committee members, and the Chief of the Agricultural Regulatory Division as a Committee member and Secretary.

Section 7. The Qualified Committee members shall hold office for a term of two years, but may be reappointed.

Section 8. Qualified Committee members shall vacate office upon:

1. Death
2. Resignation
3. Being removed by the Minister
4. Being declared bankrupt
5. Being legally declared an incompetent person or like an incompetent person.
6. Having been sentenced by the final judgment of a court to a term of imprisonment, unless the misdeed was a light or negligent sentence.

When the qualified Committee members vacates office before his term expires, the Minister may appoint another to replace him; that person shall hold office for the remaining term of the person he replaces.

Section 9. Not less than half of the committee members must be present in order for the meeting to be considered official. If the Chairman of the committee is not present or cannot perform, Committee members present will elect a member as Chairman to replace him. The final decision of the meeting shall be based on majority vote. Each Committee member has one vote; in case of tie votes, an additional vote from the Chairman is required.

Section 10. The Committee has the authority to appoint Sub-committees for the purpose of study, research or to action any seed under scrutiny. Section 9. shall be implemented *mutatis mutandis* on meeting procedures of the Sub-committee.

Section 11. The Committee shall have the authority to:

- (1) propose the control, promotion, and announcement of seed to the Minister.
- (2) give suggestion or advice to the Minister in the matter of seed.

## CHAPTER II

### LICENSE CONCERNING CONTROLLED SEED

Section 12. The Minister shall have the authority to publish prescriptions for the kind and name of seed to be controlled, in the Government Gazette.

- Section 13. For the purposes of implementation concerning controlled seed, the Minister shall be empowered to publish in the Government Gazette to
- (1) prescribe the license under Section 17(1), (2) or (3) to declare the kind, name and quantity of controlled seed aggregated and the sources thereof,
  - (2) prescribe the standard, quality, storing or preserving of controlled seed in order for the licensee to comply with Section 17(1), (2), (3), or (4),
  - (3) prescribe the kind and ratio of the material constituting used, mixed, or blended in controlled seed in order for the licensee to comply with Section 17(1), (2), (3), or (4),
  - (4) specify any dangerous chemical compound mixed with controlled seed by specifying the common and chemical names and the ratio of occurrence of that chemical compound in order for the licensee to comply with Section 17(1), (2), (3), or (4),
  - (5) specify the kind and name of controlled seed to be packed in a container, the material of the container, and the process for packing controlled seed in order for the licensee to comply with Section 17(1), (2), (3), or (4),
  - (6) prescribe the licensee under Section 17(1), or (2) to aggregate for sale only certified controlled seed
  - (7) specify the kind and quality of controlled seed permitted for import.

For publication under this Section, the enforcement period must be not less than 60 days from the date of publication.

- Section 14. It is forbidden to aggregate, sell, import, export or bring in transit controlled seed for trade, unless a license therefore has been obtained from the seed inspector. Controlled seed shall be aggregated at the place specified in the license. Application and issuance of license will follow the rules, procedures and conditions designated in the Ministerial Regulations. This article shall not be applicable to the controlled seed grower who sell such seed to the licensee for storing, trade, or to other growers who privately cultivate such seed.

- Section 15. When the Minister has published the kind and name of a seed as "controlled seed" under Section 17, the person who aggregates, sells, imports, exports or brings in transit such controlled seed for business transaction shall file an application for license under Section 14 within ninety days from the date of publication. During the intervening period, he can carry out business transactions, and when the application for license had been submitted he can continue business transaction until the seed inspectors disapproval is made, and then may bring the provisions under Section 15 into force mutatis mutandis.

- Section 16. The seed inspector shall issue a license for aggregating, selling, importing or exporting controlled seed for business transaction when it appears that the license holder is:
- (1) adequate to carry out the business;
  - (2) not less than twenty years old;
  - (3) residing in and running a business office in Thailand;
  - (4) not insane, incompetent or quasi-incompetent;
  - (5) has a suitable place for aggregating, selling, importing or exporting controlled seed in accordance with the application submitted for the license;
  - (6) the name used in the business transaction is not a copy of, or similar to, that used in business transactions of another license owner, or a person whose license was suspended or revoked before completing two years.

In the case of a juristic person applying for license, he must have the qualifications prescribed in (1), (3), (5) and (6) above, and also have an operator whose qualifications comply with (2), (3) and (4) above.

- Section 17. Types of license for dealing in controlled seed are:
- (1) license for aggregating controlled seed for trade,
  - (2) license for selling controlled seed,
  - (3) license for importing controlled seed for trade,
  - (4) license for exporting controlled seed for trade,
  - (5) license for shipping controlled seed in transit for trade.

It must be specified if the licensee under (1), (3) or (4) is also the licensee under (2) for his own aggregated, imported and exported controlled seed, as the case may be

- Section 18. The license issued under to Section 17 also covers employees or representatives of the licensee owner.  
It must be specified if the operations of the licensee owner's employee or representative, according to paragraph one above is acting for the licensee owner, with the exception that such operations were beyond the knowledge or control of the licensee owner.
- Section 19. The license under Section 17 shall be valid until the end of the calendar year in which it is issued, unless the license for import, export or shipment of controlled seed in transit for trade is for a certain period of time specified in the license, which shall not be more than one year from the date of issue of the license. If the licensee owner wishes to renew his license, he must apply for renewal before its expiration date. After application for the license, he may operate his business until the seed inspector refuses to renew his license.  
The renewal and issuance of the license shall follow the rules, methods and conditions designated in the Ministerial Regulations.
- Section 20. In case of the refusal to issue or renew a license by the seed inspector, the applicant can appeal in writing to the Minister within thirty days after the date of refusal of his application. The Minister's decision thereupon shall be final.  
In case of the seed inspector's refusal to renew a controlled seed license for trade or sale, the Minister has the power to permit his operations to continue temporarily after receiving his appeal.

### CHAPTER III

#### DUTIES OF THE LICENSE OWNER OF CONTROLLED SEED

- Section 21. It is forbidden to:
- (1) pack controlled seed in containers outside the place designated in the license; or
  - (2) sell controlled seed in containers that differ with the label.
- Section 22. The owner of a license for trading aggregated controlled seed shall perform as follows:
- (1) Provide a visible and clear signboard in front of the site used for aggregating controlled seed. Design, size and wording of the signboard must be in accordance with instructions in the Ministerial Regulations
  - (2) Provide a label in Thai on each container or package of aggregated controlled seed. Label shall include:
    - (a) Kind and name of controlled seed, and have the words "controlled seed";
    - (b) Controlled seed trade mark;
    - (c) Name of aggregator and the place the seed are aggregated;
    - (d) Net weight of controlled seed, in the metric system;
    - (e) Percent germination with date of inspection;
    - (f) Month and year of aggregation or import of the seed;
    - (g) Expiration month and year of validity of the germination test;
    - (h) If the controlled seed contains foreign matter, notification of name and proportion of the foreign matter must be provided;
    - (i) If controlled seed contains any toxic substance as described under Section 13, the name and proportion of such toxic substances must be notified, with SKULL & CROSS BONES SIGN including the warning word "DANGER" in red letters;
    - (j) Other informations which the Minister consider to be relevant to include on the label, and which is announced in the Government Gazette
- Section 23. The licensee owner for trading imported controlled seed shall perform as follows:
- (1) Display visibly and publicly a signboard indicating the offices where his controlled seed are imported. Type, size and wording of the signboard shall be in accordance with Ministerial Regulations;

- (2) Deliver a certificate of the aggregator from the source country of the aggregated controlled seed, to the seed inspector in accordance with the form and within the period prescribed by the Minister in the Government Gazette;
- (3) Deliver a sample of each lot of controlled seed imported in an appropriate quantity to the seed inspector for analysis for the purpose, and within the period prescribed by the seed inspector;
- (4) Provide labels on containers of controlled seed imported under Section 22 (2). In case the owner of the license for importing controlled seed for trade is himself packing some of the seed in the containers, the containers must be labelled in accordance with provisions of Section 22 (2) herein.

Section 24. The owner of a license for sale of controlled seed shall:

- (1) Have a signboard outside the building to conspicuously show that this is the place where controlled seed are being sold.  
Type, size and wording of the signboard shall be in accordance with Ministerial Regulations;
- (2) Take care to ensure that labels on containers of seed controlled under Section 22 (2) are complete and clear;

Section 25. The license owner must display the license or interim license in a conspicuous place in the building specific in the license.

Section 26. In case his license is lost or destroyed, the license owner must report to the seed inspector and apply for a reprint within fifteen days after it is known that the license is lost or destroyed. Application and issuance of the reprint will be in accordance with rules, and regulations, methods and conditions of the Ministerial Regulations.

Section 27. It is forbidden to transfer the following without the consent of the seed inspector: the office where controlled seed for trade are aggregated, the office where such seed are sold, the office where such seed are imported, the office where such seed are exported, or the storehouse for controlled seed  
Application and issuance of authorization for such transfer shall be in accordance with regulations, methods and conditions of the Ministerial Regulations.

## CHAPTER VI

### SEED CERTIFICATION AND CONTROL

Section 28. Any person desiring to have a certificate for any kind of seed specified under this Act, shall submit an application by giving the name of the seed and at the same time sending a sample with details of the seed to the seed inspector so that a test or analysis can be made thereon. Application for issuance of such certificate, and its issuance, providing the name of the seed, and delivering the sample and details, shall be in compliance with rules, methods and conditions prescribed by the Minister in the Government Gazette.

Section 29. The Minister is empowered to announce in the Government Gazette prescribed for the kind and name of any seed to become conserved seed.

Section 30. No person shall export conserved seed, unless he is permitted in writing by the Minister, and then only for technical experimentation or research.

Section 31. The Minister shall have the power to publish in the Government Gazette the prescription that no person shall deliver or export any kind or amount of conserved seed outside any locality, or deliver or export such seed to any locality in the Kingdom, unless written permit is received from the seed inspector.  
The application and issuance of a license shall be in accordance with rules, methods and conditions of Ministerial Regulations.

Section 32. The Minister shall have the authority to publish in the Government Gazette prescriptions for designating the kind and name of any seed as prohibited seed.

Section 33. No person shall import contraband seeds.

- Section 34. The following types of seed shall be deemed as deteriorated seed:
- (1) Seed whose period of validity for the labelled germination test date has expired;
  - (2) Seed which has quality below the standards prescribed by the Minister under Section 13.
- Section 35. Seed or counterfeit seed of the following type shall be regarded as fake:
- (1) Seed which is totally or partially counterfeited for the purpose of deceiving or making others believe it to be genuine seed;
  - (2) Seed Showing kind, species, trademark, aggregating source or date of aggregating or importation, which are contrary to fact;
  - (3) Seed which contains other seed kinds or element in excess of the amount declared on the label, or in excess of that permitted under Section 13 by the Minister.
- Section 36. No person shall aggregate, sell, import or export deteriorated seed.
- Section 37. No person shall aggregate, sell, import or export imitation seeds.
- Section 38. No person shall publicize untrue or exaggerated quality of controlled seed for the purpose of deceiving or misleading others regarding the quality of the seed.

## CHAPTER V

### SEED INSPECTORS

- Section 39. In the execution of their duties, seed inspectors are empowered to summon any make statements in writing or produce documents or materials for the purpose of making necessary consideration, to enter during the office hours, the place where controlled seed are aggregated, sold or stored for trade, or enter a vehicle loaded with seed when there is a cause for suspicion that this Act is being violated, in order to:
- (1) Inspect the seed, containers, labels, account books or any other evidence relating to the seed;
  - (2) take a moderate quantity of seed or materials suspected to be fake or deteriorated as a sample for testing, checking or analyzing;
  - (3) search, seize or attach seed, containers, labels, account books or any document relating to the seed.
- In the execution of his duties under sub-paragraph one of this Section, the license owner and those involved shall provide conveniences as befits the situation.
- Section 40. In making a search, seed inspectors must try as much as possible not to cause any damage and scattering.
- Section 41. Items seized in a search shall be packed or wrapped, and clearly marked or stamped.
- Section 42. Prior to making a search of a place or vehicle under Section 39, the searching inspector shall demonstrate that he is impartial and the search shall be made in the presence of the license owner, the occupant of the place, individual (s) working in that place or the occupant of the vehicle; or if such persons are not available, the search shall be made in the presence of at least two other persons requested by the inspector to witness the search. Anything seized or attached shall be seen by the license owner, the occupant of the place, persons working in that place, occupant of the vehicle or witness, whatever the case, in order to confirm that the items was seized in a search of the place or vehicle thereof. If the said person dose not approve the seed inspector making the search shall make the necessary records.
- Section 43. The search inspector shall record particulars of the search made and make a detailed list of items searched, seized or attached. The record of such search and the listing mentioned under paragraph one of this Section shall be read to the license owner, the occupant of the place, persons working in that place, occupant of the vehicle or witness, as the case may be, and such person shall affix his signature of approval. If the affixing of signature for approval is denied, the searching inspector shall make the necessary records.

**Section 44.** In the execution of these duties, the seed inspectors shall show their identification cards to the concerned persons listed under Section 42.

The identification card of the seed inspector shall be in compliance with the form prescribed under Ministerial Regulations.

**Section 45.** Seed containers, labels, account books or any other documents seized or attached under Section 39 (3), if no owner or possessor thereof, appears, or the public prosecutor ordered decisively not to prosecute or not to be confiscated by order of final judgement of the Court, and the owner or the occupant did not request its return within ninety days from the date the items were seized or attached, or from the date the decisive order not to prosecute or from the date the Court made final judgement not to confiscate the items, whatever be the case, shall become the property of the Department of Agriculture to dispose of as it seems appropriate.

## CHAPTER VI

### NULLIFICATION AND CANCELLATION OF THE LICENSE

**Section 46.** When it is clearly indicated to the seed inspector that the license owner does not comply with this Act, or the Ministerial Regulations or Announcements under this Act, the inspector is empowered to nullify the owner's license for a period of not more than 120 days at one time. The license owner whose license is nullified and his operations discontinued for whatever cause, shall not apply for new license under this Act.

**Section 47.** The seed inspector, with the approval of the Director-General, is empowered to cancel the license ahead of the specified time, when it is satisfactorily demonstrated that the license owner whose license was nullified has acted in compliance with the Act, or the Ministerial Regulations or Announcements under the Act.

**Section 48.** When it is clearly indicated to the Director-General that the license owner lacks qualifications in any item of Section 16, or it appears that the license owner has committed many offences under this Act, or has committed a single severe offence, the Director-General is empowered to cancel the said license.

The owner whose license is being canceled and who can continue operations under this Act, cannot apply for a new license within a period of two years after the date of cancellation of the license. The seed inspector, by his own judgement, may or may not grant a new license.

**Section 49.** Nullification and cancellation notices shall be sent to the license owner. In case of unavailability of the license owner, the notice shall be posted publicly at the place designated in the license, which shall be considered as officially effective and known to the license owner at the time of the posting.

**Section 50.** The license owner whose license is being nullified or canceled has the right to appeal to the Minister within 30 days after notification. The Minister is empowered to disregard the appeal or to change for the benefit of the license owner the notification made by the seed inspector or the Director-General.

The Minister's decision is final.

The appeal cited in the paragraph one of this section does not reduce the effectiveness of the notice of nullification or cancellation, prior to the decision of the Minister.

**Section 51.** The license owner whose license is being nullified can sell his remaining controlled seed to other license owners or any other qualified person approved by the seed inspector within 60 days after the date of notification or of the Minister's decision, unless the seed inspector extends the time therefor; however, such extension must not be for more than sixty days.

## CHAPTER VII

### SEED STATISTICS

- Section 52. The Minister is empowered to publish in the Government Gazette prescriptions for keeping statistics of any kind on seed in any locality as considered appropriate. When announcement is made in accordance with paragraph one of the section, the Director General is empowered to issue a written order to persons, who earn a living in connection with the said seed, to provide the required information on the items, particulars and quantities concerning the statistics in accordance with the printed form prescribed by the Director-General. The Director-General shall also prescribe the time, place and procedure for issuing the printed statistics forms.
- Section 53. An individual who has received the statistical information order cited under Section 52, paragraph two, must complete the printed form showing the actual items, particulars and quantity, accompanied by his signature, and to submit it in accordance with the specified period of time at the place and in the procedure stipulated on the printed form.
- Section 54. If it becomes necessary for the purpose of keeping seed statistics, the seed inspector is empowered to enter the office of the person who received the statistics order during working hours, in order to examine items, particulars and quantities relating to seed statistics, and it shall be the duty of the person who received the order or his representative to give every facility and assistance possible to the seed inspector in answering questions. In the execution of these duties, the provisions of Section 44, paragraph one, shall be applied *mutatis mutandis*.

## CHAPTER 8

### PENALTY

- Section 55. Anyone who violates Section 13, paragraph one, shall be penalized for not more than one year imprisonment, or be fined not more than two thousand baht, or both.
- Section 56. Anyone who violates Section 14, paragraph one, shall be penalized for not more than two years imprisonment, or be fined not more than four thousand baht, or both.
- Section 57. Any license owner who aggregates, sells, imports or exports controlled seed after the date of expiration of license without submitting an application for the renewal of the license under Section 19, shall be fined not more than one hundred baht daily the entire period of the expiration.
- Section 58. Any license owner who persists in carrying on business under the expired license after the seed inspector ordered the non-renewal of the license under Section 19, shall be sentenced to not more than two years imprisonment, or be fined not more than four thousand baht, or both.
- Section 59. Any license owner who violates Section 21 or Section 27, paragraph one, or does not follow Section 23, shall be fined not more than three thousand baht.
- Section 60. Any license owner who does not follow Section 22 or Section 24 shall be penalized not more than one year imprisonment, or be fined not more than two thousand baht, or both.
- Section 61. Any license owner who does not follow Section 25 or Section 26, paragraph one, shall be fined not more than one thousand baht.
- Section 62. Anyone who violates Section 30 or Section 33 shall be sentenced to not more than three years imprisonment, or be fined not more than four thousand baht, or both.
- Section 63. Anyone who violates an announcement made under Section 31, paragraph one, shall be sentenced to not more than two years imprisonment, or be fined not more than four thousand baht, or both.

- Section 64. Anyone who violates Section 36, shall be sentenced to not more than one years imprisonment, or be fined not more than two thousand baht, or both.
- Section 65. Anyone who violates Section 37, shall be sentences to no more than five years imprisonment, or be fined not more than ten thousand baht, or both.
- Section 66. Whoever advertises controlled seed in violation of Section 38 or hinders or makes it inconvenient to the seed inspector in his official actions, or does not show up for investigation, or dose not send any order document or material for which the seed inspector has sent a notice according to Section 39, shall be sentenced to not more than one month imprisonment, or be fined not more than one thousand baht, or both.
- Section 67. Any license owner whose license was order nullified under Section 46, paragraph two, and persists in carrying on business under that license, shall be sentenced to not more than one years, or be fined not more than two thousand baht, or both.
- Section 68. Anyone whose license was canceled and sells his remaining controlled seed to an other person who is not prescribed under Section 51, or sells the seed after the period specified under Section 51, shall be fined not more than one thousand baht.
- Section 69. Whoever violates Section 53 shall be fined not more than two hundred baht.
- Section 70. Whoever violates Section 54, paragraph one, shall be fined not more than five hundred baht.
- Section 71. When the Court rules that an offence has been committed in violation of an Announcement made under Section 13(3) or (4) or in violation of Section 30, 33, 36 or 37 and though the Court sees that the accused is not guilty, shall order the seizure of all seed, equipment and supplies, and any utensil used in connection with the commission of the offence. All things ordered by the Court to be siezed shall become the property of the Department of Agriculture to dispose of as it deems appropriate.

#### RATES OF FEES

1. License for aggregating controlled seed for trade 200 baht each
2. License for selling controlled seed 100 baht each
3. License for importing controlled seed for trade 200 baht each
4. License for exporting controlled seed for trade 200 baht each
5. License for bringing controlled seed i transit for trade 100 baht each
6. Testing or analysis fees of seed for official approval 200 bath/one sample
7. Seed certification 50 baht each
8. Duplicate of license 10 baht each
9. Extension of a license equal to the fee for the license

From the Government Gazette, Book 98, Section 57

Dated April 14, 2524.

Announcement of Ministry of Agriculture and Cooperatives.

Subject: Regulation of Standards, Quality and Storage of Controlled Seed

Under Seed Act B.E. 2518 (A.D. 1975)

(Book 1) B.E. 2524.

In accordance with Articles 5 and 13(2) of the Seed Act B.E. 2518, the Minister of Agriculture and Cooperatives wishes to announce this regulation on standards, quality and storage of controlled seed for permit holders to specified under Articles 17(1), (2) and (3).

1. Regulations on germination and purity of controlled seed

Item No.	Crop	Variety	Germination (%)	Purity (%)
1.	Rice ( <i>Oryza sativa</i> L.)	All	80	98
2.	Sorghum ( <i>Sorghum vulgare</i> Pers.)	all	75	96
3.	Corn ( <i>Zea mays</i> L.)	all	75	98
4.	Sweet corn ( <i>Zea mays</i> L. var. <i>saccharata</i> Bailey)	all	60	96
5.	Mungbean ( <i>Vigna radiata</i> (L.) Wilczek or <i>Phaseolus aureus</i> Roxb.)	all	75	98
6.	Black Gram ( <i>Vigna mungo</i> (L.) Hepper or <i>Phaseolus mungo</i> L.)	all	75	98
7.	Yard-long bean ( <i>Vigna unguiculata</i> (L.) Walp.)	all	70	98
8.	Soybean ( <i>Glycine max</i> (L.) Merr.)	all	65	97
9.	Cotton ( <i>Gossypium</i> spp.)	all	70	98
10.	Chinese kale ( <i>Brassica alboglabra</i> Bailey)	all	70	98
11.	Cabbage (head) ( <i>Brassica pekinensis</i> (Lour.) Rupr., var. <i>cylindrica</i> Tsen & Lee)	all	70	98
12.	Leaf mustard ( <i>Brassica juncea</i> Czern. & Coss.)	all	70	98
13.	Cucumber ( <i>Cucumis sativus</i> L.)	all	75	98
14.	Garden pea ( <i>Pisum sativum</i> L.)	all	70	98
15.	Chinese radish ( <i>Raphanus sativus</i> L.)	all	75	96
16.	Water convolvulus ( <i>Ipomoea aquatica</i> Forsk.)	all	50	94
17.	Peper ( <i>Capsicum</i> spp.)	all	55	97
18.	Tomato ( <i>Lycopersicon esculentum</i> Mill.)	all	65	98

Pure seed includes all seeds of each kind which are mature and undamaged. Pure seed also includes immature, shriveled seeds, seeds that have started to germinate and pieces of broken seeds which are larger than one-half of the original size. Seeds of Leguminosae and Cruciferae families, with the seed coats entirely removed, are excluded. Seeds must be placed in conditioned storage as stated in the permit certificate. The storage must be kept clean and equipped with good ventilation or conditioning system.

This announcement takes effect 60 days after being notified in the Government Gazette.

Dated 17 March, 2524.

Signature  
Police Colonel Krit Sangkasup Deputy Minister  
Acting for Minister of Agriculture and Cooperatives.

(Royal Gazette, Special Issue, Vol.103, Part 179, 16 Oct. 2529)

Ministry of Agriculture and Cooperatives' order  
Title: Accreditation of Certified Seeds  
In accordance with the Seed Act  
of 2518, Vol. 1, 2529.

Whereas it is deemed necessary to accredit seeds as certified seeds,  
In accordance with the provision of Section 5 and Section 20 of the Seed Act of 2518, the Minister of Agriculture  
and Cooperatives hereby issue the following order:

1. Seed producers seeking inspection or analysis of their seeds by the Department of Agriculture with a view to obtaining seed certification may apply for the accreditation using Form P.P. 13 attached. The application shall be made with officials of the Division of Seeds and Agricultural Materials Control, Department of Agriculture, Bangkok, within no less than 30 days before planting together with sample seeds and documents as follows:
  - (1) A maximum of one kilogram of sample seeds.
  - (2) Document on details of the seeds:
    - Kind, name or line number.
    - Origin.
    - Breed characteristics.
  - (3) Documents on details of production:
    - Place and area of production.
    - Dates of planting and harvesting.
    - Field number.
2. After handing in the application, the producers shall make arrangement on date, time and place for inspection by the officials, and for the producers to follow production process and producers prescribed by the Department of Agriculture.  
After seed production, the producers shall notify the officials to collect sample seeds for inspection before issuance of seed certificates.
3. After the inspection as prescribed in 2 para 2, and with the approval of the Department of Agriculture, the Department Director shall issue seed certificates, specifying kind and variety, percentage of purity, germination, moisture, presence of unwanted seeds, and, for rice, presence of red rice. Seed certificates shall be issued for each seed production and in the form laid down by the Department of Agriculture.
4. The producers shall put their trade mark together with inspection results (3.) on each seed container.
5. The seed container (4) shall be securely sealed with stamp of the Department of Agriculture. Certification shall cease the moment the seal is broken.
6. The applicant shall shoulder all the expenses incurred in application procedures, issuance of certificates, printing of labels, sealing (5.), and officials' expenses (2.).

This Ministerial order shall take effect one day after it is published in the Royal Gazette.

Declared on 24 February 2529.

Prayudh Siriphanit

Deputy Minister of Agriculture and Cooperatives for the Minister of Agriculture and Cooperatives.

**Advice for Seed Dealers on The Seed Act of 2518**

by Seed Section

Division of Seed and Agricultural Materials Control

Department of Agriculture

Tel: 579-0229

**Additional Evidence for Application for Seed Assembling, Importing and Exporting Permits.**

1. Sample of labels attached to seed containers.
2. Diagram showing assembling place and storing place of controlled seeds.

## Sample of Labels

### Controlled Seed

Seed name.

Breed name \*

Trade Mark

Net weight

Percentage of pure seed

Percentage of germination

Test date

Expiration date

Assembling date

Assembling place

Name of assembler

Address.

Telephone

\* In case there are unwanted seeds, name and proportion should be given.

## THE SEED ACT of 2518

### Objectives:

1. Help farmers to obtain good and standardized seeds.
2. Preserve quality seeds for economic reason.
3. Forbid importation of forbidden seeds.

### Types of Permits for Controlled Seed Dealers

1. For sale of controlled seeds.
2. For assembling of controlled seeds.
3. For importing of controlled seeds.
4. For exporting of controlled seeds.
5. For passage of controlled seeds.

### Documents Needed in Application for Permits.

1. Application (P.P 1)
2. Evident of ownership of the establishment
3. Copy of Trade Registration
4. Copy of Identification Card of the producer/dealer
5. Copy of Registration of the firm (if a legal entity)
6. Power of attorney paper (if a legal entity)

### Place to Apply for Permits.

Seed Section, Division of Seed and Agricultural Materials Control, Department of Agriculture, Bangkok, Bangkok 10900. Tel: 579-0229.

### Fees

- |    |  |                  |
|----|--|------------------|
| 1. | Seed assembling permit                             | 200 baht.        |
| 2. | Seed sale permit                                   | 100 baht.        |
| 3. | Seed importing permit                              | 200 baht.        |
| 4. | Seed exporting permit                              | 200 baht.        |
| 5. | Seed passage permit                                | 100 baht.        |
| 6. | Test, inspection and analysis                      | 200 baht/sample. |
| 7. | Temporary permit                                   | 10 baht.         |
| 8. | Permit renewal fees are the same for each renewal. |                  |

### Controlled Seeds

The Seed Act of 2518 declares 25 kinds of seeds as controlled seeds. The names as well as respectively germination and purity rates are given below:

Number	Kind	Minimum germination rate, %	Minimum purity rate, %
1.	Rice	80	98
2.	Sorghum	75	96
3.	Maize	75	98
4.	Mungbean	75	98
5.	Black mungbean	75	98
6.	Soybean	65	97
7.	Cotton	70	98
8.	Sweet corn	60	96
9.	Kale	70	98
10.	Cucumber	75	98
11.	Edible pod pea	70	98
12.	White mustard	70	98
13.	Green mustard	70	98
14.	Radish	75	96
15.	Morning glory	50	94
16.	Chilli	55	97
17.	Tomato	65	98
18.	yard-long bean	70	98
19.	cabbage	70	98
20.	cauliflower	70	98
21.	Broccoli	70	98
22.	Chinese mustard	70	98
23.	Lettuce	65	95
24.	Onion	70	98
25.	Water melon	70	98

### Conserved Seeds

Conserved seeds, in accordance with the Seed Act of 2518, refer to the kinds and varieties of the seeds which were declared to be conserved seeds by the Minister of Agriculture and Cooperatives. These conserved seeds are forbidden to be without permission from the Minister. Another exemption is that the seeds may be exported for research purposes. Those found to violate this restriction are liable to be put in jail for the maximum of three years, or fined for the maximum of four thousand baht, or both. Fourteen kinds of conserved seeds have been declared:

Kind	Exemption
Mango, pumelo, durain	Fruit and seeds
Grape, longan, jackfruit	Fruit and seeds
Lichee, rambutan	Fruit and seeds
Maprang, santol	Fruit and seeds
Phloo	Leaves
Tamarind	Seeds
Coconut with following characteristics:	Fresh fruit for consumption

1. Under 1000 grams of weight only.
2. Circumference of fruit less than 50 centimeters.

## APPENDIX 9

## KNOWN-YOU SEED CO. PRICE LIST

		10 กรัม/บาท	กิโลกรัม/บาท
		Baht/10 gms.	Baht/Kg.
แตงโมเนื้อสีแดง WATERMELON (RED FLESH)			
104 เอ็มไพร์ เบอร์ 2	EMPIRE NO. 2	60.00	5,800.00
117 นินา ดรากอน	NEW DRAGON	75.00	7,070.00
121 เออร์รี่ คอนโต	EARLY KLONDIKE	60.00	5,800.00
122 ฟลาวเวอร์ ดรากอน	FLOWER DRAGON	65.00	6,280.00
123 แกรนด์ เบบี้	GRAND BABY	65.00	6,280.00
128 คอนโต เบอร์ 2	KLONDIKE NO. 2	60.00	5,800.00
129 ฟัน เบบี้	FUN BABY	60.00	5,800.00
133 เรด ดีลิเชียส	RED DELICIOUS	175.00	17,220.00
139 เนชั่นแนล ชาม	NATIONAL CHARM	215.00	20,960.00
145 เทน โบว์	TEN-BOW	60.00	5,800.00
151 นินา เรด ดีลิเชียส	NEW RED DELICIOUS	215.00	20,960.00
F-445 สกายลัก	SKY LUCK	60.00	5,700.00
แตงโมไม่มีเมล็ด WATERMELON (SEEDLESS)			
106 เฟิงซาน เบอร์ 1	FENGSHAN NO. 1	360.00	35,040.00
126 คาวลิตี	QUALITY	370.00	36,970.00
แตงโมเนื้อสีเหลือง WATERMELON (YELLOW FLESH)			
120 เยลโล่ เบบี้	YELLOW BABY	275.00	27,190.00
124 สปริม เบบี้	SUPREAM BABY	230.00	22,840.00
134 พีไทท์ เยลโล่	PETITE YELLOW	275.00	27,190.00
140 สกาย ฟินิกซ์	SKY PHOENIX	245.00	24,470.00
148 นินา คราวน์	NEW CROWN	275.00	27,190.00
แตงโมเปลือกสีทอง WATERMELON (YELLOW SKIN)			
146 ฟัน เบลล์	FUN BELL	215.00	20,960.00
แตงโมเสียบยอด WATERMELON (ROOT STOCK)			
143 ไนท์	KNIGHT	65.00	6,040.00
แตงโมสำหรับกินเมล็ด WATERMELON (EDIBLE SEED)			
302 วันลี	WANLI	15.00	820.00
แตงแคนดาลูป MUSK MELON			
213 สวอน	SWAN	160.00	15,970.00
214 เรด ควีน	RED QUEEN	320.00	31,540.00
221 สกาย ร็อคเก็ต	SKY ROCKET	320.00	31,540.00
223 เจด ดีว	JADE DEW	320.00	31,540.00
225 นินา เซ็นจูรี่	NEW CENTURY	335.00	33,170.00
227 ซัน เลดี้	SUN LADY	320.00	31,540.00
234 ดีลิเคต	DELICATE	300.00	29,900.00
235 ฮันนี่ เวิร์ลด์	HONEY WORLD	335.00	33,170.00
237 เทน-มี	TEN-ME	1,515.00	151,030.00
321 ไวท์ สกิน	WHITE SKIN	135.00	13,050.00
327 ซิลเวอร์ ชาร์ม	SILVER CHARM	135.00	13,050.00
F-70-13		320.00	31,540.00
แตงกวาดองทั้งผล CUCUMBER			
266 สปริง สวอลโลว์	SPRING SWALLOW	100.00	9,970.00

	10 กรัม/บาท	กิโลกรัม/บาท
ถั่วฝักยาว YARD LONG BEAN		
691 กรีน พอด เกาซุ่ GREEN POD KAOHSIUNG	7.00	590.00
ถั่วลันเตาหวาน PEA (EDIBLE PODODED, SUGAR)		
659 เก็นส์ พอด GIANT POD	5.00	300.00
662 ซุการ์ สแนป SUGAR SNAP	5.00	390.00
663 ไทชุง เบอร์ 11 TAICHUNG NO. 11	5.00	300.00
ฟักทอง PUMPKIN		
764 เฟริสท์ เทส FIRST TASTE	65.00	6,220.00
767 เออร์ลี่ ไพร์ EARLY PRICE	65.00	6,220.00
SQ-74-279 GOLDEN SKIN	150.00	15,000.00
แฟนซี FANCY	115.00	11,500.00
มะละกอ PAPAYA		
781 ไทนุง เบอร์ 1 TAINUNG NO. 1	665.00	66,450.00
783 ซันไลท์ SUNRISE	545.00	54,370.00
784 โนนยู เบอร์ 1 KNOWN-YOU NO. 1	725.00	72,490.00
785 ไทนุง เบอร์ 2 TAINUNG NO. 2	665.00	66,450.00
มะเขือยาว EGGPLANT		
701 ปิง ตง ลอง PING TUNG LONG	46.00	4,590.00
702 เอ็กซ์ตร้าลอง EXTRA LONG	46.00	4,590.00
704 ฟาร์มเมอร์ ลอง FARMERS LONG	70.00	6,890.00
มะระ BALSAM PEAR		
812 โนนยู เบอร์ 2 KNOWN-YOU NO. 2	220.00	21,750.00
813 โนนยู เบอร์ 6 KNOWN-YOU NO. 6	220.00	21,750.00
814 มูน ชาย MOON SHINE	265.00	26,100.00
815 โนนยู กรีน KNOWN-YOU GREEN	245.00	24,470.00
ฟักเขียว GOURD (WAX)		
823 กรีน ไทเกอร์ GREEN TIGER	220.00	21,810.00
บวบเหลี่ยม GOURD		
833 พิง-อาน PING ANN	230.00	22,960.00
ปวยเล้ง SPINACH		
902 สปาร์ค SPARK	6.00	450.00
ตั้งโอ้ CHRYSANTHEMUM (GARLAND)		
981 บิ๊กลีฟ BIG LEAF	11.00	970.00
สลัดแก้ว KALE		
951 เซลหิวซ์	11.00	990.00
953 จอร์เจีย	45.00	3,930.00
954 แกรนด์ แรพพิด	25.00	1,750.00

หากสนใจในเมล็ดพันธุ์ชนิดใด สามารถสั่งซื้อทางไปรษณีย์ส่งจ่าย บริษัท เพื่อนเกษตรกร จำกัด ส่งจ่าย ป.ณ. ช้างเผือก เชียงใหม่ ตามราคาที่เราบอไว้ และเพิ่มค่าขนส่งอีก 10 บาท ต่อเมล็ดพันธุ์ 20 กรัม

หมายเหตุ บริษัทฯ ขอสงวนสิทธิ์ในการเปลี่ยนแปลงราคาสินค้าโดยไม่มีเหตุอันควรแจ้งให้ทราบล่วงหน้า  
เงื่อนไข สินค้าที่ซื้อแล้วไม่รับคืน

การบรรจุ ขุนาคบรรจุกระป๋อง 100 และ 200 กรัม, ขนาดของ 10 กรัม และ 20 กรัม สินค้าทุกชนิดจัดส่งดีตราบริษัทฯ คิดไว้อย่างถูกต้องเท่านั้น.

		๑๐ กรัม/บาท	กิโลกรัม/บาท
268 จอย	JOY	85.00	8,400.00
275 ฟาเทน	FOUNTAIN	85.00	8,400.00
276 เซาท์ สวอลโลว์	SOUTH SWALLOW	180.00	17,780.00
F73-139		100.00	9,790.00
มะเขือเทศ TOMATO			
365 ท็อปพิกคอล เอต	TROPICAL ACE	250.00	24,570.00
372 คิงคอง	KING-KONG	265.00	26,100.00
373 ชูการ์ เพลิร์ล	SUGAR PEARL	470.00	46,760.00
375 พรึเชียส	PRECIOUS	410.00	40,780.00
SB	SB	410.00	40,780.00
พริกเผ็ด PEPPER (HOT)			
405 นิวคัมเมอร์	NEW COMER	400.00	39,030.00
412 บิวตี้เบลล์	BEAUTY BELL	350.00	34,430.00
451 แพลสชั่น	PASSION	375.00	37,330.00
455 ลอง ชิลลี่	LONG CHILI	400.00	39,030.00
456 โกลเด้น ฮีท	GOLDEN HEAT	400.00	39,030.00
พริกหวาน PEPPER (SWEET)			
406 บลู สตาร์	BLUE STAR	360.00	35,580.00
410 เออร์รี่ สตาร์	EARLY STAR	360.00	35,580.00
411 บิ๊ก สตาร์	BIG STAR	360.00	35,580.00
กระเจี๊ยบมอญ OKRA			
473 ลักกี้ ไฟว์	LUCKY FIVE	26.00	2,540.00
474 เซาท์ ซี	SOUTH SEA	26.00	2,540.00
กะหล่ำดอก CAULIFLOWER			
508 ฟาร์มเมอร์ เอ็กซ์ตร้า เออร์รี่	FARMER EXTRA EARLY	30.00	2,720.00
กะหล่ำปลี CABBAGE			
636 ท็อปพิกคอล ดีไลท์	TROPICAL DELIGHT	105.00	10,450.00
บร็อคโคลี่ BROCCOLI			
553 กรีน คิงส์	GREEN KING	130.00	12,630.00
29-A	29-A	105.00	10,270.00
ผักกาดฮ่องเต้ PAI-TSAI			
606 ชิงเชียง	CHING CHIANG	6.00	500.00
ผักกาดขาวปลี CHINESE CABBAGE			
613 ซัมเมอร์ ไบรท์	SUMMER BRIGHT	65.00	6,340.00
615 ไวท์ ซัน	WHITE SUN	65.00	6,340.00
168 พันธุ์ใหม่พิเศษ	NEW VARIETY	40.00	4,000.00
ผักกาดหัว RADISH			
523 มิง-โฮ	MING-HO	50.00	4,590.00
524 เรด คอท	RED COAT	50.00	4,590.00
ข้าวโพดหวาน CORN SWEET			
689 ฮันนี่ บีนส์ เบอร์ 2	HONEY JEAN NO. 2	9.00	820.00
ถั่ว BEAN			
680 เออร์รี่ บัช	EARLY BUSH	7.00	575.00

4/5

## APPENDIX 10

### Lam Nam Oon Integrated Agro Production and Marketing Program 1988/1989

No.	COMPANY	CROP	Area (Rai)		No. of Contract	
			Target	Actual	Target	Actual
1	Known-You Seed Co., Ltd.	1.1 Tomato Seed	100.00	117.90	400	393
		1.2 Cantaloupe Seed	500.00	728.00	500	624
		1.3 Watermelon Seed	500.00	824.00	500	713
		1.4 Sweet Pepper Seed	-	1.00	-	1
		1.5 Sweet Pepper Seed (open)	-	1.00	-	4
		1.6 Bitter Guard Seed	-	2.00	-	2
2	Upjohn/Asgrow Seed Production	2.1 Tomato Seed	250.00	320.00	-	444
		2.2 Cantaloupe Seed	330.00	380.00	500	444
		2.3 Watermelon Seed	64.00	55.00	-	78
3	Horthai Co., Ltd.	3.1 Tomato Seed	180.00	65.00	360	104
		3.2 Asparagus	400.00	33.25	350	27
		3.3 Mango	200.00	20.00	200	30
		3.4 Tomato Seed (Open pollination)	20.00	2.00	40	2
		3.5 Flower Seed	-	0.75	-	3
		3.6 Vegetable	15.00	0.00	30	0
4	Adams Enterprises Co., Ltd.	4.1 Tomato Seed	60.00	7.00	240	15
5	Farm Management Group [F.M.G.]	5.1 Tomato Processing	400.00	247.08	160	102
		5.2 Baby Corn	2,250.00	1,423.50	300	195
6	Agro Enterprises Int.	6.1 Seedless Watermelon	1,000.00	50.00	500	27
7	Three Enterprises Int.	7.1 Dried Guard (Kanpyuo)	120.00	116.00	60	44
8	Mr. Tan Ka-aeng	8.1 Sweet Corn	-	10.00	-	6
		8.2 Pumpkin	-	32.00	-	10
		8.3 Cantaloupe	-	2.00	1	
Totals:		17 Crops	6,389.00	4,437.48	4,140	3,269

**Job creation for other farmers  
in LNO and neighboring area**

**1988/1989**

No.	Crops	Area (Rai)	No. of Extra Labor	(Baht)
1.	Fl Hy. Seed Production	2,499	3,748	3,373,200
2.	Dried Guard (Kanpyuo)	116	100	240,000
3.	Baby corn	1,431	381	228,600
4.	Tomato Processing 213	50	4,500	
<b>Totals</b>		<b>4,259</b>	<b>4,279</b>	<b>3,846,300</b>

50

**Summary of Contract Farming  
from 1985/1986 - 1987/1988**

**Lam Nam Oon Integrated Agro Production and Marketing Program**

No.	Crop	Year 1985/1986		Product Net Cash Value	Net Cash income	Year 1986/1987		Production Value	Net Cash income	Year 1987/1988		Production Value	Net Cash income
		Area (Rai)	No. Contract			Area (Rai)	No. Contract			Area (Rai)	No. Contract		
1.	Tomato Seed	12.00	21	216,025.00	-	208.31	375	2,656,900.00	5,920.15	222.90	514	3,552,786.00	8,151.44
2.	Cantaloupe Seed	62.00	62	-	-	235.64	190	2,236,956.80	5,467.37	377.50	363	5,651,466.10	11,450.54
3.	Watermelon Seed	-	-	-	-	46.00	33	360,000.00	-	158.20	174	1,615,272.00	6,687.21
4.	Feed Corn Seed	-	-	-	-	-	-	-	-	42.00	10	53,656.72	863.35
5.	Vegetable Seed:	23.75	6	-	-	-	-	-	-	-	-	-	-
	-Chinese Green	-	-	-	-	4.95	9	23,844.00	2,171.80	10.05	13	24,156.00	251.28
	-Chinese Cabbage	-	-	-	-	-	-	-	-	3.47	7	5,630.00	-677.87
	-Chinese Kale	-	-	-	-	0.55	2	2,360.00	1,781.31	6.52	12	28,424.00	2,182.76
	-Sugar Pea	-	-	-	-	6.95	15	3,321.50	-	0.68	1	85.00	-326.71
	-Bitter Guard	-	-	-	-	-	-	-	-	4.57	9	44,200.00	4,687.86
	-Sweet Pepper	-	-	-	-	-	-	-	-	1.00	2	2,900.00	-1,874.00
	-Chinese Mustard	-	-	-	-	-	-	-	-	1.50	3	5,520.00	1,635.33
	-Long Bean	-	-	-	-	-	-	-	-	3.00	2	18,900.00	5,139.33
	-Chinese Radish	-	-	-	-	2.12	3	2,320.00	-890.27	-	-	-	-
	-French Bean	-	-	-	-	31.00	23	35,128.80	-299.87	-	-	-	-
	-Cucumber	-	-	-	-	25.00	15	2,850.00	-	-	-	-	-
6.	Tomato Processing	100.00	52	547,429.00	-	26.00	27	111,870.00	2,211.31	118.00	55	430,997.74	1,041.48
7.	Feed Corn	-	-	-	-	34.86	19	8,715.00	-26.17	52.50	17	31,777.50	37.94
8.	Sunflower	-	-	-	-	-	-	-	-	45.25	21	30,840.00	105.38
9.	Baby Corn	-	-	-	-	58.25	35	95,654.14	937.52	193.00	107	343,314.50	890.91
10.	Green Manure	-	-	-	-	-	-	-	-	81.00	17	-	-
11.	Seedless Watermelon	-	-	-	-	-	-	-	-	59.00	49	94,941.80	-2,431.75
12.	Asparagus	-	-	-	-	12.00	12	-	-	12.00	12	-	-
13.	Mango	18.00	30	-	-	18.00	30	-	-	18.00	30	-	-
<b>Total</b>		<b>215.75</b>	<b>171</b>	<b>763,454.00</b>	<b>-</b>	<b>709.63</b>	<b>788</b>	<b>5,539,920.24</b>	<b>-</b>	<b>1,410.14</b>	<b>1,418</b>	<b>11,934,847.36</b>	<b>-</b>

Remark 1/ Land and farmer show here are contract farming with Private sector and LNO. except No. 10 was supported by LNO.

- 14 -