

CA1
EA968
89A77
ENG
DOCS

CA1 EA968 89A77 ENG DOCS
Meiklejohn, Richard.
An assessment of Thailand's
agriculture sector and agro-food
43278288

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 INTRODUCTION 2

2.1 Purpose and Approach 2

2.2 Background 3

2.3 Conclusions 4

2.4 Recommendations 5

3.0 SUBJECT OVERVIEW 6

3.1 Program Description 6

4.0 AN ASSESSMENT OF THAILAND'S AGRICULTURE SECTOR AND AGRO-FOOD INDUSTRY 7

4.1 Objectives for Target Investors in Agriculture 7

4.2 Success Factors for Target Investors in Agriculture 8

5.0 BOARD OF INVESTMENT 10

5.1 Investment Incentives for the Investor 11

5.2 Investment Promotion Zones 12

5.3 Investment for Exporting Enterprises 13

6.0 RESOURCES OF THAILAND 13

6.1 Regional 13

7.0 OVERVIEW OF AGRICULTURE 15

7.1 Production and Markets 15

7.2 Demand 16

7.3 Trade 16

8.0 INVESTMENT OPPORTUNITIES 17

8.1 Types 17

8.2 Areas 18

8.3 Main 18

9.0 AGRO-FOOD INDUSTRY 19

9.1 Biotechnology-based Agro-Industries 19

9.2 Food Processing 19

9.3 Activities Eligible for Export 20

10.0 FRUIT AND VEGETABLE 21

10.1 Overview 21

10.2 Activities Eligible for Investment 21

10.3 Programs for Selected Fruits and Vegetables 22

10.4 Export Potential 22

10.5 Constraints 23

10.6 Considerations 23

10.7 Recommendations 24

10.8 Opportunities 24

**AN ASSESSMENT OF THAILAND'S AGRICULTURE SECTOR
AND AGRO-FOOD INDUSTRY**

Prepared by: Richard Meiklejohn
Capilano College
Asia-Pacific Management Cooperative Programme

For: Commercial Division
Canadian Embassy
Bangkok, Thailand

Date: December, 1989

43-278-282

Dept. of External Affairs
Min. des Affaires extérieures

JAN 10 1997

RETURN TO DEPARTMENTAL LIBRARY
RETOURNER A LA BIBLIOTHEQUE DU MINISTERE

1950
JAN 10 1950
U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

TABLE OF CONTENTS

	Page
1.0 EXECUTIVE SUMMARY	1
2.0 INTRODUCTION	3
2.1 Purpose and Approach	3
2.2 Background	3
2.3 Conclusions	4
2.4 Recommendations	5
3.0 MARKET OVERVIEW	6
3.1 Economic Environment	6
3.2 Economic Constraints	8
4.0 GOVERNMENT POLICY ON AGRICULTURE	8
4.1 National Economic and Social Development Plan	8
4.2 Guidelines for Target Industries in Agriculture	10
5.0 BOARD OF INVESTMENT	10
5.1 Investment Incentives for the Investor	11
5.2 Investment Promotion Zones	12
5.3 Investment for Exporting Enterprises	13
6.0 RESOURCES OF THAILAND	13
6.1 Regional Differences	13
7.0 OVERVIEW OF AGRICULTURAL THAILAND	15
7.1 Production and Markets	15
7.2 Demand	16
7.3 Traditional Crops	16
Rice	16
Tapioca	17
Rubber	17
Sugar	18
Maize	18
8.0 AGRO-FOOD INDUSTRY	21
8.1 Biotechnology-based Agro-Industries	21
8.2 Food Processing	24
8.3 Activities Eligible for Export Promotion	25
9.0 FRUIT AND VEGETABLE INDUSTRY	26
9.1 Overview	26
9.2 Activities Eligible for Investment Promotion	26
9.3 Prospects for Selected Fruits and Vegetables	27
9.4 Export Potential	29
9.5 Constraints	29
9.6 Conclusions	30
9.7 Recommendations	30
9.8 Opportunities	31

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	1.0
3	INTRODUCTION	2.0
3	2.1 Purpose and Approach	
3	2.2 Background	
4	2.3 Conclusions	
5	2.4 Recommendations	
6	MARKET OVERVIEW	3.0
6	3.1 Economic Environment	
6	3.2 Economic Conditions	
8	GOVERNMENT POLICY ON AGRICULTURE	4.0
8	4.1 National Economic and Social Development Plan	
10	4.2 Guidelines for Target Industries in Agriculture	
10	BOARD OF INVESTMENT	5.0
11	5.1 Investment Incentives for the Investor	
12	5.2 Investment Promotion Agencies	
13	5.3 Investment for Exporting Enterprises	
13	RESOURCES OF THAILAND	6.0
13	6.1 Regional Differences	
15	OVERVIEW OF AGRICULTURAL THAILAND	7.0
15	7.1 Production and Markets	
16	7.2 Demand	
16	7.3 Traditional Crops	
16	Rice	
17	Fabrics	
17	Rubber	
18	Sugar	
18	Maize	
21	AGRO-FOOD INDUSTRY	8.0
21	8.1 Biotechnology-based Agro-Industries	
21	8.2 Food Processing	
22	8.3 Activities Eligible for Export Promotion	
26	FRUIT AND VEGETABLE INDUSTRY	9.0
26	9.1 Overview	
26	9.2 Activities Eligible for Investment Promotion	
27	9.3 Prospects for Selected Fruits and Vegetables	
29	9.4 Export Potential	
29	9.5 Constraints	
30	9.6 Conclusions	
30	9.7 Recommendations	
31	9.8 Opportunities	

10.0	SEED INDUSTRY	31
10.1	Overview	31
10.2	Public Seed Sector	31
10.3	Private Seed Sector	32
10.4	Constraints	32
10.5	Production Potential and Markets	33
10.6	Conclusions	38
11.0	TREE CROPS	38
11.1	Cashews	38
11.2	Oil Palm	39
12.0	LIVESTOCK INDUSTRY	39
12.1	Overview	39
12.2	Activities Eligible for Investment Promotion	39
12.3	Swine Industry	40
12.4	Constraints	41
12.5	Conclusions	41
12.6	Poultry Industry	41
12.7	Constraints	42
12.8	Conclusions	43
12.9	Leather Industry	44
13.0	DAIRY INDUSTRY	45
13.1	Overview	45
13.2	Milk Drinking Campaign	45
13.3	Policy Priorities	46
13.4	Dairy Farming Promotion Organization	46
13.5	Potential for Thailand's Dairy Industry	47
13.6	Constraints	47
13.7	Opportunities	48
13.8	Conclusions	49
13.9	Recommendations	49
14.0	FEED CROPS	50
14.1	Overview	50
14.2	Forage Crops	51
14.3	Crop Residues	51
14.4	Conclusions	51
14.5	Recommendations	51
15.0	SEAFOOD INDUSTRY	52
15.1	Activities Eligible for Investment Promotion	52
15.2	Prawn Farming Industry	54
15.3	Exports	56
15.4	Constraints	56
15.5	Conclusions	57
15.6	Recommendations	57
15.7	Opportunities	58
16.0	SOURCES CONSULTED	59
16.1	Bibliography	59
16.2	Interviews	63

31	10.0 SEED INDUSTRY
31	10.1 Overview
31	10.2 Public Seed Sector
32	10.3 Private Seed Sector
32	10.4 Conclusions
33	10.5 Production Potential and Markets
38	10.6 Conclusions
38	11.0 TREE CROPS
38	11.1 Cashews
39	11.2 Oil Palm
39	12.0 LIVESTOCK INDUSTRY
39	12.1 Overview
39	12.2 Activities Eligible for Investment Promotion
40	12.3 Swine Industry
41	12.4 Conclusions
41	12.5 Conclusions
41	12.6 Poultry Industry
42	12.7 Conclusions
43	12.8 Conclusions
44	12.9 Leather Industry
45	13.0 DAIRY INDUSTRY
45	13.1 Overview
45	13.2 Milk Drinking Campaign
46	13.3 Policy Priorities
46	13.4 Dairy Farming Promotion Organization
47	13.5 Potential for Thailand's Dairy Industry
47	13.6 Conclusions
48	13.7 Opportunities
49	13.8 Conclusions
49	13.9 Recommendations
50	14.0 FEED CROPS
50	14.1 Overview
51	14.2 Forage Crops
51	14.3 Crop Residues
51	14.4 Conclusions
51	14.5 Recommendations
52	15.0 SEAFOOD INDUSTRY
52	15.1 Activities Eligible for Investment Promotion
54	15.2 Prawn Farming Industry
56	15.3 Exports
56	15.4 Conclusions
57	15.5 Conclusions
57	15.6 Recommendations
58	15.7 Opportunities
59	16.0 SOURCES CONSULTED
59	16.1 Bibliography
63	16.2 Interviews

TABLES

	Page	
Table 1	RICE: Area, Production, Yield, Farm Value	18
Table 2	MAIZE: Area, Production, Yield, Farm Value	19
Table 3	CASSAVA: Area, Production, Yield, Farm Value	19
Table 4	SUGAR CANE: Area, Production, Yield, Farm Value	20
Table 5	PARA RUBBER: Area, Production, Yield, Farm Value	20
Table 6	Future Technologies in the Agro-Industry	22
Table 7	Important Agricultural Products and Technologies	23
Table 8	Types of Fresh Fruits	26
Table 9	Types of Fresh Vegetables	27
Table 10	MUNGBEAN: Area, Production, Yield, Farm Value	34
Table 11	SORGHUM: Area, Production, Yield, Farm Value	35
Table 12	SOYABEAN: Area, Production, Yield, Farm Value	35
Table 13	GROUNDNUTS: Area, Production, Yield, Farm Value	36
Table 14	OIL PALM: Area, Production, Yield, Farm Value	36
Table 15	CASTOR BEAN: Area, Production, Yield, Farm Value	37
Table 16	SESAME SEED: Area, Production, Yield, Farm Value	37
Table 17	Livestock and Poultry Population	40
Table 18	Production of Livestock Products	42
Table 19	ANNUAL CATCHES OF MARINE FISHES	53
Table 20	ANNUAL CATCHES OF FRESH WATER FISHES	54
Table 21	SHRIMP CULTURE: Production	55
Table 22	Exports of Black Tiger Prawns	56

Table Conversions

- 1.00 Canadian Dollar equals 21.45 Baht (approximate)
- 1 rai equals 1600 square metres
- 2.5 rai equals 1 acre
- 1 acre equals 0.41 hectares

Appendix D: Companies and Contacts in the Agro-Industry

Canadian Companies in the Agro-Food Industry in Thailand	90
Leading Thai Companies in the Agro-Food Industry	93
Useful Contacts and Addresses	100

18	RICE: Area, Production, Yield, Farm Value	Table 1
19	MAIZE: Area, Production, Yield, Farm Value	Table 2
19	CASSAVA: Area, Production, Yield, Farm Value	Table 3
20	SUGAR CANE: Area, Production, Yield, Farm Value	Table 4
20	RAPESEED: Area, Production, Yield, Farm Value	Table 5
22	Four Technologies in the Agro-Industry	Table 6
23	Important Agricultural Products and Technologies	Table 7
26	Types of Fresh Fruits	Table 8
27	Types of Fresh Vegetables	Table 9
34	MUNGBEAN: Area, Production, Yield, Farm Value	Table 10
35	SORGHUM: Area, Production, Yield, Farm Value	Table 11
35	SOYABEAN: Area, Production, Yield, Farm Value	Table 12
36	GROUNDNUT: Area, Production, Yield, Farm Value	Table 13
36	OIL PALM: Area, Production, Yield, Farm Value	Table 14
37	CASTOR BEAN: Area, Production, Yield, Farm Value	Table 15
37	SESAME SEED: Area, Production, Yield, Farm Value	Table 16
40	Livestock and Poultry Population	Table 17
43	Production of Livestock Products	Table 18
43	ANNUAL CATCHES OF MARINE FISHES	Table 19
44	ANNUAL CATCHES OF FRESH WATER FISHES	Table 20
45	SHRIMP CULTURE: Production	Table 21
46	Exports of Black Tiger Prawns	Table 22

Table Conversions

1.00 Canadian Dollar equals 21.45 Baht (approximate)
 1 rai equals 1600 square metres
 2.5 rai equals 1 acre
 1 acre equals 0.41 hectares

APPENDICES

	Page
<u>Appendix A: Agricultural Profile</u>	
Regional Profile of Thailand	66
Agro-Economic Zones of Thailand	67
List of Provinces by Agro-Economic Zone and Region	68
Land Suitability for Agriculture	69
<u>Appendix B: Economic Indicators</u>	
Main Economic Targets in the 6th NESDP	71
Industrial Production - Selected Major Products	72
Gross Domestic Product by Industrial Origin - Current Prices	73
Gross Domestic Product by Industrial Origin - 1972 Prices	74
Exports for Major Items	75
Imports by Economic Classification	76
Balance of Trade, Thailand	77
Agricultural Balance of Trade	77
Agricultural Production - Main Products	78
Value of Agricultural Exports	79
Value of Agricultural Imports	80
Sector Shares of GDP	81
Sector Shares of Exports	82
Employed Persons by Industry	83
<u>Appendix C: Investment Promotions</u>	
Agricultural Products and Commodities Eligible for Investment Promotion	85
Projects Receiving BOI Promotion by Product Group	88
<u>Appendix D: Companies and Contacts in the Agro-Industry</u>	
Canadian Companies in the Agro-Food Industry in Thailand	90
Leading Thai Companies in the Agro-Food Industry	93
Useful Contacts and Addresses	100

APPENDICES

Page

Appendix A: Agricultural Profile

66
67
68
69

Regional Profile of Thailand
Agro-Economic Zones of Thailand
List of Provinces by Agro-Economic Zone and Region
Land Suitability for Agriculture

Appendix B: Economic Indicators

71
72
73
74
75
76
77
78
79
80
81
82
83

Main Economic Targets in the 6th NESDP
Industrial Production - Selected Major Products
Gross Domestic Product by Industrial Origin - Current Prices
Gross Domestic Product by Industrial Origin - 1972 Prices
Exports for Major Items
Imports by Economic Classification
Balance of Trade, Thailand
Agricultural Balance of Trade
Agricultural Production - Main Products
Value of Agricultural Exports
Value of Agricultural Imports
Sector Share of GDP
Sector Share of Exports
Employed Person by Industry

Appendix C: Investment Promotion

84
85

Agricultural Products and Commodities
Eligible for Investment Promotion
Projects Receiving BOI Promotion by Product Group

Appendix D: Companies and Contacts in the Agro-Industry

90
91
92
100

Canadian Companies in the Agro-Food Industry in Thailand
Leading Thai Companies in the Agro-Food Industry
Useful Contacts and Addresses

EXECUTIVE SUMMARY

The role of agriculture in Thailand is at a crossroads as its flourishing economy pursues continued growth and development in one of the most dynamic regions in the world. Thailand's past economic success has been dependent on the vigor of its agricultural sector; however, to maintain its growth, the sector is currently undergoing a transformation due to a number of factors: the declining availability of arable land, agriculture's employment capacity has reached its limits, international commodity markets are uncertain with oversupply, fluctuating commodity prices and intense competition, protectionism and the impact of subsidies by large producers such as the United States and the European Community.

In order to adapt to these factors, Thailand is utilizing its strong agricultural base to produce more value-added goods for domestic and foreign consumption and to introduce modern technology to achieve high quality and efficiency in their products.

Thailand's investment incentives have been aimed towards export oriented - industrialization requiring production systems to become more competitive, resulting in the need to acquire new technologies, training to use the new technologies, marketing expertise to gain better access to foreign markets and managerial expertise to manage the transition process. It is in these areas where Canadians can assist Thailand in its transition from an agricultural to an industrialized society.

In the past, Canada has not been effective in altering its traditional trading patterns and markets with the U.S., Europe and Japan. Thailand represents a door to one of the most dynamic regions in the world in terms of economic growth and investment opportunities.

For Canada to enhance its market share in Thailand, it has to evaluate its past performance and quickly learn to capitalize on its strengths. In Thailand's case, continued growth translates into potential markets; domestically, regionally and internationally.

The area with great potential is Thailand's agro-food industry. Thailand wants to become self-sufficient in agri-food processing and a world leader in the export of processed food. It is already the world leader in canned tuna and canned pineapple. It is also looking at expanding the fruit and vegetable industry, the livestock and dairy industry, the rubber industry and the marine product industry.

Nevertheless, Thailand still faces a number of deficiencies such as antiquated production technology and methods, inadequate standards and a shortfall of skilled technicians and workers. Canada's strengths in the agro-industry and technology coincide with Thailand's development needs.

As income in Thailand continues to rise over the long-term, a shift towards a diminishing demand for grains and a rise in protein content in the Thai diet is leading to the increased development of Thailand's livestock industry. The developing livestock industry will require more coarse grains, animal feeds and breeding technology which Canada has expertise in.

The rise in income also opens up new markets for agricultural commodities, raw materials and processed foods and technology in which Canada has a competitive advantage.

Canadians must also recognize Thailand's large and developing domestic market, as well as its increasing importance as a key platform for developing linkages with the growing and increasingly integrated Southeast Asian and Indochina markets. As Thai tastes and income levels change, so will their demand for processed goods.

To be successful, Canada must effectively market agri-food products and technology and not remain a mere exporter of commodities.

Canadians must become more perceptive, flexible and aware of market demands, and be able to make the timely delivery of goods, products and services to suit the specified requirements.

Canada must develop strategies, innovative approaches and possible trade-offs to compete in Thailand's agro-food industry to promote and capture a larger share of the growing Thai market.

Areas of cooperation include seafood and meat processing, transfer of technology, animal breeding, feed production and management; training; food and feed storage technology; embryos and semen; milk production technology; and fruit and vegetable producers seeking to increase exporting capacity via joint ventures and licensing.

INTRODUCTION

Purpose and Approach

The purpose of this study is to provide Canadians in the public and private sectors with an overview of the agricultural sector in Thailand, focussing on the increasing opportunities for Canadians in the Thai agro-industry. Its role is to perform as a catalyst by encouraging and guiding Canadians to utilize their expertise in potential cooperative ventures in the Thai agro-food industry. It aims at increasing awareness of Thailand as an investment opportunity to Canadians and to match Canadian expertise with Thai needs.

Background

The Thai economy has experienced rapid growth in the last few years, predominantly in the industrial and service sectors. Thailand has transformed from an economy almost entirely revolving around rice to a diversified manufacturing sector having almost as large a share of Gross Domestic Product (GDP) as agriculture.

Thailand has reached a point where it is now being considered as a "newly industrialized country" (NIC). This is reflected in the declining share of agriculture in GDP from 25% in 1980 to 16% in 1988. Nevertheless, Thailand's agricultural exports remain the major source of export earnings representing 51% of total value in 1987.

Thailand's export led growth in the manufacturing industry has been centered around the Greater Bangkok area. Unfortunately, the growth has been unmatched in the other regions of Thailand. Recent attractive prices have led to an increase in production of major crops in corn, sugar cane, rubber, soyabean, cotton, and mungbean; however, these traditional crops have been subject to price fluctuations. Farmers are now diversifying into non-traditional areas such as fruits, vegetables, cashew, oil palm, livestock and dairy.

To reach NIC status, Thailand must improve rural income distribution. In a country where 2/3 of the labour force is involved in agriculture, the agro-food industry will have a large role to play in Thailand's future growth. The Thai government is making measures to further intensify agricultural productivity, encouraging diversification into agro-industries and promoting off-farm activities to supplement incomes of Thai farmers.

During Thailand's fifth National Economic and Social Development Plan (1982-1986) problems and issues arose which significantly affected the development of Thai agriculture. Agricultural production was dependent on only a few traditional crops such as rice, maize, cassava, tobacco and rubber, characterized by low productivity, and high costs and low quality of production. These problems inhibited the pace of agricultural development resulting in a growth rate in the agricultural sector of 2.1%.

In response to the fifth NESDP, Thailand's sixth National Economic and Social Development Plan (1987-1991) focussed on the agro-industry as a key target industry. The agro-industry was chosen as the linkage between the traditional agricultural society, and the expanding industrial base. The Thai government has developed guidelines and promotional support for the agricultural sector, realizing the paramount linkage between agriculture and industry in Thailand's drive to become a NIC. There is a variety of benefits to be reaped and opportunities to be capitalized upon by Canadians if they act astutely and promptly.

Thailand is the centre of one of the most dynamic regions in the world with a vast array of opportunities for cooperative ventures. All economic indicators as well as confidence in the Thai economy remain strong. The market remains ripe for Canadian companies to enter and contribute to the continued expansion of Thailand's agro-industry and related fields through joint ventures, technology transfer and the sharing of management expertise.

In the future, Thailand will continue to be one of the most open of all Asian economies, welcoming foreign investment and placing few restrictions on foreign trade. Thailand is waiting to forge new external links reflecting its new policies. If new relationships are to develop between Canada and Thailand, each partner must understand the other's goals and priorities. The links must cater to the needs and strengths of both the Canadian and Thai economies.

CONCLUSIONS

- * The Thai economy is utilizing its strong agricultural base to develop its agro-industry to produce more value-added goods for domestic and foreign consumption and to introduce modern technology to achieve high quality and efficiency. Improving competitiveness requires the acquisition of new technologies, training to use the new technologies, marketing expertise to gain better access to foreign markets and managerial expertise to manage the transition process.
- * Thailand is moving away from a traditional subsistence economy dependent on the production of agricultural commodities such as rice, cassava, sugar cane, tobacco, maize and rubber, to an emerging large scale food processing industry focussing on livestock, dairy, animal feed, cassava, and vegetable, fruit and seafood canning.
- * Thailand's true potential as a food processing industry has hardly been scratched. It remains the most promising base for export-oriented production in the region with an abundant and cheap labour pool, easily trained workers, tax holidays and incentives for export-oriented ventures.

- * Value-added food processing and packaging has potential throughout the country and will play a key role in raising farm incomes.
- * Canada has strengths which coincide with Thailand's development needs in the agro-food industries: dairy and livestock, seed, animal feed and forages and food processing. To be successful, Canada must vigorously market agri-food products and technology and not remain as mere commodity exporters.
- * Thailand offers Canada access to the world's biggest market in the Asia-Pacific which presently accounts for less than 10% of Canada's total exports. This is following a dramatic shift in the pattern of world trade towards the Asia-Pacific.

RECOMMENDATIONS

- * Thailand has achieved considerable progress in industrial development; however, its efforts have led to a high degree of concentration of industries and businesses in and around Bangkok. Canadians should single out other principal cities (eg. Nong Khai) to act as development poles and to take advantages of investment privileges.
- * Canadians should take advantage of Thailand's investment incentives and desire to become a leader in food processing by establishing joint ventures with Thai companies and developing export commodities in which Thailand enjoys a comparative advantage.
- * Thailand requires assistance in developing its agro-industry to produce more value-added goods by acquiring new technologies. Canada can assist Thailand's development through technology transfer in areas such as food processing, dairy production and cattle breeding.
- * The agro-food industry with the most potential for cooperative ventures with Canada is the dairy industry. Canada has the expertise and capability, while Thailand requires the technology and management skill. Canada should become more active in Thailand's expanding dairy industry.
- * In order to gain access to Thailand's agro-industry market, Canadian companies must become more active in promoting their companies and their services by participating in trade fairs and trade missions. Business relationships in Thailand take time to nurture and develop. If Canadians are patient and show some effort, they will reap the rewards.

MARKET OVERVIEW OF THAILAND

Economic Environment

In the last two decades, Thailand has been one of the fastest growing developing countries in the world. During the 1960's and 1970's, Thailand's economy expanded at an annual rate of 7%, comparing favourably with the other nations of the Pacific Rim - the area which achieved the highest average growth in the world during this period.

Following a period of policy adjustment and unsteady economic performance during the first half of the 1980s, the Thai economy has achieved an impressive record of economic expansion since 1986 characterized by surging exports, price stability and an investment boom. In 1986, 1987 and 1988, the economy grew by 4.7%, 7.1% and 11.0% respectively. Economic growth in 1989 is estimated at 10.4%, the agricultural sector expanding by 4.8%, manufacturing 12.5% and construction by 19.8%. Forecasts for 1990 foresee economic growth at 9.4% - 4% for the agricultural sector and 12% for the manufacturing sector. All economic indicators and confidence in the Thai economy remain very strong.

Thailand has had the ability to take advantage of the strength of its resource base and the abundance of fertile land. The increase in agricultural exports has enabled the economy to maintain a rather fixed exchange rate which has led to relatively low inflation and enhanced the growth of the non-agricultural sector.

Thailand's competitive exchange rate policy has led to a depreciation of Thailand's effective exchange rate, raising the growth rates of foreign exchange earners, particularly manufactured exports and tourism.

Also contributing to Thailand's growth have been sound fiscal and monetary policies that stabilized the Thai economy even in difficult periods, such as the world economic slowdown of 1985-86.

Moreover, Thailand's diversified economic structure in product types and export markets have reduced the effects of world economic fluctuations and of the increasing protectionism of its major trading partners.

Although Thailand has incurred a rapid increase in industrial and service sectors, agriculture has remained the key sector in development and growth for the last 25 years. Diversification has turned Thailand into one of Asia's main agricultural producers and exporters.

Thailand's recent rise in inflation to 6% has been due to increases in agricultural and food prices. Prices of agricultural products and processed foods in the first half of 1989 increased by 10.7% and 18.2% respectively, compared to 1988. The highest increases were in seafood and fruits which were up 20%, while grain, cereal, meat and dairy product prices increased by 15.4%, 13.7%, 15.1% and 8.7% respectively.

Thailand's growth in agricultural exports in the first 7 months of 1989 was led by sugar and prawns. The increase in export value of sugar was 102.6% and the increase in prawn export value was 94.1%.

Growth in manufacturing and in the service sector has reduced agriculture's dominance. In 1988, agriculture made up 16.9% of GDP, while manufacturing, mining, construction, transportation and communications, banking, insurance and real estate consisted of 43.9%. Processing of agricultural products is the most important industrial activity, contributing 5.7% of total industrial output.

As Thailand likely moves toward its second consecutive year of double-digit growth in 1989, it remains a market of prime importance to Canada. Bilateral trade is expected to reach \$750 million, up 33% from 1988, with the trade imbalance increasingly widening in Thailand's favour. Thailand's impressive growth rates and increasing purchasing power will make it an important trading partner for Canada over the longer term.

Economic expansion in Thailand has been due to several internal and external factors. Government policy of avoiding large national projects and relying on the private sector to make investment decisions has led to the development of a wide range of manufacturing industries consistent with its comparative advantage.

The Thai economy is geared toward seizing opportunities created by external events. However, because competitiveness in manufacturing still derives primarily from their low prices, rapid industrialization can only be sustained under favourable conditions which cannot always be counted on. The international environment has been very favourable during its past economic growth.

Japan and the Asian NICs (Taiwan, Hong Kong, South Korea and Singapore) have lost their competitiveness in certain manufacturing industries, thus creating an opportunity for Thailand to accelerate industrialization which has led to a shift in comparative advantage in East Asia.

The decline in the NICs competitiveness has prompted countries to invest in Thailand, which has led to an investment boom since 1987. Private investment rose 26% in 1987 and 23% in 1988. The government's sound macroeconomic management and political stability has also contributed to increasing investor confidence in Thailand.

Constraints on the Economy

- * An expanding trade deficit which totalled 100 million baht in 1988, twice the amount of 1987. The majority of imports were for the expansion of export-oriented projects.
- * Protectionism and uncertainty in the world market.
- * Unbalanced regional economic development. The majority of development has taken place in and around Bangkok.
- * Infrastructure shortages in coping with the economic boom.
- * Expansion has caused environmental problems such as water, air and noise pollution, traffic and port congestion, and has led to haphazardous waste treatment.

The main threats to growth which need to be monitored are trends towards protectionism, unfavourable weather conditions affecting agriculture and a low world inflation rate depriving Thai exports of their competitive advantage.

For growth to continue, an economic environment must be created in which exports can begin to strengthen qualitative factors, drawing upon innovation, product differentiation and product quality.

Despite these constraints, Thailand holds the promise of unprecedented prosperity. Its future development remains the brightest in the entire region and can act as a base for Canadians in all of Asia.

GOVERNMENT POLICY

Sixth National Economic and Social Development Plan (1987-1991)

The Sixth NESDP outlines Thailand's development strategy and direction from 1987 to 1991. The Sixth Plan, like its predecessors, is a set of policy statements, providing a broad framework for the government agencies to follow. Since it is broad, it tends to lack in operational content, it is void of statutory enforcement and unbinding of budget allocation providing therefore for much leeway and interpretation. Nevertheless, it is the benchmark used to guide Thailand's development path, making it important to know when investing.

Economic growth and expansion remain the NESDP's major objectives. Two sectors have been identified as the focus sectors: agro-processing and engineering industries. Emphasis is on the creation of additional value-added goods in the agricultural industries and increased exports of agricultural and labour intensive manufacturing products.

Three main strategies have been developed to achieve these broad goals:

1. To become more efficient in its economic development efforts by improving and utilizing human and natural resources, science and technology, management and administration.
2. Address the income disparities in the regional areas by improving the efficiency in rural and urban management.
3. To diversify production and marketing structures in conjunction with market demand and the availability of resources. This strategy is in response to the decline in the role of the major agricultural commodities. The Sixth Plan is promoting 161 agricultural commodities and 38 industrial commodities. Incentives and investment promotion plans have been implemented to attract investors to move to the new economic zones outside of Bangkok.

Due to fluctuating prices and uncertain conditions in the markets for agricultural products and limited farmland, Thailand has been forced to develop a new strategy for agricultural development to maintain its rapid growth. The Sixth Five-Year Plan is to diversify production from traditional export commodities to non-traditional agricultural crops with import-substitution, export and industry development. The government has encouraged private sector involvement in production, processing, marketing and trade of non-traditional agricultural commodities with minimal government intervention.

The government is following a restructuring of the domestic production system so that the risks which arise from market instability in traditional exports, such as maize, tapioca and rubber are reduced. Priority has been awarded to marketing and restructuring the production system in manufacturing and processing of agro-industrial products.

The strategy is concerned with production that responds to foreign market demands and product quality. This strategy will be continued in the 7th NESDP (1992-1996), where agro-industry will continue to receive high priority.

The focus of the 7th Plan will be on domestic issues as the economy begins to slow down, such as the environment, jobs, education, health, transportation, infrastructure and income distribution. Development priorities will be to decentralize from Bangkok to improve the domestic market and facilitate a more stable manufacturing base.

As the agricultural labour force declines and migrates to the industrial sector, the agricultural sector production pattern will change from small, labour intensive farming to mechanized farming on larger plots of land.

The fundamental adjustment necessary for continued growth remains the reduction of the emphasis on primary agricultural activity, focussing on the expanding role of the manufacturing industries to generate employment and export income.

Development Guidelines for Target Agro-Industries

1. Develop and support agro-industries that have high potential for exports and import substitution. Emphasis will be placed on improving quality and raising standards, advising on investment opportunities, research and development into appropriate technology, strengthen productivity, develop management systems, and upgrade small-scale and medium scale manufacturers.
2. Expand the production base into new agro-industries which have high market potential from:
 - (i) surpluses of traditional raw materials (rice, maize, sugarcane, rubber, cassava, and tobacco);
 - (ii) goods with development potential such as processed food from vegetables and fruit, forest products (paper, furniture), pharmaceutical products, health food from medicinal plants, spices, and aromatics.
3. Encourage farmers to formulate production plans focussing on quality and to join groups for producing raw materials that are required by agro-industrial plants.
4. Encourage development of agro-industries in rural localities, based on needs of the market.
5. Restructuring Agricultural Production:
 - (i) diversify agricultural production from traditional commodities that face marketing problems into new products that correspond to market demand;
 - (ii) improve product quality in accordance with market conditions and reduce production costs.

BOARD OF INVESTMENT

The role of the Board of Investment (BOI) is to promote the establishment of private sector investments which are in line with the government's development goals. BOI accomplishes this by providing and administering incentives for investors and implementing promotional campaigns. The BOI establishes investment policies and approves the promotion of investments.

Sub-committees are empowered to approve export-oriented projects and deal with specific matters such as legal issues, machinery and raw materials privileges, expatriate employment and land use.

For a project to be granted investment incentives, the BOI must be satisfied that the project is feasible and makes a contribution to national economic development. Priority consideration is given to projects which export their production, use domestic raw materials, employ a large labour force and are located outside of Greater Bangkok.

Import substitution projects are not eligible for promotion unless there are economic benefits such as technology transfer, skills development and linkages to priority industries.

A promoted company is either a limited company, a foundation or a cooperative granted a promotion certificate by the BOI to engage in any of the activities eligible for promotion.

A list of agricultural activities eligible for promotion is in Appendix C. Products which are not on the list, but meet general BOI criteria for promotion can usually be added to the list at the investor's request.

Investment Incentives for the Investor

Guarantees:

1. Against nationalization;
2. Against competition of new state enterprises;
3. Against state monopolization of the sale of products similar to those produced by promoted enterprises;
4. Against price controls;
5. Permission to export;
6. Against imports by government agencies or state enterprises with taxes exempted.

Protection Measures:

1. Imposition of surcharge on foreign products at a rate not exceeding 50% of the CIF value for a period not more than 1 year at a time;
2. Import ban on competitive products;
3. Authority by the Chairman to order assisting action of tax relief measures for the benefit of promoted projects.

Permissions:

1. To bring in foreign nationals to undertake investment feasibility studies;
2. To bring in foreign technicians and experts to work under promoted projects;
3. To own land for carrying out promoted activities;
4. To remit abroad foreign currency.

Tax Incentives:

1. Exemption or 50% reduction of import duties and business taxes on imported machinery;
2. Reduction of import duties and business taxes of up to 90% on imported raw materials and components;
3. Exemption of corporate income taxes from 3 to 8 years with permission to carry forward losses and deduct them as expenses for up to 5 years;
4. Exemption of up to 5 years on withholding tax on goodwill, royalties or fees remitted abroad;
5. Exclusion from taxable income of dividends derived from promoted enterprises during the income tax holiday.

Investment Promotion Zones

Investment promotion zones are designated areas around the country for industrial development. Additional incentives are offered to investors who choose to establish their operations in these areas.

1. Maximum reduction of 90% of business tax on sales of products for a period up to 5 years;
2. Reduction of 50% of corporate income tax for 5 years after the termination of a normal income tax holiday or from the date of income earning;
3. Allowance to double the cost of transportation, electricity and water supply for deduction from taxable corporate income;
4. Allowance to deduct from the taxable corporate income up to 25% of the investment in the costs of installing infrastructural facilities for 10 years from the date of income earning.

The BOI has designated four Investment Promotion Zones:

Zone 1 is in the north of Thailand including San Kamphaeng District in Chiang Mai Province, Mae Sot District in Tak Province and Muang District in Lamphun Province.

Zone 2 is in the central/northeast regions including Muang, Pak Thong Chai and Pak Chong Districts in Nakhon Ratchasima Province, and Muang and Kaeng Koi Districts in Saraburi Province.

Zone 3 is in the northeast including Muang and Kaeng Koi Districts in Kon Kaen Province.

Zone 4 is in the south including Muang and Hat Yai Districts in Songkhla Province.

Also included in the Investment Promotion Zones are industrial estates promoted by the BOI. These are:

- Bang Chan Industrial Estate, Minburi District, Bangkok
- Lard Krabang Industrial Estate and Export Processing Zone, Lard Krabang District, Bangkok

- . Nava Nakorn Industrial Estate, Pathumthani Province
- . Bang Poo Industrial Estate, Samut Prakarn Province
- . Bang Plee Industrial Estate, Samut Prakarn Province
- . The Northern Region Industrial Estate, Lamphun Province
- . Laem Chabang Industrial Estate, Choburi Province
- . Map Ta Phut Industrial Estate, Rayong Province

Incentives for Exporting Enterprises

1. Exemption of import duties and business taxes on imported raw materials and components.
2. Exemption of import duties and business taxes on re-exported items.
3. Exemption of export duties and business taxes.
4. Allowance to deduct from the taxable corporate income the amount equivalent to 5% of an increase in income derived from export over the previous years, excluding costs of insurance and transportation.

Foreign Ownership

Projects which are BOI promoted may be majority foreign owned when 50% to 79% of production is exported, and 100% foreign owned when 80% or more of production is exported.

If projects are based on local resources, 60% of registered capital must be held by Thais, and projects manufacturing for the domestic market must be 50% Thai owned.

RESOURCES OF THAILAND

Climate

Thailand has a monsoonal climate divided into three major seasons: (1) the cool season from November through February; (2) the hot season from March to May; and (3) the rainy season from May through October. Along the southeast coast of the peninsula, the rainy season lasts through December.

Regional Differences

Thailand can be divided into six principal regions: a) Central Plain, b) Southern Coast, c) Northeast Plateau, d) Central Highlands, e) North and West Continental Highlands, f) Peninsular Thailand.

North

The Northern region consists of forested mountains and the upper central plains. It is drained by four main rivers which combine to form the Chao Phraya, Thailand's major river which flows south and joins the sea near Bangkok. March until May is the hottest time of year in the North and December to January the coolest. The rainy season runs from June to November, with the highest rainfall occurring in August.

Vegetation consists of mixed deciduous and dry evergreen forests and some pine forest above 1,000 meters in elevation. In the lowlands, transplanted rice is the main crop. Some parts of the paddy soils are used for tobacco, vegetables and soybeans as an irrigated second crop in the dry season. Other soils are used for the cultivation of upland crops, including tobacco, corn, peanuts, soybeans, sugar cane, vegetables and fruit trees like longan and mandarin oranges.

Northeast

The Northeast is Thailand's driest region consisting of approximately one third of the country's land, of which approximately 13% is still forested. Solar radiation is strong and temperature variation wide. April is the hottest time of year, January the coolest, with the highest rainfall in August. The monsoon rainfall is not retained well by the region's sandy soil.

The most important crop in the lowlands is glutinous and non-glutinous rice. Low fertility of soils, frequent droughts and flash floods make other areas only moderately suited for rice cultivation.

Upland crops are grown on the alluvial flood plains on more fertile soil, but in some areas soils have a high salt content. Cassava and kenaf are the main crops of the Northeast. Corn, sugar cane, sorghum, castor bean and peanuts are also grown. Continuing crops are mulberry for silk production, mango and kapok. The Northeast region is also the most important livestock production area.

Central

The Central region is an alluvial plain which extends from the western mountains to the southeastern coast. This region covers one-fifth of the country and it contains the fertile basin of the Chao Phraya river. It is Thailand's most productive farming land due to alternating tropical wet and dry seasons, plentiful water supply and efficient natural soil replacement. April is the hottest month, January the coolest and September the wettest.

The main crop in the southern Central Plain is wet land rice, as most of the soils are poorly drained, very fine textured and are flooded during the rainy season. Due to the Chao Phraya Irrigation Project, it can grow a second crop of rice in the dry season.

Increasing areas are used for vegetables and fruit, some grown on land once used for rice. Vegetables and fruit trees are grown on raised beds, separated by deep ditches. The most widely grown fruits are citrus, papaya and mangoes. The important vegetable crops are beans, eggplant, peas, tomato, sweet corn, baby corn, lettuce, cabbage, chinese kale and cucumber. In the tidal flat areas, land is used for saltwater-shrimp, salt farming and sugar production.

In the western and northern Central Plain, the soils are more varied and the agriculture more diversified. The principal crops are transplanted rice, corn, soybeans, mungbeans, cotton and sugar cane. In the western Central Plain, sugar cane is the most important upland crop, as well as corn, sorghum, castor bean, peanuts and mungbeans. Areas once used for rice are now being used for shrimp and fish ponds.

East

This region was once under dry evergreen forest, but during the last two decades it has been cleared. The principal upland crops are cassava, sugar cane, pineapple, coconut and corn. Rubber is also a main crop along with fruits such as durian, rambutan and citrus.

South

The main crop in the Peninsula is rubber, which is grown on sloping soils with good drainage. Fruit, coffee, coconut and cashew nuts are also grown. The eastern coast cultivates upland crops such as corn and beans, while broadcast rice is also grown on marine brackish water and alluvial deposits. Increasing area is also being devoted to the cultivation of oil palm. Great potential exists in this region for shrimp and palm oil.

OVERVIEW OF AGRICULTURAL SECTOR

Production and Markets

Agricultural growth has resulted in a diversified production structure based on traditional and non-traditional crops, including cereals, fruit and vegetables, sugar cane, rubber, livestock and seafood.

Traditional Crops

- Rice
- Cassava
- Rubber
- Maize
- Sugar Cane
- Kenaf
- Tobacco (Virginia)

Non-Traditional Crops

Pineapple
Mungbeans
Sorghum
Kapok
Groundnuts
Soyabeans
Cotton
Sesame
Oil Palm
Sunflower
Strawberries

Coconut
Chilli Peppers
Shallot/Onions
Garlic
Tomatoes
Cucumbers
Mustard
Cabbage
Long Beans
Cashews

Demand

Thailand's production potential for domestic and foreign demand is very important. Since local consumption consists primarily of fresh or semi-processed produce, the future of agro-industries is in the export market.

As Thailand's per capita income growth begins to expand, food consumption patterns will begin to change, from cereals to meat, fish and dairy products. These changes are reflected in the country's exports, which are changing from the traditional to the non-traditional commodities. As Thai tastes and incomes change, other food processing possibilities will arise creating more value added-goods.

In view of the limited domestic market for processed food due to the country's abundant supply of fresh produce, any significant expansion will take place by export growth rather than import substitution.

TRADITIONAL CROPS

Rice

Rice is the staple food of Thailand, thus playing a vital role in the economy. Thailand is traditionally recognized as a major rice producing nation. Rice covers 60% of the total cultivated land, predominantly situated in the Central region. Until the early 1980s it was the country's largest export item when it was overtaken by manufactured products.

Today, paddy production is the fifth top foreign currency earner. Thailand is currently ranked the world's fifth largest rice producer after China, India, Indonesia and Bangladesh. In 1989, the production of the rice crop is forecast to be 18 million tons compared to 1988's banner year of 17.6 million tons.

Tapioca (Cassava)

Tapioca is the second largest foreign currency earner after rice in the farm sector and it is one of the top 10 export items.

Cassava roots are grown primarily in the Eastern and Northeastern regions and are used for processing into tapioca products, including hard pellets, chips and flour. The majority of tapioca products are processed into tapioca pellets, for the manufacture of animal feed.

Most tapioca products are exported overseas to the European Community consisting of 90% of total exports. The remainder goes to the U.S.S.R., Korea, Japan and Israel. Thailand still maintains a high surplus. The Ministry of Commerce has introduced an export system to encourage tapioca exports to other markets.

During the last decade, export volume and value of tapioca products has fluctuated widely. Prices have been susceptible to oversupply, whereas volume has been susceptible to a decline in the output of other agricultural products like maize which is used as a tapioca substitute in manufacturing animal feed.

Rubber

The rubber industry is the third largest foreign currency earner in the farm sector. Thailand is also the world's third largest natural rubber producer after Malaysia and Indonesia. Its share of world rubber production has risen from 14.6% in 1983 to 18.2% in 1988. Rubber is Thailand's fifth largest export item. The largest importer is Japan (45%), while other major importers are China, the United States and Singapore.

Rubber has also played a vital role in Thailand's economy, with rubber product manufacturing rapidly emerging as one of the most promising sectors. Rubber prices have vastly improved from the record lows in 1982-1985, contributing to its rise as one of the top foreign currency earners in the farm sector.

Approximately 95% of Thailand's rubber trees are located in the southern provinces while the remaining 5% are located in the east. Programs are also being introduced to cultivate rubber production in the northeastern region with success. The areas around Loei and Nong Khai have yielded the best results.

Traditionally, Thailand's latex from trees has been processed into rubber sheets and blocks for export to manufacture car tires. Fresh latex is currently being made into a concentrated latex which is being used to produce rubber products like condoms, balloons, toys, electrical tape, paint, car mats and gloves.

The future of the rubber industry looks bright as consumption is increasing among the NICs, China, United States, Japan and India.

Sugar

The sugar industry is the fourth major foreign currency earner in Thailand's farm sector. Sugar is produced from cane sugar grown predominantly in the western part of the country and in certain areas in the east and northeast. Thailand has reached self-sufficiency in sugar output; nevertheless, exports fluctuate year to year depending on the global demand.

To stabilize the industry and to ensure income for planters, the Thai government adopted a revenue sharing system between cane planters and sugar millers. The revenue derived from sales of sugar is taken into account and the balance shared at a ratio of 70-30 percent between cane planters and sugar millers. There are three types of sugar production. Quota A involves sugar produced for domestic consumption to ensure domestic supply, Quota B is for overseas sales and Quota C is either for local sale or export after the first two quotas are met.

Maize (Corn)

Maize is grown primarily in the upper central region and the northeast region and is of great importance to the high land farmers. It is used primarily for the animal feed industry. The major markets are Malaysia, Hong Kong, Saudi Arabia and Singapore.

Table 1

RICE (Major and Minor Crop): Area, Production, Yield, Farm Value

Crop Year	Planted Area ('000rai)	Harvested Area ('000rai)	Production ('000tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	62,667	55,843	17,470	313	39,586
1979/80	58,971	54,087	15,758	291	42,656
1980/81	60,110	57,501	17,368	302	54,970
1981/82	59,970	56,906	17,774	312	51,118
1982/83	60,134	55,875	16,879	302	49,572
1983/84	62,596	60,038	19,549	328	54,443
1984/85	62,329	60,186	19,905	331	46,278
1985/86	63,422	61,457	20,264	331	46,278
1986/87	61,571	57,463	18,868	328	45,528
1987/88	58,474	56,768	18,042	318	67,910

Source: Office of Agricultural Economics

Table 2

AGRO-FOOD INDUSTRY

MAIZE: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	8,661	8,211	2,791	340	4,492
1979/80	9,529	8,902	2,863	322	5,984
1980/81	8,960	8,409	2,998	357	7,284
1981/82	9,796	9,157	3,449	377	7,517
1982/83	10,494	8,163	3,002	366	6,124
1983/84	10,552	9,792	3,552	363	8,845
1984/85	11,355	10,866	4,226	389	9,845
1985/86	12,377	11,990	4,934	412	9,980
1986/87	12,194	11,345	4,309	360	6,894
1987/88	10,941	8,484	2,781	328	6,896

Source: Office of Agricultural Economics

Table 3

CASSAVA: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	5,286	4,967	11,101	2,235	8,547
1979/80	7,250	7,009	16,540	2,360	12,405
1980/81	7,940	7,769	17,744	2,284	8,162
1981/82	7,726	6,795	17,788	2,618	9,071
1982/83	8,552	6,362	18,989	2,985	14,051
1983/84	8,780	8,345	19,985	2,395	13,190
1984/85	9,230	8,603	19,263	2,239	7,705
1985/86	7,748	7,528	15,255	2,026	11,898
1986/87	8,820	8,567	19,554	2,283	17,403
1987/88	9,879	9,668	22,307	2,307	13,607

Source: Office of Agricultural Economics

Table 4

SUGAR CANE: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	3,190	3,152	20,561	6,523	5,493
1979/80	2,730	2,660	12,827	4,823	4,967
1980/81	2,927	2,853	19,854	6,958	12,623
1981/82	3,857	3,833	30,200	7,878	14,426
1982/83	3,645	3,607	24,407	6,766	7,517
1983/84	3,607	3,349	23,869	7,127	8,282
1984/85	3,424	3,319	25,055	7,549	7,641
1985/86	3,443	3,412	24,093	7,061	5,710
1986/87	3,370	3,251	24,450	7,521	7,041
1987/88	3,664	3,566	27,191	7,624	8,918

Source: Office of Agricultural Economics

Table 5

PARA RUBBER: Area, Production, Yield, Farm Value
Year 1978 - 1987

Year	Planted Area (^{'000} rai)	Tappable Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978	9,426	6,767	467	69	5,888
1979	9,576	8,857	534	60	7,673
1980	9,615	7,753	465	60	7,433
1981	9,867	7,933	507	64	6,717
1982	10,001	8,862	576	65	9,567
1983	10,143	8,864	593	67	8,688
1984	10,254	8,572	617	72	9,109
1985	10,288	8,821	773	87	11,401
1986	10,346	9,001	811	90	12,653
1987	10,390	8,734	851	97	15,462

Source: Office of Agricultural Economics

AGRO-FOOD INDUSTRY

Biotechnology-Based Agro-Industries

Thailand's agricultural sector has a number of important industries where biotechnology is or can be applied in. These are livestock, sugar, animal feed, cassava, aquaculture, fertilizers, pesticides, vegetable and fruit canning and seafood canning.

The development of agro-industry will create linkages between the agricultural sector and the industrial sector. The linkages will help increase production and exports, and assist Thailand's development into an industrialized country.

Thailand's low level of research and development activity in industry means the growth of technology based industries is highly unlikely. There is a low probability that technology developed in research laboratories will drive the technology based agro-industries as in developed countries such as Canada. The majority of industries will have to rely on imported technology to bridge existing capability and production gaps.

Biotechnology will have important impacts on the development of new crops, plants and animal species. Prospects are bright for the development of insect and disease resistant plants in Thailand through genetic engineering. Initially the effects will be in the rice, maize and legumes due to large plantation areas.

The animal feed industry should expand to satisfy the need created by the increase in livestock production and aquaculture. Thai animal feed firms are highly competitive in export markets and it is expected that these firms will invest in technology development to remain competitive.

Source: Thailand Development Research Institute, Thailand's
Capability in Industry, 1989.

Table 6

Future Technologies in the Agro-Industry

Animal breeding technology
Chemical engineering technology
Chemical and biochemical technology
Chemical and biochemical analysis
Control and measurement technology
Computer-aided production technology
Consumer testing
Dehydration (drying) technology
Enzyme technology
Fermentation and reactor technology
Genetic engineering technology
Industrial engineering technology
Plant tissue culture cell fusion technology
Plant breeding technology
Packaging technology
Preservation technology (including refrigeration)
Pollution control technology
Separation and purification technology
Sterilization and pasteurization technology
Water purification technology.

Source: Survey of firms in, Thailand's Capability in Industry, 1989.
by Thailand Development Research Institute.

The following lists important agricultural products where Thailand is expected to maintain a comparative advantage over the next 5-10 years.

Table 7

Products	Export Amount (1988) (million baht)	Value (million baht)	Technological Considerations
Rice	2.8	19,600	
Cassava	7.2	20,700	- Productivity 2.2 ton/rai can be improved to 5-6 ton/rai.
Rubber	900,000	23,500	- Currently replacing 60% of plantation with variety providing 1 year faster growth and 50% better yield.
Shrimp	40,000	n.a.	- Imported technology. High impact on related industries and on the environment.
Fruits/Vegetables	n.a.	7,750	- High potential in increasing varieties and improving technology and vegetable seeds.
Orchids	7,500	510	- High potential in improving production technology.
Herbs and Spices	615	34,000	- High potential for variety improvements and high impacts on linkage industries.
* fish meal	360,000	n.a.	- Plant and animals for animal feed. SCP may replace protein fish meal.
* atemia	300	n.a.	- Need to improve production technology.
* soyabean meal	450,000	n.a.	- Potential to increase production to satisfy market need by developing pest-resistant varieties and utilizing rhizobia.

Source: Thailand Development Research Institute, Thailand's Capability in Industry. 1989.

Opportunities for Canadian Agricultural Technology/Machinery

In conjunction with Thailand's goal to become a world leader in food processing, Thailand is also looking to increase production without increasing the harvested area. Canada has equipment and expertise to assist Thailand in becoming more efficient in production in the following areas:

1. Four wheel drive tractors.
2. Seeding equipment.
3. Tillage equipment.
4. Harvesting equipment.
5. Grain handling.
6. Storage equipment and silos.
7. Specialized machinery for the production of grains under dryland farming. Potential exist in the dry region of the Northeast part of Thailand.

Food Processing

Thailand's food processing industry is enjoying an investment boom as the export of highly processed foods continues to expand. The agro-food business is becoming more attractive because it yields the maximum benefit in terms of the value-added component, employment and export earnings, unlike the manufacturing industries, which often rely on imported raw materials.

Areas such as fruit and vegetables, cashew nuts, dairy, livestock and seafood are spearheading the growth of Thailand's food processing industry.

Investment is in a broad range of products including canned and frozen fruits and vegetables; seafood products such as crabs and baby clams; processed meat; and prawn farming. Other promising areas are processed foods derived from non-traditional crops such as tomatoes, mushrooms, asparagus and baby corn.

During the past two years of the Sixth Plan, the Thai government has introduced various production promotion programmes in the agricultural sector:

- * diversification of crops;
- * introduction of new hybrids;
- * new types of extension services;
- * commercialization of farm products instead of relying on traditional outlet of surplus for exports;
- * fruit preservation;
- * export of chicken parts;
- * livestock production in small and large scale farms;
- * introduction of broiler (meat type) and chicken (egg type) hybrids.

The agro-food processing industries perform a vital role in Thailand's agricultural sector undertaking important marketing functions involving transportation, communication and processing, while serving as channels for technology transfers in each industry.

Thailand's agri-business contributed 51% of total Thai export earnings in 1987. This contribution is expected to grow in the future as Thailand continues to move away from a dependence on raw agricultural exports to more value-added agricultural exports.

Thailand's true potential as a food-processing industry has hardly been scratched. It remains the most promising base for export-oriented production in the region with an abundant and cheap labour pool, easily trained workers, tax holidays and incentives for export-oriented ventures.

Activities Eligible for Export Promotion

1. Processing or preservation of food
 - * canning (air-tight containers)
 - * food preservation
 - * fruit juice
 - * sticky rice crackers
 - * production of pasteurized and/or sterilized milk
2. Meat Processing
 - * swine
 - * poultry
 - * aquatic animals
3. Processing of Agricultural Products
 - * alfa starch
 - * nursery block for planting made from agricultural waste

Food processing can be separated into two fields: preservation, which includes canning, juicing, preserving, drying and freezing; and processing, which includes conserves, condiments and fermenting.

FRUIT AND VEGETABLE INDUSTRY

Overview

The fruit and vegetable industry has a very important role to play in Thailand's agro-industrialization. The Thai government's policy to further intensify agriculture productivity is encouraging diversification into the fruit and vegetable industry.

Thailand's fruit and vegetable production sector is becoming very dynamic as production intensifies under the Sixth NESDP. The Thai farmer and farm industry have access to a broad spectrum of climatic conditions, allowing for the production of a full range of tropical and semi-tropical products.

Activities Eligible for Investment Promotion

1. Large scale cultivation
2. Processing fruit and vegetable products
 - * Canning
 - * Preservation
 - * Juice
3. Multiplication of vegetable seeds

Table 8

Types of Fresh Fruits

- | | |
|--------------------|-------------------|
| 1. Baby Banana | 14. Mango |
| 2. Grape | 15. Lychee |
| 3. Guava | 16. Durian |
| 4. Jujube | 17. Longan |
| 5. Orange | 18. Mangosteen |
| 6. Papaya | 19. Rambutan |
| 7. Pineapple | 20. Langsad |
| 8. Pomelo | 21. Custard Apple |
| 9. Sapodiallya | 22. Rose Apple |
| 10. Seville Orange | 23. Passion Fruit |
| 11. Sweet Banana | 24. Sweet Corn |
| 12. Young Coconut | 25. Jack Fruit |
| 13. Strawberries | 26. Ma-Prang |

Source: Thai Fruit and Vegetables Exporters Association, 1989

Table 9

Types of Fresh Vegetables

- | | |
|-------------------------------|------------------------------|
| 1. Cabbage | 17. Sugar Pea |
| 2. Asparagus | 18. Celery Cabbage |
| 3. Cow Pea (Green Long Bean) | 19. Balsam Pear |
| 4. String Bean | 20. Morning Glory |
| 5. Cauliflower | 21. Young Maize |
| 6. Cucumber | 22. Fresh Ginger (Young/Old) |
| 7. Bamboo Shoot | 23. Cantonese Vegetables |
| 8. Turnip | 24. Onion-like Vegetables |
| 9. Carrot | 25. Angled Loofah |
| 10. Chilli (Red/Green/Yellow) | 26. Tomato |
| 11. Bird Chilli | 27. Brinjal |
| 12. Sweet Pepper | 28. Eggplant (Violet) |
| 13. Broccoli | 29. Coriander |
| 14. Shallot | 30. Parsley |
| 15. Onion | 31. Lettuce |
| 16. Spring Onion | 32. Lime |

Source: Thai Fruit and Vegetable Exporters Association, 1989.

The intensification of production is creating greater demands for farm management, irrigation, fertilizer and chemical inputs. The industry has developed an infrastructure to provide seeds, fertilizers, disease and insect control, agricultural machinery, packaging materials and facilities for transportation, storage and marketing.

Value-added fruit and vegetable processing and packaging has potential throughout the country and is already playing a key role in raising farm incomes in the northeastern and southern provinces. There remain considerable investment opportunities for fruit and vegetable processing in the rural areas.

Prospects for Selected Fruits and Vegetables

Papaya

There are good prospects for further expansion of papaya exports as there are no major constraints to increased production. Papaya is easy to grow, matures quickly and is not greatly affected by diseases and pests in most areas of Thailand. The selling of papaya, like other fruits, depends upon exporters being able to supply fruit of consistently high quality.

The biggest market is in Japan, but markets also exist in Europe and North America. Potential exists for products such as papaya puree, dried papaya and canned papaya.

Mango

Exporters should be able to develop markets for fresh mangoes in Europe, North America and Southeast Asia. The market for processed mangoes in the canned, juice and puree form is growing and good possibilities exist for manufacturers.

Banana

Banana production in Thailand currently has no linkages to agro-industries, except for small quantities sent to drying factories. Exports of bananas remain small and prospects for increased exports to other markets are slim as there is no control over quality and price of the local varieties for export markets. The thin skins of local banana varieties also render them especially susceptible to damage.

Strawberries

Strawberries have been planted in recent years in the Northern hills of Thailand. Although they have been highly profitable, the expansion of output is constrained by the limited areas in which the crop may be grown. However, farm yields are low and an increase of present output could be achieved with advanced technologies.

Tomatoes

Tomatoes have become one of the most important vegetables in Thailand with output increasing in response to rapidly expanding markets for both fresh and processed tomatoes. Most tomatoes produced in the North and Northeast are used in paste manufacturing factories, close to the plantation areas. Tomatoes are also used in the production of tomato ketchups and tomato sauce. There are small quantities of juice and canned whole tomatoes produced.

The major constraints affecting the production of tomato paste include the inferior quality of the tomatoes grown in Thailand; and the need to introduce state of the art processing equipment to increase the quality of processed products. It has also been found that varieties of tomatoes grown from imported seeds are susceptible to pests and disease under local conditions.

Export Potential

Thailand's export potential for fruit and vegetables is diversifying from the traditional Asian countries to North America and Europe. The market in Asia remains large, however in the last 6-7 years as fruits and vegetables have gained more importance in Thailand's trade picture, North America and Europe have become viable markets.

There are a number of reasons explaining the export expansion. There has been an increase in purchasing power of consumers abroad; improved quality of the product; crop diversification; and an improved market promotion strategy.

Thailand produces about 7 million tons of fruit each year, while 60,000 to 75,000 tons are destined for export markets.

The main export markets are Hong Kong, Singapore and Malaysia, as well as Japan, Taiwan, Brunei and Saudi Arabia. Newer markets include France, the U.K., West Germany, the U.S., Canada and Australia.

Main Fruits for Export

- Papaya
- Longan
- Banana
- Mango
- Tangerine
- Pineapple
- Durian
- Pomelo

Main Vegetables for Export

- Onion
- Tomatoes
- Mushrooms
- Baby corns

Constraints

1. Disorganized marketing system. There is no central system for the transfer of produce from farmers to merchants. Buying and selling depends on individual agreements;
2. Lack of grading and packing facilities;
3. Lack of cold storage;
4. Lack of loading and unloading equipment;
5. Freight expense;
6. Lack of pest resistant varieties;
7. Inadequate training in field technologies for farmers;
8. Disorganized crop production, eg. farmers are ignorant of market demand for particular crops.

Conclusions

1. Demand for fresh fruit and vegetables, both domestic and for export is high. If a good system can be arranged for the production, transportation, postharvest handling and marketing, the fruit and vegetable industry will be of great economic importance.
2. Export oriented production will not be realized until the farmer understands that larger farm revenues are due to export-oriented production and farm specialization.
3. Climatic conditions in Thailand, especially in the mountainous regions, are suitable for the production of temperate vegetables. Tropical vegetables can be produced in the lowlands. The Thai government is promoting increasing vegetable and fruit growing areas to replace some of the paddy fields.
4. Fallow riceland nearby irrigation systems in Central and Northeast Thailand are being converted to vegetable growing areas.
5. Processing vegetables and fruits has a very bright future. The rapid development is illustrated by the pineapple industry.
6. Canada still remains an infant market to Thailand. The vegetable and fruit industry requires improvement in overseas transportation costs and quality.
7. A contradiction exists with the fruit and vegetable industry, and in the agro-industry as a whole. Thailand wants to export and develop agro-food processing and at the same time diminish imbalances in income and poverty. Yet, to do the former, one requires an increase in capital and investment which is impossible for the majority of the farmers to obtain.
8. The opportunity for investment in pre-harvest and post-harvest technology is dependent on the farmer's financial capabilities, his current land and his crop base.

Recommendations

1. Post-Harvest Technology
 - introduce stackable, reusable plastic crates allowing for more efficient precooling and better sanitation between harvest and packing plant.
 - introduce bins and tractors to the industry to speed up product handling and reduce handling losses.
2. Food irradiation technology to extend shelf life.

3. Establish a joint venture promoting expertise in freezing technology and introduce innovations in packaging and related machinery such as the use of aluminium and plastic laminates as packing materials in response to the preference for long life and fresher foods.

4. Technology transfer of aseptic packed fruit juices and gas flush-packed chilled foods.

Opportunities in the Fruit and Vegetable Industry

1. Modernization of food processing for export.
2. Production of fruit juices, concentrates, purees, dehydrated products, sauces and jams.
3. Technology Transfer
 - * post-harvest technology
 - * handling equipment
 - * refrigerated storage
 - * decay control treatment in packing methods
4. Tomato processing.
5. Development of commercial vegetable production utilizing improved varieties of germplasm (chromosomes/genes) which are resistant to diseases and insect pests.
6. Seed - many seeds used in vegetable production are unavailable in Thailand.
7. Harvesting Aids
 - * self-supporting fruit ladders (to be introduced and manufactured in Thailand)
 - * mini-lifts
 - * canvas bottomed packing bags to reduce handling damage

SEED INDUSTRY

Overview

Thailand's seed industry is divided into the public and private sector. The public sector has been established for many years; however opportunities for expansion and investment exist in the private sector.

Public Seed Sector - Seed Division

Rice is the most important item in the seed industry. In 1988, a total of 8.4 thousand tons were produced, accounting for 60% of total seed production.

Corn seed is second in importance. Its highest production occurred in 1984 at 2,700 tons. Since that time, production has been declining due to lower demand for corn seed induced by declining corn prices.

Soyabean is the third most important item. Its production has been increasing rapidly since 1985 because government intervention in importing soyabean and soyabean meal has pushed up domestic prices.

Groundnut seed production has also increased rapidly in the last few years for direct consumption and export. The international market assisted in pushing up the domestic price. Groundnut seed is also used in the public drought relief programmes which has increased its demand.

Mungbean is also produced and its demand has risen because it is also used by the public drought relief programme.

Small quantities of cotton and sorghum seed are also produced, as well as wheat and sesame seeds.

The production of vegetable seed is in its early stage of development. Its growth is slow because it is lacking in the necessary equipment for processing vegetable seeds, and in appropriate personnel.

Private Seed Sector

The private sector is just beginning to take advantage of technological advances and has opportunities for growth. In the past, the private seed sector was dominated by a few large firms concentrating only on vegetable seed.

Seed companies spend as much as 10-20% of their revenues on sales promotion campaigns, which has fueled greater market acceptance by farmers.

There are approximately 100 brands of corn seeds and 60 brands of vegetable seeds on the market, thus competition depends on using the best brand name.

One of the main characteristics responsible for the fast development in the private seed sector has been its openness to imports and foreign investment. Investment by foreign firms has stimulated research and development by seed companies. Technology transfer is beginning to take place in the industry.

Constraints

1. Seed Quota
2. Competition from the public sector

Production Potential and Markets

Sesame

Sesame is well suited as a dry season crop in irrigated areas, especially in areas where dry season irrigation may be limited. It is also suitable for rainfed areas where it could follow rice or maize provided there is adequate soil moisture remaining after harvesting the main crop. Many varieties of sesame exist so a careful selection is required to select the best possible growing conditions.

Domestically sesame is one possible input to both the oil seed milling and livestock feed industries, but it is likely to remain a minor input unless its price falls relative to its competitors (soybean and groundnuts).

Sunflower

Traditionally sunflower has been difficult to grow in Thailand, however the introduction of hybrid varieties has overcome this problem. If production costs can be kept low, possible markets for sunflower would be oilseed meal for livestock and the edible oil industry.

Groundnuts

Groundnuts are cultivated under both rainfed and irrigated conditions. Presently, most groundnuts produced in Thailand are consumed locally. One fifth of the crop is crushed to produce oil and meal. The meal is in demand as an input for animal feeds for the broiler and livestock industries. However, groundnuts for oil and meal are in competition with soyabeans, sunflower and sesame. Internationally, groundnut exports are highly competitive, and Thai groundnuts generally have not been of high quality.

Soyabeans

Soyabean is one of the commodities promoted by the government, and protected by a specific import substitution policy under which the imports of soyabeans are banned and the imports of soyabean meal and cake are subject to licensing.

There are a number of constraints associated with the production of soyabeans in Thailand. Most production suffers from low yields, arising from poor quality seed and poor cultivation practices.

Source: Office of Agricultural Economics

Sorghum

There are two varieties of sorghum grown in Thailand, red sorghum and white seeded sorghum. White seeded sorghum is mainly exported because its low digestibility as animal feed has restricted its domestic use in producing livestock feeds. Domestic animal feed manufacturers would also prefer maize because of its lower price.

To increase the importance of sorghum as a commercial feed grain, producers should aim to increase production of high yielding hybrid red seed varieties, since market demand is chiefly for red sorghum.

Table 10

MUNGBEAN: Area, Production, Yield, Farm Value Crop Year 1978/79 - 1987/88

Crop Year	Planted Area ('000rai)	Harvested Area ('000rai)	Production ('000tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	2,638	2,340	259	111	1,294
1979/80	2,652	2,216	251	113	1,195
1980/81	2,796	2,469	261	106	1,527
1981/82	3,040	2,861	284	99	1,860
1982/83	3,034	2,775	281	101	1,971
1983/84	3,022	2,803	288	103	2,038
1984/85	3,280	3,017	352	117	2,069
1985/86	3,426	3,307	323	98	2,069
1986/87	3,172	3,081	301	98	1,773
1987/88	2,900	2,735	267	98	2,122

Source: Office of Agricultural Economics

Table 11

SORGHUM: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	1,096	942	216	229	317
1979/80	1,182	1,004	199	199	380
1980/81	1,546	1,463	237	162	530
1981/82	1,749	1,663	274	164	722
1982/83	1,534	1,476	236	160	609
1983/84	1,657	1,568	327	209	883
1984/85	1,838	1,773	374	211	845
1985/86	1,935	1,823	404	222	735
1986/87	1,212	1,148	211	184	310
1987/88	1,105	998	192	192	448

Source: Office of Agricultural Economics

Table 12

SOYABEANS: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	1,010	908	159	175	856
1979/80	679	627	102	163	537
1980/81	788	658	100	152	578
1981/82	797	781	132	168	895
1982/83	778	631	113	180	580
1983/84	1,008	974	179	184	1,087
1984/85	1,253	1,208	246	204	1,478
1985/86	1,524	1,505	309	206	1,884
1986/87	1,799	1,763	356	202	2,192
1987/88	2,260	1,896	338	178	2,705

Source: Office of Agricultural Economics

Table 13

GROUNDNUTS: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	660	622	128	205	640
1979/80	609	573	109	191	624
1980/81	658	624	129	207	1,030
1981/82	764	733	147	200	965
1982/83	761	734	145	198	1,043
1983/84	783	753	147	194	1,096
1984/85	820	781	172	220	912
1985/86	779	756	171	227	1,218
1986/87	790	781	169	217	844
1987/88	763	734	162	219	1,129

Source: Office of Agricultural Economics

Table 14

OIL PALM: Area, Production, Yield, Farm Value
Year 1978 - 1987

Year	Planted Area (^{'000} rai)	Harvested Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978	94	35	58	1,661	67
1979	154	47	78	1,647	96
1980	226	69	107	1,543	138
1981	283	94	152	1,619	189
1982	332	154	254	1,642	302
1983	374	226	303	1,338	433
1984	30	283	393	1,391	677
1985	513	332	609	1,831	920
1986	561	374	694	1,853	778
1987	615	432	728	1,685	1,405

Source: Office of Agricultural Economics

Table 15

CASTOR BEAN: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	271	37	137	185
1979/80	311	35	114	191
1980/81	264	34	131	207
1981/82	277	36	130	206
1982/83	275	34	130	177
1983/84	267	34	129	203
1984/85	267	32	122	213
1985/86	272	25	93	283
1986/87	318	31	100	283
1987/88	263	28	109	153

Source: Office of Agricultural Economics

Table 16

SESAME SEED: Area, Production, Yield, Farm Value
Crop Year 1978/79 - 1987/88

Crop Year	Planted Area (^{'000} rai)	Production (^{'000} tons)	Yield Per Rai (kg/rai)	Farm Value (million baht)
1978/79	289	29	104	257
1979/80	228	21	95	245
1980/81	245	27	111	339
1981/82	257	28	111	289
1982/83	213	22	105	220
1983/84	194	16	84	201
1984/85	230	22	96	258
1985/86	272	25	93	283
1986/87	318	31	100	285
1987/88	283	27	96	252

Source: Office of Agricultural Economics

Conclusions

1. The seed industry is expanding significantly and has reached a level where most seed is produced domestically.
2. Thailand has an open policy towards foreign investment and the imports of seeds.
3. There are many seed companies, both Thai and foreign, which concentrate their activities on maize, sorghum, sunflower and vegetables.
4. The government provides seed for crops like rice, soybeans and groundnut and is just now expanding into the vegetable seed market which is heavily dominated by the private sector.
5. The private sector is focussing on quality as the main competition issue. This has been stimulated by an open investment policy.
6. The farmer is becoming more sophisticated and modernization has arrived in the seed industry. Local seed agents and seed companies are increasing rapidly.
7. Thailand has the potential to establish itself as an international seed community.
8. Hybrid vegetable seed production has a bright future. Cheap labour, suitable climatic conditions and government support of foreign investment are key factors.

TREE CROPS

Cashews

Most of the cashews are grown in southern Thailand and are consumed domestically. Cashews are a crop well suited to the conditions prevalent in the Northeast. The Thai government has had over the years cashew promotion programmes, but little production has been achieved due to the fact that no local traders offered a market for the cashew nuts. The promoted varieties were not in demand for exporters.

Projects have been initiated to encourage farmers to switch production from tapioca to cashew nuts by providing farmers with high quality cashew nuts in demand in world markets.

An expanded production of high quality cashew nuts may lead to increased exports by Thailand provided that price and quality are improved. Major markets for cashews include North America, EEC and Japan.

Oil Palm

Cultivation of oil palm in the southern region of Thailand has expanded significantly in recent years. The main factors for this are the relatively high protection given to oil palm cultivation and the rapid rise in the palm oil share of all vegetable oils produced in Thailand. Since trees do not begin to yield until four years and full maturity not occurring for seven years, oil palm requires a long-term investment.

Prospects for further expansion of the palm oil industry are bright due to: (a) satisfactory cultivation conditions in southern Thailand; (b) relatively low land and labour costs compared to other major oil palm producing countries such as Malaysia; (c) high export potential; and (d) a strong domestic market for palm oil.

LIVESTOCK INDUSTRY

Overview

Livestock production is an integral part of the Thai agricultural sector. In 1987, the value of livestock products amounted to 34.4 billion baht representing 17.1% of the total value of agricultural products. Exports of livestock and animal feeds accounted for 4.8% (7.3 billion baht) and 1.9% (2.9 million baht) respectively. Imports of livestock products accounted for 10.6% (5.7 billion baht) of total agricultural imports, and imports of animal feeds accounted for 4.6% (2.5 billion baht).

In the livestock sector, we are discussing the role of the Thai small farmer because 90% of animal agriculture is located on small farmer holdings of 3-10 cows, with 65% of them members of cooperatives.

Livestock production consists of cattle, buffalo, swine and poultry. Cattle and buffalo production has declined with the introduction of small farm tractors which has reduced the demand for draft animals. Cattle fattening has been introduced to substitute for imports of high quality beef which reached approximately 200 tons per year valued at 31 million baht. There are approximately 15,000 heads of cattle for fattening involving 5,600 farmers. Dairy cattle of 109,000 heads in 1988 produced about 102,000 tons of milk per year which supplied only 20% of the domestic population.

Activities Eligible for Investment Promotion

1. Livestock raising or meat processing

- * Hogs
- * Poultry
- * Aquatic Animals
- * Buffaloes
- * Beef Cattle
- * Beef Cattle Raising

2. Slaughtering and disembowelling of poultry for export
3. Rabbit raising and processing for export
4. Slaughtering and processing of hog carcasses
5. Slaughtering and processing of cattle carcasses

Table 17

Livestock and Poultry Population, Thailand
1978-1987
('000m.t.)

Year	Cattle	Swine	Chicken
1978	4,436	5,324	65,324
1983	4,832	4,193	78,189
1984	4,789	4,263	78,198
1985	4,829	4,224	78,717
1986	4,878	4,201	79,265
1987	4,968	4,209	84,495
Avg. Growth Rate (%)	1.95	0.96	4.07

Source: ASEAN Statistical Yearbook on Food, Agriculture and Forestry, 1978-1987; ASEAN ADPC, Bangkok, Thailand.

Swine Industry

Swine production in Thailand is fully developed with advanced technology for breeds, feeding and management. The potential to increase swine production in Thailand is high. In 1988, Thailand had 5.7 million heads of swine. The majority of production is for domestic consumption which has been increasing at 4.3% a year.

The export of swine depends on price. Fall of the domestic sale price provides opportunity to compete in the world market and also forces major producers to increase swine exportation in order to gain a higher income. In 1987, Thailand exported 38.37 million baht of swine, while in 1988 it exported 4.57 million baht. A limiting factor is trade protection in terms of disease regulations in importing countries.

Constraints

1. As mentioned above, one of the major constraints in swine production is the fluctuation of swine price.
2. Swine disease.
3. High price of animal feed and high cost of production.

Cooperative Opportunities

- * large scale swine farming
- * vaccine production
- * animal feed production
- * swine slaughtering and meat processing plants

Conclusions

1. The Canadian swine industry is one of the most successful in the world and has the expertise to assist Thailand in its development.
2. Canadians can provide healthy breeding stock with growth performance, feed efficiency and carcass leanness. In fact, Canadian firms are beginning to make inroads.
3. Canada can assist in establishing commercial swine enterprises to ensure proper health care and nutrition of swine and provide the best selection of crossbreeding.
4. Canada can offer management expertise and technological advice in swine production facilities such as feeding systems, building layouts, waste disposal systems and grandparent replacement stock.

Poultry Industry

Poultry production has transformed from a household activity to become a major commercial production system in Thailand. In 1987, Thailand had 89.8 million chickens. The development of the poultry industry is at a similar level of advancement as the swine industry with an integrated production and management system. Up until 1987, the industry was experiencing a growth rate between 15% and 20%, but since then it has plateaued. Future growth will depend on the application of technological advancements because of rising fixed costs such as construction and land.

Broiler production is more than 400 million heads of chicken a year, of which 20% is exported. In 1987, Thailand exported 91,945 tons of broiler meat at 4,595 million baht, while 1988 the export value was 4,792 million baht. Ninety percent of exports go to Japan with the remaining 10% to Singapore and Hong Kong.

Most (90%) of the industry is controlled by the "Big 7" (CP Group, Sri-Thai, Laemthong, General Foods, Central Group, Beta Group and Saha Farm). The remaining 10% are compact farms.

The commercialization of the poultry industry has been assisted by the animal feed producers who are operating the processing plants and cold storage facilities. The industries' expansion has lowered the price of chicken, thus encouraging domestic consumption, as well as enabling Thailand to export fresh and frozen chicken.

The industry has also been promoted by the government in both production and marketing. The Department of Livestock Development is the main governmental agency that is responsible for the quality control of exported chicken. All processing plants must comply to the government slaughtering and sanitary regulations; and all frozen broilers must be certified for export.

Table 18

Production of Livestock Products, Thailand 1976-1986 ('000m.t.)					
Year	Milk	Eggs	Beef/Veal	Pork	Chicken Meat
1976	13	88	131	170	240
1983	40	120	143	200	375
1984	45	126	146	205	356
1985	41	127	152	205	393
1986	43	128	154	205	430
Avg. Growth Rate (%)	13.4	4.2	1.4	2.6	5.3

Source of data: Selected Indicators of Food and Agriculture Development in Asia-Pacific Region, 1976-1986; FAO, Bangkok.

Constraints

1. High cost of production makes Thailand less competitive in the international market.
2. Import tariffs on ingredients such as soybean meal have raised the cost of animal feed and consequently the cost of chicken.
3. Shortage of refrigerated containers and a lack of modern shipping technology have caused problems in the handling of frozen chicken.

4. Low quality of packaging

5. The commercial industry is grouped into independent raisers and contract raisers. The commercial raisers produce between 1,000 to 10,000 heads of chickens and are predominantly located within 200 kilometres from Bangkok in and around Chacheongsao, Chonburi, Nakorn Phathom and Nokorn Nayok.

Conclusions

1. The increase in population, income and degree of urbanization in Thailand is raising the demand for meat and other livestock products. To meet this demand, the production of livestock has been expanding steadily.

2. The expansion of the livestock industry increases the demand for animal feeds. Some of the feeds come from the agro-waste and some are grains that are used for direct human consumption. The extent to which the livestock sector can grow depends partly on the type, price and quantity of feed available in the area.

3. The development of the livestock industry is experiencing a transition from a backyard activity, where native breeds are fed on whatever feeds that are available to a modern commercial activity where selected breeds are eating proper nutritious feeds to ensure high growth at the least possible cost.

4. In Thailand, chicken meat is the most important meat, followed by pork, and egg production. Beef and milk are smallest in terms of quantity produced.

5. Support policies and programmes to promote livestock production include: livestock extension programmes, animal disease prevention and control, research and development programmes, administrative support, and livestock marketing and other infrastructure support services.

6. While livestock/poultry and meat processing industries continue to expand in Thailand, Thailand must meet the standards of western countries such as hygiene rules and quality to compete.

7. The government is improving efficiency of production and raising quality to reduce production costs. This can be translated into efforts aimed at introducing high quality breeding stock, good animal feed, better veterinary services, efficient sanitary systems and proper shipping and freight technology.

Opportunities exist in:

1.
 - * packaging technology
 - * frozen technology
 - * finished products
 - * food irradiation
 - problem exists in marketing the term "gamma" in Thailand because it brings negative connotations.
 - * bone separators
 - * deboning technology
 - * utilization of poultry by-products
2. Joint venture with a fish meal company to produce a high quality feed.
3. Food processing opportunities in chicken nuggets, chicken satay, etc.
4. Animal husbandry has distinct advantages in that it is not dependent on adequate rainfall or irrigation systems and is less prone to drought and flooding. The financial return from livestock is more constant and the markets are easier to find.
5. In promoting the livestock sector, there is inconsistency between government policy on livestock and on feed grain. While the government is trying to promote the livestock sector, it is also controlling the import of feeds. These policies have to be consistent.

Leather Industry

Thailand's leather industry can be divided vertically into three segments: suppliers of cattle and buffalo hides, tanneries and leather product manufacturers. Production of leather products is for both local consumption and export. Exports account for 80-85% of total production. However, domestic hide production is still insufficient to meet total demand for tanned hides. During 1985-1987, exports of leather products increased 38% a year on average. In 1984, exports amounted to 1,497 million baht, in 1988, exports were expected to reach 4,500 million baht. The main markets are the U.S., Europe and the Middle East.

The major factors contributing to the increase in exports are the improved quality of Thai made products, price competitiveness and special tariff treatment given to Thai products.

There are 150 tanneries in operation and they process about 48,000 tons of raw hide feedstocks comprising fresh, brined, dried and chemically treated hides obtained from slaughterhouses and other sources into 16,000 tons of tanned leather annually.

About two-thirds of leather products are made from domestic supplies of tanned leather, with the balance imported from the U.S., Australia, New Zealand, Afghanistan and Italy.

The leather industry consists of three main products: shoes, gloves and bags. The major raw materials for the products are tanned cow and buffalo leather, snake skin, other reptile skins and pigskin. These are imported from Australia, the U.S. and Europe.

The leather product sector has a promising future, although it must overcome several problems, including a shortage of raw leather and low quality of tanned leather.

DAIRY INDUSTRY

Overview

The growth potential for the dairy farming industry is one of the most impressive in Thailand. There are vast opportunities for joint venture and cooperative efforts for suppliers of all types of products and equipment ranging from animal feed to vaccines, to milk processing machines to storage silos.

During 1987 and 1988 the dairy industry in Thailand has experienced strong growth, reflected by the strong performance of the unprocessed and ready-to-drink milk sector.

This strong performance is due to a number of factors:

1. Population growth.
2. A rise in per capita income.
3. Milk Drinking Campaign and greater acceptance to fresh milk consumption among the present generation.
4. Recognition of the nutritional value of milk.

Government Policy

The Thai government has made self-sufficiency in dairy products a prime objective in the current NESDP Plan.

The Milk Drinking Campaign

The Milk Drinking Campaign was instituted two years ago to promote public daily milk drinking habits, to expand the pasturized milk market and to support the government's agricultural policy.

To date, the Milk Drinking Campaign has been highly successful creating a 20% increase in milk consumption in each of the last two years. The campaign has been directed towards the younger generation, thus establishing a foundation for future markets.

Policy Priorities

1. Development of milch cow raising.
2. To accelerate the increase in milch cow production, the government and private sector imported 19,900 herd from New Zealand and Australia. Importation of 7,600 cows is planned for 1990-91.
3. Promote the use of embryo transfer to speed up the development and improvement of milch cow breeding stocks.
4. Importation of semen.
5. Thailand's average milk output per day is 9-10 kgs which is well below the level in Canada, the United States and Europe. The government is thus promoting milk productivity through new technology and research.

Dairy Farming Promotion Organization (DPO)

The DPO was established a state enterprise in 1971. Their aims are to promote the raising of dairy cattle and other dairy animals; to produce milk, meat and other dairy products; to educate people in dairy husbandry; to buy, sell, exchange or donate dairy animals and dairy products; to operate other activities connected with dairying and its organization; and to develop the processing of milk products.

To achieve these aims, the DPO has the following mandate:

1. To cooperate with and promote the dairy farming industry by technological and marketing assistance.
2. To create and undertake business relating to dairy plants, dairy products or frozen meats, refrigerated trucks, milk selling shops and dairy and meat products, in partnership with other parties.

The DPO is involved in the entire cycle of production, from the initial planning stages, to development, processing, distribution and marketing. It operates a full scale dairy industry, starting from inducing farmers to realize the importance and potential returns to be derived from dairy farming, providing training, promoting understanding of the aspects of dairy farming, providing counselling services on artificial insemination, preventive and curative treatment of animal diseases, as well as providing basic amenities for dairy farming at low costs.

Dairy Farming

The dairy cattle population of Thailand in 1988 was approximately 109,100 heads with raw milk production at 102,060 tons per year or 280 tons per day.

Milk production in the country meets only 20% of domestic milk consumption. At present, all raw milk produced is processed to be ready to drink (RTD) milk. Total RTD milk production of the country in 1988 was 141,000 tons or 386 tons daily.

Potential for Thailand's Dairy Industry

Due to the continued support from the government and the increasing acceptance by investors, dairy farming has spread rapidly into many new regions of Thailand including the north, the south and the northeast.

It has great potential for success if expansion in the drier regions like the northeast are located close to dams and water availability for stock and irrigation. The north also has potential for further expansion in the region of Chiang Mai and Chiang Rai because of the growing market of Chiang Mai, Thailand's second largest city.

There has been an increase in private sector investment due to the profitability of dairy farming and the booming national economy of Thailand. Opportunities exist to improve the standards, the quantity and quality of dairy products due to the availability of capital from the private sector.

There is potential for more economic milk production if the dairy farmer bases his feeding programme on the establishment and proper management of improved pastures. This would reduce the current reliance on expensive meal concentrate for milk production, reducing the largest component of the dairy production costs. This can only be achieved through better management of high-quality, leafy pasture.

Constraints

1. The relatively high rainfall and temperature of the tropics can produce a high quantity of forage grown per unit area for livestock, but the major problem is feed quality. Tropical pastures are generally low in quality, relative to temperate pastures, which can adversely affect forage intake and animal production. Efficient pasture management is essential to ensure that the forage is controlled to maximize the quantity of green, leafy pasture.
2. Another factor causing problems is infertility and low conception rates in the cattle. This contributes to the additional insemination costs, but more importantly, delayed calving means loss of milk and loss of income.
3. The Thai dairy industry farmers are in need of education and management expertise in all areas of soil, plant, animal and financial management related to dairy production and the integration of all these factors into a successful farm management system.

4. The current rapid growth in the number of dairy cows and the concurrent growth in the number of male calves is providing an excellent opportunity for the establishment of specialist dairy/beef farmers who can purchase young male dairy calves and rear them for the beef market. If the feeding programme is handled correctly, the dairy/beef animals are capable of producing high-quality, top-grade beef for the consumer market.

5. In order to achieve increased production and efficiency through improved pastures, a reliable source of seed of adequate quality must be available to farmers. If the farmer cannot purchase quality seed on a regular basis to maintain pasture production, then control, management and increased production will not be effective. The supply of good quality forage seed to farmers in Thailand is poor and demands action if progress is to be made.

Opportunities for Technology Transfer

* Livestock and Poultry Breeding

- hybrid, embryos
- animal breeding specialists and consultants
- artificial insemination
- hatching incubators

* Livestock and Poultry Care

- feed stuff preparation equipment
- disinfectants/vaccines
- sorting systems
- vitamin preparations

* Livestock and Poultry Processing and Packaging

1. Dairy and Poultry Processing

- slaughtering equipment
- yoghurt processing equipment
- washing systems and equipment
- separators, mixers, homogenizers, dryers
- egg collecting systems

2. Meat Processing

- deboning and desinewing systems
- meat cutting equipment
- sausage making machines
- food processing machinery for red meat and poultry
- test equipment for quality control of processed meat

3. Storage and Packing

- cold storage/refrigeration
- meat packaging equipment and machinery

Conclusions

1. Thailand's dairy industry has experienced a decline in milk production at a time when milk consumption is growing. Government policy is aimed at expanding the cattle and dairy industries as soon as possible.
2. Unless Canada establishes a presence in Thailand now, it will be all the more difficult to penetrate the market in the future; however, the opportunities will not be presented on a platter. If Canada maintains a focussed approach, backed by resources, it will be able to obtain a market share.
3. Success depends on obtaining a strong livestock base, good feed system and strong farm management.
4. In the past Canadian cattle has had difficulty in competing in price with Australia/New Zealand/Europe even though the quality of Canadian cattle may be better.
5. There is good potential to begin exporting milk and dairy products to other ASEAN countries in the next five years.
6. The pasteurized milk market has good growth potential and will overtake the currently dominant UHT milk in the long run.

Recommendations

1. Efforts should be directed towards the export of semen, followed by embryos and to a lesser extent cattle, and to establishing model farms (breeding systems) to service the farming community with good breeding stock, semen, consulting help, etc.
2. Consider joint ventures with Thai firms, where the Canadian company develops the processing facility and the Thai partner is responsible for the development of the dairy herd.
3. Canadian exporters should form a consortium to pursue cattle projects with private companies in Thailand who have firm financial positions. Canada can emphasize the importance of good herd and better farm management. Canada is internationally recognized as one of the world's best sources for superbly efficient and quality dairy cattle and breeding stock. Canada has an excellent genetic pool and maintains the highest health standards in the world.
4. Utilize Canada's expertise in pasteurization of fluid milk and production of creams. Joint venture and technology transfer possibilities.
5. Participate in developing model farms as a method of gaining a market share.

6. Consider joint ventures to process value-added products where Canada has the expertise. This includes natural and processed cheese, creamy butter, condensed and evaporated milk, ice cream yoghurt, frozen deserts and fruit and yoghurt based drinks. Canada is internationally competitive in dairy technology using the latest technology for processing and manufacturing of conventional dairy products. Canada has state of the art, ultra high temperature processing systems for the production of long shelf-life products.

FEEDCROPS

Overview

Thailand's major crops: rice, maize, cassava and soybean provide by-products as feed stuffs in concentrate, which is a major feed source for monogastric animals. These main crops also provide residues as feed for ruminants, along with forage crops.

Estimated use of the feed concentrate in intensive commercial livestock is 4 million tons a year. The major ingredients used are rice bran, broken rice, grounded maize, dry chipped cassava tuber, soyabean meal and fish meal. Feed concentrate comprises more than 60% of the total costs of production.

Rice production area in Thailand is approximately 9.6 million ha. with a total production of 18 million tons of rice grain a year. About 70% of the rice production is for domestic consumption and livestock feed, while exports range from 3.5 to 4.5 million tons a year. By-products such as rice bran and broken rice. They are the major ingredients in feed concentrate. The estimated demand for domestic livestock feed of rice bran is 1.2 million tons and broken rice is 2 million tons per year. Rice straw is an important feed source for ruminants and is important as a replacement when there is a forage shortage. There are approximately 26 million tons a year produced.

Maize production area in Thailand is 1.9 million ha. with an estimated total production of 5 million tons. The majority of production is for export, however during the last three years the utilization of maize for domestic livestock has increased due to the expansion of broiler production. The estimated demand for the domestic livestock industry in 1988 was 1,700 million tons.

The production area of cassava in 1988/89 was 1.6 million ha. with total production at 23.5 million tons. Cassava is resistant to dry environments and requires simple maintenance. Most cassava products are for export, while domestic consumption has been increasing slowly. Cassava flour is the most widely used product domestically. Cassava as an ingredient in feed concentrates requires additional protein supplements, as opposed to the other carbohydrate feeds, and is therefore not yet well received.

Soyabean production has increased gradually due to the government's efforts to promote it. In 1988/89 the area of production was 0.4 million ha. Total production in 1988/89 is estimated to be 0.49 million tons. The current situation of soyabean production is one of under-supply due to the increasing domestic demand, especially for the livestock industry. In 1987/88, Thailand imported 232,180 tons of soyabean meal. The estimated total consumption for 1988/89 is 771,440 tons, so approximately 221,440 tonnes will have to be imported. The livestock industry will consume 659,160 tons in 1989/90. The demand for soyabean meal will increase approximately 40,000 to 50,000 tons each year.

Forage Crops

In 1986, there were approximately 0.15 million ha. of natural grazing land. The natural grasslands that exist cannot support a greater number of ruminants.

The quality of grasses in Thailand is lower than grasses from temperate zones which has resulted in the introduction of grass species from western countries. These imported grasses require proper management and should be grown as permanent pasture. However, because agriculture in Thailand has been crop oriented and characterized by small holdings, most small farmer are not capable of proper management, except for the pastures used for intensive dairy farms.

Crop Residues

As crop-livestock integration is introduced to farmers, crop residues are becoming major feed sources for ruminants. In addition to rice straw as an important feed source, other by-products are being utilized from sugarcane, corns (baby corn and maize production), pineapple, cassava, soybean and rubber.

Conclusions

The demand for feed is directly related to livestock and poultry production, which is on the increase.

Recommendations

1. Opportunities exist for a joint venture to produce high quality feed and pre-mixes (vitamins, minerals and medication) and feed supplements
2. Promote Canada's technological advantages in nutrition research, animal health, veterinary medicine and biotechnology (pharmaceuticals, growth hormones, drug implants).
3. Introduce genetic engineering to produce superior types of feed.
4. Canada has some of the best forage in the world in Dehy Alfalfa and Canola meal. Thailand has recently allowed the importation of animal feed raw materials to prevent expected shortages next year.

SEAFOOD INDUSTRY

Fishery Resources

Thailand's fishery resources originate in the Gulf of Thailand and the Andaman Sea, and come from four sources of production: marine catch accounting for 87.6% of the total, coastal cultivation (aquaculture) accounting for 5.8%, freshwater catch accounting for 4.5% and fresh water cultivation (aquaculture) accounting for 2.1% of the total catch.

Thailand's seafood industry has emerged as one of the top 10 foreign currency earners and is playing a vital role in the country's economic development. Frozen, canned and dried shrimp, squid and cuttlefish are the major seafood exports. Thailand's canned seafood exports has placed it number one in Southeast Asia and also among the world's leading canned seafood exporters. For instance, exports of canned tuna alone account for more than 60% of the total canned seafood exports.

The concentration of the seafood industry is on the southern east coast located around Songkhla, followed by the lower central area at Samut Sakhon and the eastern region at Samut Prakarn. Rayong is the center for dried squid processing. Bangkok is the center for seafood export and dominates the frozen shrimp business.

Key Areas of Expansion Identified by the Board of Investment

1. Brackish water shrimp farming.
2. Aquarium fish, freshwater plants for aquariums.
3. Aquaculture feed production.
4. Hatchery and culture operations.
5. Breeding and raising tiger prawns.
6. Marine products for canning (tuna, baby clams, cuttle fish and molluscs).
7. Cold storage facilities.

Table 19

**ANNUAL CATCHES OF MARINE FISHES: Quantity and Value
1985/1986**

Quantity: tons
Value: millions of baht

Species	1985		1986	
	Quantity	Value	Quantity	Value
Indo-Pacific Mackerel	121,107	1,042	113,497	1,138
Indian Mackerel	36,970	324	41,691	357
Sharks	3,246	17	4,332	23
Rays	5,980	28	9,190	45
Other				
Foodfishes	626,715	4,238	653,784	5,274
Trash Fish	776,421	1,640	976,236	2,107
Shrimps	107,472	4,510	120,413	5,072
Lobsters	1,353	57	1,402	57
Sargasted				
Shrimps	18,818	56	19,359	58
Sea Crabs	26,829	675	35,606	906
Shellfishes	183,523	582	160,691	448
Squid/				
Cuttlefishes	116,035	2,456	134,915	3,344
Seaweeds	4,233	7	1,155	3
Sea-cucumbers	31	0.2	11	0.1
Jellyfishes	29,018	12.1	76,090	38.2
Turtle Eggs	99,648	0.8	166,150	1.1
Total	2,057,751	15,650	2,348,572	18,877

Source: Department of Fisheries

Table 20

**ANNUAL CATCHES OF FRESH WATER FISHES: Quantity and Value
1984-1986**

Quantity: tons
Value: millions of baht

Species	1984		1985		1986	
	Quantity	Value	Quantity	Value	Quantity	Value
Snake Head Fish	20,394	682	21,842	726	23,542	796
Catfish (Pla-duk)	14,864	439	17,973	553	18,851	426
Perch	9,159	119	9,635	212	7,896	157
Local Carp	20,108	386	16,048	302	21,750	386
Tilapia	21,441	312	15,367	272	23,287	279
Common Carp	4,632	129	3,578	98	4,044	103
Sepat Siam Catfish (Pla-Swai)	18,846	229	23,056	290	23,022	347
Swamp eel	11,320	243	18,194	236	15,796	155
Other Food Fishes	2,483	61	2,553	79	1,596	44
Macrobracium	26,938	448	24,112	406	35,482	532
Shrimps	4,734	522	7,158	725	6,405	608
Other	2,680	10	3,130	15	2,094	10
	4,220	208	4,807	216	3,998	156
Total	161,819	3,795	167,453	4,134	187,763	4,004

Source: Department of Fisheries

Prawn Farming Industry

Thailand's prawn farming industry is contributing to sharp growths in exports. In 1980, more than 3,500 farmers were engaged in prawn farming on more than 167,000 rai of land capable of producing 8,000 tons. The industry has expanded rapidly in the last few years, especially in 1988 when prices rose in response to higher demand. In 1989, black tiger prawn production is expected to jump sharply by 150% to 100,000 tons.

Prawn farming can be divided into three categories:

1. **Natural Method:** Farmers either draw sea water with fry into the fields or release the fry in the pens for one to two months to let them feed on natural food. This method yields about 40-70 kilos per rai per year.

2. **Semi-Intensive Method:** Part of the production process is controlled, such as releasing fry from nurseries to supplement natural fry, giving supplementary food and controlling diseases and predators. The prawns commonly raised under this method are black prawns and "cha buai." Annual yields vary between 90 and 200 kilos per year.

3. **Intensive Method:** Requires skill, technology, good soil, water and electricity because all production processes are controlled. Fry direct from nurseries are fed special feed with ground fish and cray fish. Water is changed regularly, and oxygen is increased directly by swirling the water. There are strict controls on predators and diseases carried out. Farm size averages five-six rai and the rate of release is 24,000-48,000 per rai. Annual yields can reach 1,000 kilos per rai.

During the last three years, prawn farming has been transforming from the natural method to the more intensive method due to the successful development and application of technology in shrimp feedmills, processing facilities and post larvae development farms, and a decreasing number of natural fry.

In 1988, the production of black tiger prawns continued to rise to over 40,000 tons. The attractive prices, ranging from 200-300 baht per kilo, continued to lure more investors.

This dramatic increase in local production has made Thailand the world's fifth largest producer and exporter of black tiger prawns after China, Taiwan, the United States and India.

Table 21

SHRIMP CULTURE: Production
1983 - 1987

Species	Quantity: tons			
	1984	1985	1986	1987
Banana Shrimp	8,657	10,397	11,031	8,843
School Shrimp	2,653	3,635	3,672	2,703
Jumbo Tiger Prawn	171	106	897	10,544
Other Shrimp	1,527	1,702	2,286	1,476
Giant Seapers	75	72	59	25
Mulletts	387	268	260	306
Tilapias (Malayan)	1,924	1,369	846	463
Other Fish	51	11	15	44
Total	15,559	17,738	19,289	24,517

Source: Department of Fisheries

Exports

Shrimp's have become one of the most promising export items. In 1988, 9,553 million baht worth of tiger prawns were exported and 1989's target is 13,500 million baht. Black tiger prawns are the predominant species produced.

Table 22

Exports of Black Tiger Prawns in Thailand 1981-1989

	Value (m. baht)	Quantity (tons)
1981	2,136	18,761
1982	2,764	22,647
1983	3,164	20,150
1984	2,799	19,428
1985	3,439	24,541
1986	4,391	28,717
1987	5,750	33,911
1988	9,553(e)	40,000(e)
1989	13,500(t)	100,000(t)

Source: Customs Department
(e) estimate for 1988
(t) target for 1989

Current Situation

By the first quarter of 1989, two events slowed down development in the prawn industry: prawn production outpaced demand, and Japan, the largest market for black tiger prawns, cut purchases. This stalled exports of thousands of black tiger prawns sending domestic prices from 220 baht a kilo to about 120 baht a kilo.

Constraints

1. Fish catch is decreasing because the natural rate of reproduction cannot keep pace with the rate of depletion.
2. The production of freshwater fishing sources is slow and are in limited number. Poor maintenance, deterioration and pollution are concerns.
3. Domestic shortage of prawn feed caused by high prawn production.

4. High price of shrimp feed which accounts for 50%-60% of the cost of production. Quality shrimp feed production must use fishmeal with 60% protein content, while Thailand can only produce 20,000 to 30,000 tons of high protein fish meal.
5. Lack of cold storage facilities. Freezing prawn requires freezers that can reduce the temperature down to -20 C. in 3 hours.
6. Unreliable water supplies.

Conclusions

1. The prawn feed industry is controlled by a few large firms, particularly the giant agro-industrial conglomerate Charoen Pokphand Group. These larger companies have been criticized for manipulating the market to put smaller breeders out of business.
2. Since Thailand does not have adequate cold storage facilities, all the shrimp harvests went straight to the market, increasing the glut.
3. Despite the price drop, the prawn industry is not in a crisis and the future remains very bright. Farmers who were once making 200-300% returns on their crops are now making around 50%. Therefore, there will be lower prices and lower margins in the future.
4. Prawn business in Thailand is no longer production driven, but market driven.
5. Shrimp production in Thailand is being transformed from a luxury food to a relatively low-cost, steadily supplied item.
6. Thailand should diversify its export market from a reliance on Japan where presently 70% of shrimp production is exported.
7. Thailand has all the resources available, but requires technological innovations. Thailand will remain in the forefront of the prawn industry in ASEAN for another 5-10 years until competition with Indonesia increases. It is anticipated that Indonesia will eventually lead the industry.

Recommendations

1. Opportunities exist in producing value-added products.
2. Intensive producers must reduce input costs. Feed costs make up over half of the production costs. Find alternatives to fishmeal and introduce new breeding technology.
3. Joint venture forming a shrimp marketing and sales company. The Canadian entity would market and sell the shrimp products purchased from the Thai entity.

Opportunities for the Transfer of Technology

- * Breeding Stock and Technologies
- * Fish Farming and Shrimp Farming Technologies
 - feed makers
 - automatic nutrition analyses
- * Processing Equipment
 - cleaning and grading equipment
 - cutting and mincing machines
 - skinning machines
 - automatic shrimp deshelling machines
 - head removing/slicing/gutting/conveying machines
 - fish meal making machines
 - fish-sausage making machines
 - computer-control weight and length apparatus
- * Refrigeration and Packaging Technology
 - freezing equipment
 - ice making equipment
 - cold storage equipment
 - meat packaging equipment
- * Fishing Machinery
 - fishnet capstans
 - discharging apparatus
 - automatic tow machines
- * Auxilary Equipment and Instrumentation
 - fish detectors
 - satellite remote sensing techniques
 - hydrographic apparatus

BIBLIOGRAPHY

- rch & Consultant." Market Study on Dairy Industry in
for Magee Robertson Inc. Bangkok. August 1987.
- ada Inc. Thailand Fresh Fruit and Vegetable Study.
1989. Prepared for the Thai Fruit and Vegetable
s Association.
- Statistics of Thailand Crop Year 1987/88. Center for
ral Statistics, Office of Agricultural Economics, Ministry of
re & Co-operatives, Bangkok. 1988.
- ical Yearbook on Food, Agriculture and Forestry 1978-
ASEAN Agricultural Development Planning Centre, Kasetsart
y Campus, Bangkok. 1988.
- nd. Quarterly Bulletin. March 1989.
- ti: A 'Mid-Year Review of Business and Economic Activity.'
ure: Improved profits take root." July 1989.
- ttle to the market." July 1989.
- leap over barriers." July 1989.
- hipping up a shortage." July 1989.
- Pinched by hasty planning." July 1989.
- asirm. "Milk Drinking Campaign." Presented at Dairy Asia
entral Plaza Hotel, Bangkok, Thailand. 2-3 November 1989.
- lications Co., Ltd.(The). Thailand Industrial Buyer's
989. The Business Publications (1985) Co., Ltd. 1989.
- iew. "The Agricultural Sector: Stronger Performance than
d..." July-August 1989.
- hailand. BLC Publishing Co., Ltd. Bangkok. 1989.
- likhit. "Unbalanced Development." Thailand Business. July-
1989.
- ss in Thailand. BLC Publishing Co. Ltd., Bangkok. 1989.

- Dynamics of Thai Agriculture 1961-85. Agriculture and Rural Development Program, Bangkok. 1988.
- Goldstein, Carl. "Asia's supermarket." Far Eastern Economic Review. 29 December 1988.
- Goldstein, Carl. "A bumper catch." Far Eastern Economic Review. 29 December 1988.
- Handley, Paul. "Once a luxury; shrimp are now a low-commodity: Cultured Revolution." Far Eastern Economic Review. 5 October 1989.
- Ludwig, J.H.D. and Thanong Pukrushpan. Small-Scale Agroindustrial Development Project: Thailand. Admark Consultants Ltd. and Department of Food Science and Technology, Faculty of Agroindustry, Kasetsart University, Bangkok. April 1988.
- Manee Wivutvongvana, Pipob Lumyong and Nimit Podwattanakul. "Vegetable Production in Thailand: Current Status and Prospects." Faculty of Agriculture, Chiang Mai University, Chiang Mai, Thailand. 1986.
- Mingsam Kaosa, Kanok Rerkasem and Chaiwat Roongruangsee, Eds. Agricultural Information and Technology Change in Northern Thailand. Thailand Development Research Institute, Bangkok, 1989.
- National Economic and Social Development Board. The Sixth National Economic and Social Development Plan (1987-1991). Office of the Prime Minister, Bangkok.
- Nisit Patamayothin and Sakarindr Bhumiratana. "Tomato Processing in Thailand." Food Processing Section, King's Project and Royally Recommended Project, King Mongkut's Institute of Technology Thonburi, Bangkok. 1986.
- Office of Agricultural Economics. Selected Economic Indicators Relating to Agriculture. Ministry of Agriculture and Cooperatives, Division of Policy and Agricultural Development Plan, Bangkok. No. 84(12) 1988.
- Office of the Board of Investment. Potential Joint Venture Partners in Thailand. Office of the Prime Minister, Bangkok.
- Office of the Board of Investment. Agro-Industry in Thailand. Office of the Prime Minister, Bangkok. 1988.
- Office of the Board of Investment. Agricultural Industries in Thailand. Office of the Prime Minister, Bangkok. 1987.

- Office of the Board of Investment. Manufacturing for Export in Thailand. 1988.
- Office of the Board of Investment. Key Investment Indicators of Thailand. Office of the Prime Minister, Bangkok. June 1989.
- Office of the Board of Investment. A Guide to Investing in Thailand. Office of the Prime Minister, Bangkok. June 1989.
- Office of the Board of Investment. Thailand Investment: A Directory of BOI Promoted Companies 1989. Office of the Prime Minister, Bangkok, 1989.
- Rahman, Syed Sajjadur and David Balcome. Canadian Business Linkages with Developing Countries, Volume 1 The Asian Experience. Ottawa: International Business Research Institute. November 1987.
- Samart Chiasakul, Chuta Manasphaiboal and Mikimasa Yoshida, Eds. Thailand's Economic Development in the 1980's. Institute of Developing Countries, Tokyo. 1989.
- Sawart Yamvongsri. Market Study on Agro and Food Processing Industry. Prepared for the Commercial Division, Canadian Embassy. April 1986.
- Setting Up in Thailand: A Guide for Investors. BLC Publishing Co., Ltd. Bangkok. 1988.
- Somsamorn Chaikraveephundh, Ed. "Fruit Exports." Thailand Ex-Import Review. Vol. 3, No. 5, 1989.
- Sornthep Tumwasorn. "Dairy Cattle Breeding." Presented at Dairy Asia '89 at Central Plaza Hotel, Bangkok, Thailand. 2-3 November 1989.
- Suchart Prasith-rathsint, Ed. Thailand's National Development: Policy Issues and Challenges. Bangkok: Thai University Research Association and Canadian International Development Agency, August 1987.
- Suraphong Kosiyachinda. "Postharvest Problems of Vegetables in Thailand." Department of Horticulture, Faculty of Agriculture, Kasetsart University, Bangkok. 1986.
- Suthan Setboonsarng, Sarun Wattanutchariya and Banlu Puthigorn. Seed Industry in Thailand: structure, conduct and performance. IVO, Development Research Institute. 1988.
- Thailand Business Review. "Expansion Continues Unabated." July-August 1989.

Thailand Company Information 1988-89. Advanced Research Co., Ltd.
Bangkok.

Thailand Development Research Institute. Distribution Infrastructure of
Four Product Export of Thailand: Tapioca, Frozen Chicken, Seafood
and Longan. TDRI, Bangkok. 1987.

Thailand Development Research Institute. The Development of Thailand's
Capability in Industry: Vol. 6 Overview and Recommendations. 1989.

Thailand Development Research Institute. Thailand Natural Resources
Profile. 1987.

Thinakorn Komkris. "Dairy Development in Thailand." Presented at Dairy
Asia '89 at Central Plaza Hotel, Bangkok, Thailand. 2-3 November
1989.

"Workshop on Perspectives and Implications of the Comparative
Advantage Study on Selected Feedcrop and Livestock Production
Systems in the ASEAN." Chiangmai, Thailand. 23-25 May 1989.

Vitoon Khumnirdpetch, "National Plans, Policies and Programmes on
Feedcrop Livestock Production and Development of Thailand."
Department of Livestock Development. Presented in the Regional
Workshop on Perspectives and Implications of the Comparative
Advantage Study on Selected Feedcrop and Livestock Production
Systems in the Asean Countries. Document No. 8. Chiang Mai,
Thailand. May 23-25, 1989.

-----, "Comparative Advantage of Agricultural Production Systems and its
Policy Implication in Thailand." Document No. 12. Chiangmai,
Thailand. May 23-25, 1989.

Yang, Charles Y. General Development of the Vegetable Industry
of Thailand. Agriculture Vegetable Development Centre,
Kasetsart University. December 1988.

INTERVIEWS - September/October 1989

Board of Investment
555 Vibhavadi Rangsit Road
Bangkok

Department of Export Promotion
Ministry of Commerce
22/77 Rachadapisek Rd.
Bangkhen, Bangkok 10900

National Economic and Social Development Board
962 Krungkasem Road, Bangkok

Office of Agricultural Economics
Ministry of Agriculture & Cooperatives
Bangkok

Thai Aquaculture Development and Exporting Association
1575 Charoen Nakorn Road
Bangkok

Dairy Farming Promotion Organization of Thailand
Bangkok Office:
103 Kamphaeng Phet Road

Thai Fishery and Frozen Products Association
160/194-197, 12th A Floor
ITF Building, Silom Road
Bangkok 10500

Poultry Promotion Association of Thailand
23/15-16 Thaniya Road
Bangkok

Thai Food Processors' Association
888/114 Ploenchit Road
11th Floor, Mahatun Plaza
Bangkok 10500

Thai Fruits and Vegetables Exporters Association
3 Soi Archara, Suthisarn Road
Bangkok 10310

Asian Vegetable Research and Development Center
Kasetsart University
50 Thanon Phahon Yothin, Bangkok
Bangkok

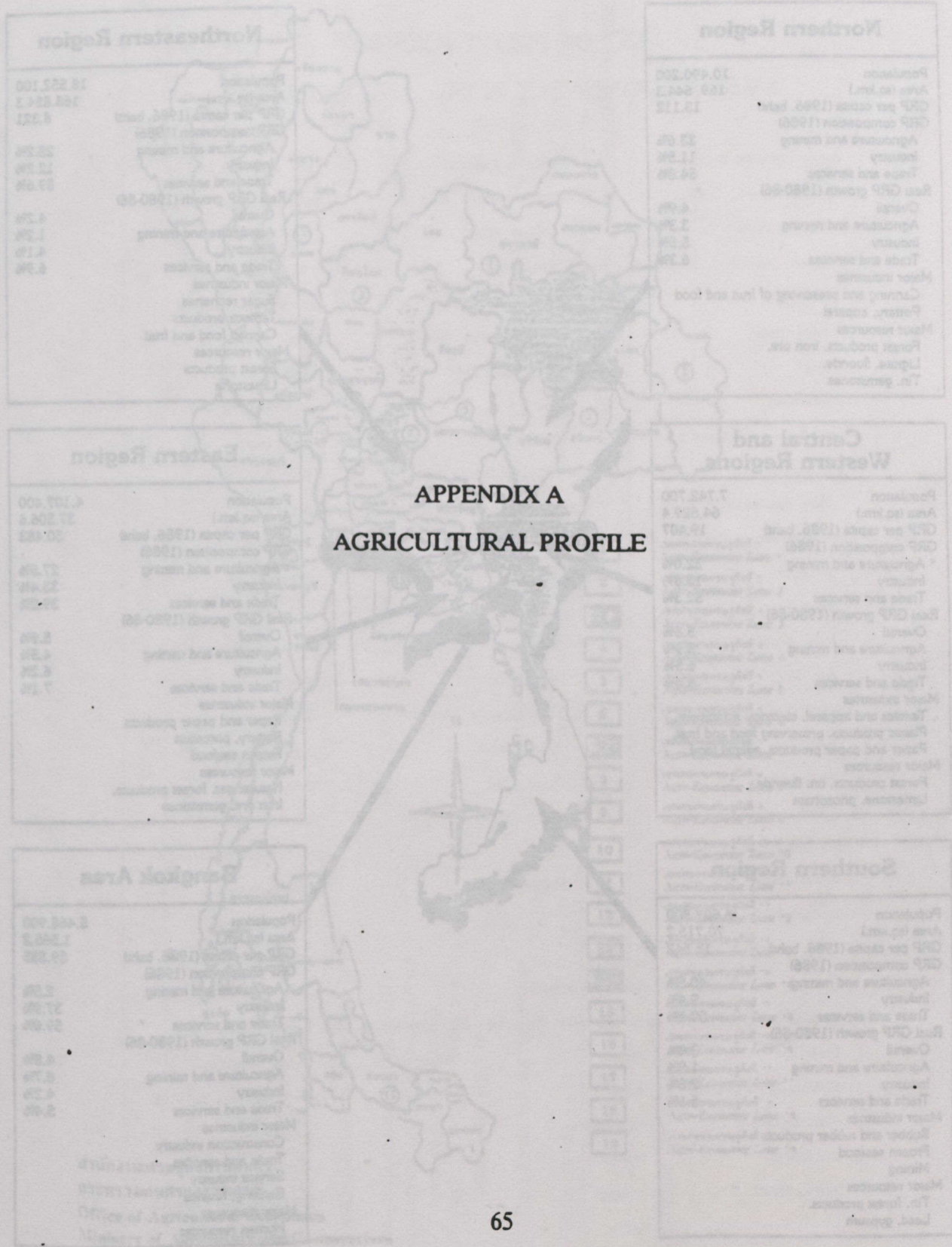
Department of Horticulture
Faculty of Agriculture
Kasetsart University
50 Thanon Phahon Yothin, BangKhen
Bangkok

Department of Animal Science
Faculty of Agriculture
Kasetsart University
50 Thanon Phahon Yothin, BangKhen
Bangkok

Faculty of Agro-industry
Kasetsart University
50 Thanon Phahon Yothin, BangKhen
Bangkok

Thailand Development Research Institute-Foundation
Rajapark Building 163 Asoke Road
Bangkok 10110

Forestry Industry Organization
76 Rajadamnernnok Ave.
Bangkok 10100



APPENDIX A
AGRICULTURAL PROFILE

Northeastern Region

Population	10,490,200
Area (sq km)	159,844.3
GDP per capita (1995) (Baht)	13,112
GDP composition (1995)	
Agriculture and mining	33.5%
Industry	11.5%
Trade and services	54.9%
Real GDP growth (1990-95)	4.8%
Exports	1.3%
Agriculture and mining	1.3%
Industry	4.1%
Trade and services	4.3%
Major resources	
Cashew and processing of rice and food	
Forest products	
Mineral resources	
Food products for export	
Liquor licenses	
Tourism	

Northern Region

Population	7,742,700
Area (sq km)	84,014.4
GDP per capita (1995) (Baht)	19,907
GDP composition (1995)	
Agriculture and mining	22.0%
Industry	12.5%
Trade and services	65.5%
Real GDP growth (1990-95)	5.3%
Exports	1.3%
Agriculture and mining	1.3%
Industry	4.3%
Trade and services	7.1%
Major resources	
Tourism and regional, energy, and other	
Forest products, processing of rice and food	
Food and other products for export	
Mineral resources	
Forest products for domestic consumption	
Liquor licenses	

Eastern Region

Population	4,107,400
Area (sq km)	37,304.4
GDP per capita (1995) (Baht)	30,483
GDP composition (1995)	
Agriculture and mining	17.5%
Industry	22.4%
Trade and services	59.9%
Real GDP growth (1990-95)	8.9%
Exports	4.3%
Agriculture and mining	4.3%
Industry	4.3%
Trade and services	7.1%
Major resources	
Food and other products	
Forest products	
Mineral resources	
Forest products for domestic consumption	
Liquor licenses	

Central and Western Regions

Population	1,442,000
Area (sq km)	1,348.3
GDP per capita (1995) (Baht)	39,386
GDP composition (1995)	
Agriculture and mining	2.3%
Industry	37.9%
Trade and services	59.8%
Real GDP growth (1990-95)	4.8%
Exports	4.3%
Agriculture and mining	4.3%
Industry	4.3%
Trade and services	4.3%
Major resources	
Construction industry	
Food and other products	
Forest products	
Mineral resources	
Liquor licenses	

Bangkok Area

Population	1,442,000
Area (sq km)	1,348.3
GDP per capita (1995) (Baht)	39,386
GDP composition (1995)	
Agriculture and mining	2.3%
Industry	37.9%
Trade and services	59.8%
Real GDP growth (1990-95)	4.8%
Exports	4.3%
Agriculture and mining	4.3%
Industry	4.3%
Trade and services	4.3%
Major resources	
Construction industry	
Food and other products	
Forest products	
Mineral resources	
Liquor licenses	

Southern Region

Population	10,490,200
Area (sq km)	159,844.3
GDP per capita (1995) (Baht)	13,112
GDP composition (1995)	
Agriculture and mining	33.5%
Industry	11.5%
Trade and services	54.9%
Real GDP growth (1990-95)	4.8%
Exports	1.3%
Agriculture and mining	1.3%
Industry	4.1%
Trade and services	4.3%
Major resources	
Cashew and processing of rice and food	
Forest products	
Mineral resources	
Food products for export	
Liquor licenses	
Tourism	

A Regional Profile of Thailand

Northern Region	
Population	10,490,200
Area (sq.km.)	169,644.3
GRP per capita (1986, baht)	13,112
GRP composition (1986)	
Agriculture and mining	33.6%
Industry	11.5%
Trade and services	54.8%
Real GRP growth (1980-86)	
Overall	4.9%
Agriculture and mining	3.3%
Industry	5.5%
Trade and services	6.3%
Major industries	
Canning and preserving of fruit and food	
Pottery, apparel	
Major resources	
Forest products, iron ore,	
Lignite, fluoride,	
Tin, gemstones	

Northeastern Region	
Population	18,552,100
Area (sq.km.)	168,854.3
GRP per capita (1986, baht)	8,321
GRP composition (1986)	
Agriculture and mining	23.2%
Industry	12.2%
Trade and services	59.6%
Real GRP growth (1980-86)	
Overall	4.2%
Agriculture and mining	1.2%
Industry	4.1%
Trade and services	6.9%
Major industries	
Sugar refineries	
Tapioca products	
Canned food and fruit	
Major resources	
Forest products	
Limestone	

Central and Western Regions	
Population	7,742,700
Area (sq.km.)	64,829.4
GRP per capita (1986, baht)	19,407
GRP composition (1986)	
Agriculture and mining	32.0%
Industry	15.8%
Trade and services	52.3%
Real GRP growth (1980-86)	
Overall	5.8%
Agriculture and mining	5.9%
Industry	6.5%
Trade and services	5.4%
Major industries	
Textiles and apparel, electrical equipment,	
Plastic products, preserving food and fruit,	
Paper and paper products, animal food	
Major resources	
Forest products, tin, fluoride,	
Limestone, phosphate	

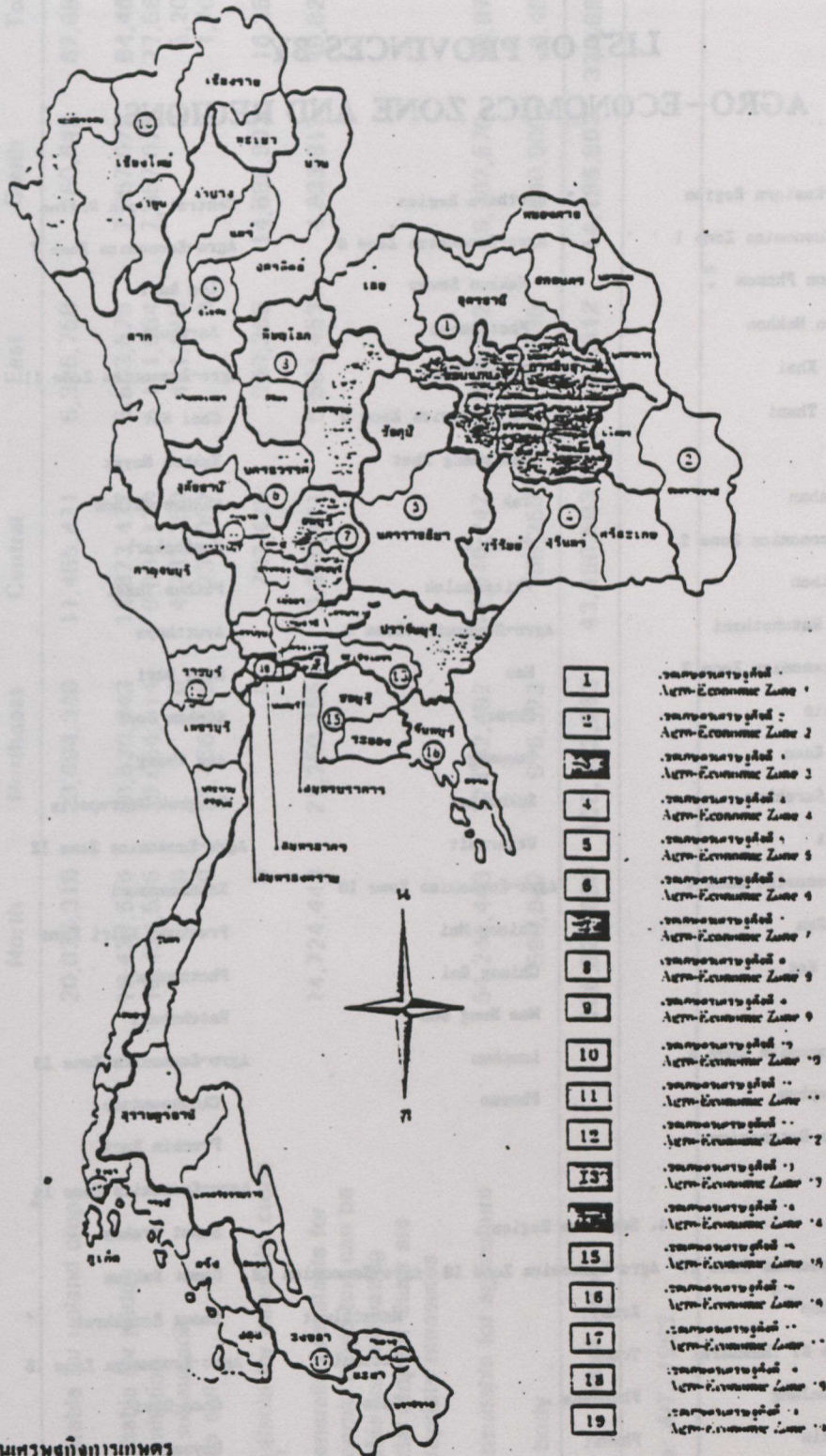
Eastern Region	
Population	4,107,400
Area (sq.km.)	37,506.6
GRP per capita (1986, baht)	30,483
GRP composition (1986)	
Agriculture and mining	27.5%
Industry	33.4%
Trade and services	39.2%
Real GRP growth (1980-86)	
Overall	5.9%
Agriculture and mining	4.5%
Industry	6.2%
Trade and services	7.1%
Major industries	
Paper and paper products	
Pottery, porcelain	
Frozen seafood	
Major resources	
Natural gas, forest products,	
Iron ore, gemstones	

Southern Region	
Population	6,607,900
Area (sq.km.)	70,715.2
GRP per capita (1986, baht)	15,542
GRP composition (1986)	
Agriculture and mining	40.5%
Industry	9.4%
Trade and services	50.1%
Real GRP growth (1980-86)	
Overall	3.4%
Agriculture and mining	1.9%
Industry	2.6%
Trade and services	5.1%
Major industries	
Rubber and rubber products	
Frozen seafood	
Mining	
Major resources	
Tin, forest products,	
Lead, gypsum	

Bangkok Area	
Population	5,468,900
Area (sq.km.)	1,565.2
GRP per capita (1986, baht)	59,885
GRP composition (1986)	
Agriculture and mining	2.5%
Industry	37.9%
Trade and services	59.6%
Real GRP growth (1980-86)	
Overall	4.8%
Agriculture and mining	0.7%
Industry	4.2%
Trade and services	5.4%
Major industries	
Construction industry	
Trade and services	
Service industry	
Banking, finance	
Major resources	
Human resources	



Figure 2. Agro-Economic Zone of Thailand



สำนักงานเศรษฐกิจการเกษตร
กระทรวงเกษตรและสหกรณ์
Office of Agricultural Economics
Ministry of Agriculture and Co-operatives

LIST OF PROVINCES BY AGRO-ECONOMICS ZONE AND REGIONS

1. North-Eastern Region

Agro-Economics Zone 1

Nakhon Phanom

Sakon Nakhon

Nong Khai

Udon Thani

Loei

Mukdahan

Agro-Economics Zone 2

Yasothon

Ubon Ratchathani

Agro-Economics Zone 3

Kalasin

Khon Kaen

Maha Sarakham

Roi Et

Agro-Economics Zone 4

Buri Ram

Si Sa Ket

Surin

Agro-Economics Zone 5

Chaiyaphum

Nakhon Ratchasima

2. Northern Region

Agro-Economics Zone 6

Nakhon Sawan

Phetchabun

Uthai Thani

Agro-Economics Zone 8

Kamphaeng Phet

Tak

Phichit

Phitsanulok

Agro-Economics Zone 9

Nan

Phrae

Lampang

Sukhothai

Uttaradit

Agro-Economics Zone 10

Chiang Mai

Chiang Rai

Mae Hong Son

Lumphun

Phayao

3. Central Plain Region

Agro-Economics Zone 7

Lop Buri

Saraburi

Agro-Economics Zone 11

Chai Nat

Nakhon Nayok

Nakhon Pathom

Nonthaburi

Pathum Thani

Ayutthaya

Sing Buri

Suphan Buri

Ang Thong

Bangkok Metropolis

Agro-Economics Zone 12

Kanchanaburi

Prachuap Khiri Khan

Phetchaburi

Ratchaburi

Agro-Economics Zone 13

Chachoengsao

Prachin Buri

Agro-Economics Zone 14

Samut Prakan

Samut Sakhon

Samut Songkhram

Agro-Economics Zone 15

Chon Buri

Rayong

Agro-Economics Zone 16

Chanthaburi

Trat

4. Southern Region

Agro-Economics Zone 17

Chumphon

Nakhon Si Thammarat

Phatthalung

Songkhla

Surat Thani

Agro-Economics Zone 18

Krabi

Trang

Phangnga

Phuket

Ranong

Satun

Agro-Economics 19

Narathiwat

Pattani

Yala

Land Suitability for Agriculture

(rai)

	North	Northeast	Central	East	South	Total
Area suitable for upland crops	20,036,318	30,694,340	11,485,471	5,306,758	160,642	67,683,529
Area suitable for paddy flo limitation	16,434,526	40,520,643	14,873,477	5,583,579	7,057,075	84,469,300
Acid sulfate soil	16,434,526	39,054,014	9,904,130	5,111,964	7,057,075	77,561,709
Saline soil	0	0	4,732,250	471,615	0	5,203,865
	0	1,466,629	237,097	0	0	1,703,726
Area suitable for perennial crops	0	0	702,428	960,385	14,696,993	16,359,806
Area generally unsuitable for economic crops but can be suitable for cultivating special crops if there are appropriate measures	14,724,446	21,250,255	3,355,121	5,564,453	4,933,812	49,828,087
Area unsuitable for agriculture	54,241,443	12,092,402	12,845,747	3,988,102	16,707,570	99,875,264
Water body	590,947	976,323	188,259	84,535	640,900	2,480,964
Grand Total	106,027,680	105,533,963	43,450,503	21,487,812	44,196,992	320,696,950

Source: AIT, 1983.

Main Economic Targets in the Sixth NESDP 1987-1991

Categories	Fifth Plan	Sixth Plan
Trade Deficit/GDP	5.8%	2.7%
Current Account Deficit/GDP	3.8%	0.9%
Export Growth Rate		
Value	9.8%	9.9%
Volume	8.4%	7.4%
Import Growth Rate		
Value	3.7%	9.7%
Volume	2.0%	4.5%
Real Economic Growth		
Agriculture	2.1%	2.9%
Manufacturing	5.1%	6.6%
Mining	6.1%	6.4%
GDP	4.4%	5.0%
Production of natural gas (million c.f./day)	320	720
Real Expenditure Growth		
Private Consumption	4.3%	3.7%
Private Investment	0.8%	8.1%
Public Consumption	3.3%	5.3%
Public Investment	1.8%	1.0%
Central Government revenue/GDP	14.8%	15.8%
Central Government deficit	3.4%	2.0%
Population growth rate	1.7%	1.3%
Inflation rate	2.9%	2.3%
Per capita income (baht)	21,395	27,783

Source: National Economic Social Development Board

Industrial Production - Selected Major Products

	unit	1983	1984	1985	1986	1987	1988
Food Products							
Tapioca products	metric tons	5,196.751	6,569.728	7,088.393	6,318.565	n.a.	n.a.
Raw sugar	metric tons	1,435.632	1,568.265	1,530.044	1,842.379	2,432.214	2,864.741
Canned pineapples	metric tons	153.600	200.806	208.600	239.900	n.a.	n.a.
Canned sea food	metric tons	74.293	110.234	132.457	198.533	n.a.	n.a.
Condensed milk	metric tons	82.073	79.297	80.445	82.758	100.638	n.a.
Evaporated milk	metric tons	15.495	15.216	16.309	162.313	20.787	n.a.
Beverages and Tobacco							
Beer	'000 litres	145.629	163.905	105.226	86.329	97.293	130.251
Soft drinks	'000 litres	1,285.690	1,441.780	1,467.008	1,500.410	1,593.224	1,836.225
Liquor	'000 litres	424.000	434.720	381.940	390.620	465.460	n.a.
Cigarettes	metric tons	29.089	29.211	29.215	29.539	31.403	33.992
Textile Products							
Cotton Fabrics :							
Weaving	'000 sq.yards	888.555	937.758	986.718	1,054.262	1,360.011	n.a.
Knitting	'000 sq.yards	84.794	90.624	96.179	127.136	191.372	n.a.
Man-made Fabrics :							
Weaving	'000 sq.yards	846.604	904.860	971.454	1,046.727	1,332.111	n.a.
Knitting	'000 sq.yards	370.867	397.566	424.297	478.390	515.096	n.a.
Jute Products	metric tons	174.276	192.851	157.125	198.514	195.567	191.554
Synthetic Fibre	metric tons	110.482	115.160	126.539	133.406	140.504	155.639
Pulp and Paper Products							
Pulp	metric tons	74.086	90.017	106.770	113.500	134.875	n.a.
Printing and writing paper	metric tons	65.500	68.000	78.200	98.200	110.830	n.a.
Kraft paper	metric tons	240.249	275.190	246.178	238.129	358.857	412.595
Sanitary paper	metric tons	15.196	15.830	15.100	31.600	33.760	n.a.
Chemical Products							
Sodium silicate	metric tons	22.305	24.702	23.559	19.224	23.840	n.a.
Sulphuric acid	metric tons	56.359	63.294	65.890	77.822	81.112	n.a.
Caustic soda	metric tons	82.497	82.064	105.029	921.176	135.435	n.a.
Hydrochloric acid	metric tons	85.941	84.398	85.502	93.241	110.147	n.a.
Fertilizer	metric tons	286.753	285.800	295.000	287.000	n.a.	n.a.
Nitrogen	cubic metres	4,956.322	6,136.450	6,355.815	6,803.443	6,690.845	n.a.
Construction Materials							
Cement	metric tons	7,263.457	8,239.970	7,915.729	7,913.622	9,850.367	11,514.410
White cement	metric tons	56.362	60.927	57.624	52.034	66.366	n.a.
Vinyl floor tiles	square metres	2,150.364	2,099.518	1,997.432	1,901.796	2,068.617	n.a.
Water closets	units	214.701	302.899	290.230	313.498	372.968	n.a.
Plywood	'000 sheets	4.136	3.530	3.372	2.888	3.067	n.a.
Iron and Steel Products							
Galvanized iron sheet	metric tons	123.679	153.775	128.681	140.908	171.666	189.996
Tin plate	metric tons	73.119	91.974	68.175	104.433	119.319	147.337
Electrical Products							
Televisions	units	631.300	594.000	467.449	487.875	751.249	799.700
Radios	units	505.900	994.400	357.472	308.516	636.793	816.200
Refrigerators	units	379.000	369.000	266.981	286.320	n.a.	n.a.
Integrated circuits	million units	402	487	783	406	945	1,143
Transportation Equipment							
Passenger cars	units	33.945	36.127	24.861	21.053	29.333	54.459
Commercial vehicles	units	75.314	74.910	58.244	53.102	68.815	99.724
Motor cycles	units	313.260	320.538	223.646	241.081	302.195	488.669
Total tyres	metric tons	45.297	44.442	31.564	33.347	42.205	50.787

Note: n.a. - not available

Sources: Bank of Thailand, Ministry of Industry, Industry Associations, Thai Textile Manufacturing Association

Gross Domestic Product by Industrial Origin at Current Prices

(billion baht)

Industrial Origin	1980		1986		1987		1988 ^p	
	Value	Share of GDP	Value	Share of GDP	Value	Share of GDP	Value	Share of GDP
Agriculture	152.9	23.2%	180.8	16.5%	198.3	16.1%	247.7	16.9%
Crops	101.4	15.4%	108.2	9.9%	121.1	9.8%	163.6	11.2%
Livestock	15.5	2.4%	19.9	1.8%	22.6	1.8%	24.8	1.7%
Fisheries	8.1	1.2%	15.1	1.4%	14.3	1.2%	15.1	1.0%
Forestry	8.6	1.3%	9.0	0.8%	9.0	0.7%	9.3	0.6%
Agricultural services	5.4	0.8%	7.1	0.6%	7.2	0.6%	7.8	0.5%
Simple agricultural processing	13.8	2.1%	21.5	2.0%	24.1	1.9%	27.1	1.8%
Mining and Quarrying	22.1	3.4%	34.4	3.1%	38.2	3.1%	44.3	3.0%
Manufacturing	139.9	21.3%	255.0	23.3%	295.5	23.9%	357.9	24.4%
Food	17.8	2.7%	33.3	3.0%	32.8	2.7%	39.3	2.7%
Beverages	10.4	1.6%	21.0	1.9%	23.6	1.9%	26.0	1.8%
Tobacco and snuff	7.4	1.1%	12.1	1.1%	12.8	1.0%	13.5	0.9%
Textiles	17.0	2.6%	27.3	2.5%	37.1	3.0%	41.4	2.8%
Garments and made-up textile goods	14.1	2.1%	35.5	3.2%	44.2	3.6%	50.4	3.4%
Leather, leather products, and footwear	2.8	0.4%	7.3	0.7%	10.7	0.9%	16.6	1.1%
Wood and wood products	5.8	0.9%	5.4	0.5%	6.6	0.5%	9.4	0.6%
Furniture and fixtures	2.9	0.4%	3.7	0.3%	5.2	0.4%	6.9	0.5%
Paper and paper products	2.1	0.3%	3.9	0.4%	4.8	0.4%	5.6	0.4%
Printing and allied industries	2.2	0.3%	3.7	0.3%	4.0	0.3%	4.7	0.3%
Chemicals and chemical products	4.8	0.7%	8.8	0.8%	10.1	0.8%	11.8	0.8%
Petroleum refineries and products	11.5	1.7%	25.7	2.3%	19.1	1.5%	22.1	1.5%
Rubber and plastic products	4.2	0.6%	6.2	0.6%	8.2	0.7%	10.9	0.7%
Nonmetallic mineral products	5.2	0.8%	10.3	0.9%	11.9	1.0%	13.8	0.9%
Basic metal industries	3.7	0.6%	3.2	0.3%	3.4	0.3%	4.1	0.3%
Metal products (excl. machinery)	3.9	0.6%	6.6	0.6%	7.5	0.6%	8.7	0.6%
Nonelectrical machinery	3.7	0.6%	6.1	0.6%	7.1	0.6%	9.0	0.6%
Electrical machinery and supplies	3.4	0.5%	7.7	0.7%	8.4	0.7%	9.9	0.7%
Transport equipment	11.4	1.7%	12.5	1.1%	17.8	1.4%	27.0	1.8%
Miscellaneous, n.e.s.	5.6	0.8%	14.9	1.4%	20.3	1.6%	26.6	1.8%
Construction	34.8	5.3%	56.6	5.2%	63.0	5.1%	74.5	5.1%
Electricity and Water Supply	6.3	1.0%	28.7	2.6%	31.9	2.6%	37.5	2.6%
Transportation and Communications	37.9	5.7%	85.4	7.8%	92.9	7.5%	106.8	7.3%
Trade	110.2	16.7%	169.8	15.5%	192.4	15.6%	232.2	15.8%
Banking, Insurance, and Real Estate	19.9	3.0%	37.4	3.4%	48.7	3.9%	60.0	4.1%
Ownership of Dwellings	22.8	3.5%	44.8	4.1%	48.8	4.0%	52.7	3.6%
Public Administration and Defense	30.7	4.7%	50.6	4.6%	52.7	4.3%	56.2	3.8%
Other Services	81.0	12.3%	151.1	13.8%	171.7	13.9%	195.8	13.4%
Gross Domestic Product	658.5	100.0%	1,094.7	100.0%	1,234.0	100.0%	1,465.7	100.0%

Notes: p - provisional, totals may not add exactly due to rounding

Gross Domestic Product by Industrial Origin at Constant 1972 Prices

(billion baht)

Industrial Origin	1980	1986		1987		1988p	
	Value	Value	Growth*	Value	Growth	Value	Growth
Agriculture	61.8	78.7	4.1%	77.2	-2.0%	83.8	8.6%
Crops	39.8	49.3	3.6%	47.0	-4.6%	52.8	12.3%
Livestock	7.5	10.9	6.6%	11.6	5.7%	12.2	5.9%
Fisheries	3.1	4.5	6.0%	4.3	-3.1%	4.3	-0.2%
Forestry	2.6	2.3	-2.1%	2.2	-5.6%	2.1	-4.6%
Agricultural services	2.3	2.3	0.2%	2.3	-1.3%	2.4	4.3%
Simple agricultural processing	6.5	9.5	6.5%	9.8	3.8%	10.0	1.3%
Mining and Quarrying	7.9	9.7	3.5%	10.4	7.3%	11.8	13.5%
Manufacturing	65.0	89.3	5.4%	101.4	13.6%	114.0	12.4%
Food	9.2	14.6	8.0%	15.1	3.4%	16.5	9.5%
Beverages	6.3	8.6	5.2%	9.2	6.9%	10.2	10.4%
Tobacco and snuff	4.3	4.1	-0.7%	4.3	5.9%	4.6	5.5%
Textiles	9.4	13.1	5.7%	15.3	16.6%	16.9	10.6%
Garments and made-up textile goods	5.9	9.3	7.9%	11.2	20.5%	12.3	10.0%
Leather, leather products, and footwear	1.2	2.3	11.7%	3.1	35.6%	3.6	17.5%
Wood and wood products	1.4	1.3	-0.8%	1.4	9.0%	1.6	11.8%
Furniture and fixtures	0.8	1.1	4.2%	1.2	13.9%	1.3	12.1%
Paper and paper products	1.2	1.5	3.8%	1.7	18.7%	1.9	11.4%
Printing and allied industries	1.0	1.5	6.4%	1.5	-1.2%	1.5	0.3%
Chemicals and chemical products	2.7	4.2	7.4%	4.6	10.3%	5.1	12.2%
Petroleum refineries and products	3.4	4.3	4.3%	4.5	4.6%	4.8	6.3%
Rubber and plastic products	1.8	2.2	3.5%	2.6	18.2%	3.2	21.0%
Nonmetallic mineral products	2.4	3.3	5.7%	3.9	18.4%	4.4	13.9%
Basic metal industries	1.2	1.5	3.6%	1.5	0.5%	1.5	5.2%
Metal products (excl. machinery)	1.2	1.6	5.0%	1.8	14.2%	2.1	13.5%
Nonelectrical machinery	2.2	3.2	6.7%	3.6	12.7%	4.1	13.9%
Electrical machinery and supplies	1.9	2.7	6.2%	3.2	19.4%	3.8	16.3%
Transport equipment	5.1	3.8	-4.7%	4.7	23.7%	5.9	26.8%
Miscellaneous, n.e.s.	2.5	5.2	12.7%	6.8	32.1%	8.5	24.0%
Construction	13.5	16.2	3.1%	17.5	8.1%	19.9	13.7%
Electricity and Water Supply	5.9	11.2	11.2%	12.2	9.0%	13.8	13.4%
Transportation and Communications	20.0	30.2	7.1%	32.7	8.3%	36.2	10.8%
Trade	50.7	67.1	4.8%	74.7	11.5%	84.6	13.2%
Banking, Insurance, and Real Estate	8.3	12.0	6.4%	15.3	27.0%	18.1	18.4%
Ownership of Dwellings	14.3	18.0	3.9%	19.0	5.2%	20.2	6.6%
Public Administration and Defense	15.4	22.0	6.1%	22.7	3.0%	23.6	3.8%
Other Services	36.7	57.5	7.8%	63.4	10.4%	69.4	9.5%
Gross Domestic Product	299.5	411.8	5.5%	446.4	8.4%	495.4	11.0%

Notes: p - provisional. * - average annual growth from 1980-1986. totals may not add exactly due to rounding
 Source: National Economic and Social Development Board

Exports and Projected Exports for Major Items

	1987		1988 *		1989 **		1989 Growth Rate
	Volume	Value	Volume	Value	Volume	Value	
Agricultural Products							
Rice	4,356.658	22.230	4,400.000	30.200	4,500.000	30.000	-0.7%
Rubber	885.913	20.539	940.000	23.500	1,015.000	23.800	1.3%
Tapioca products	6,228.755	20.719	7,000.000	18.900	7,200.000	19.000	0.5%
Maize	1,629.174	3.868	1,800.000	4.860	2,700.000	8.100	66.7%
Frozen chicken	81.917	4.028	89.800	4.600	100.000	5.200	13.0%
Tobacco	27.793	1.358	30.000	1.500	28.000	1.400	-6.7%
Raw coffee	22.705	1.100	27.836	1.250	38.000	1.525	22.0%
Black mung beans	102.392	780	80.000	759	80.000	780	2.8%
Mung beans	94.719	739	60.000	660	60.000	620	-6.1%
Fruits	44.617	600	62.000	650	55.000	600	-7.7%
Fishery Products							
Frozen shrimp	33.911	5.750	42.000	8.550	50.400	12.300	43.9%
Frozen squid	61.637	4.167	55.500	3.600	55.500	3.100	-13.9%
Frozen fish	130.355	2.493	150.000	3.000	160.000	3.500	16.7%
Dried squid	5.216	1.402	5.230	1.500	5.245	1.600	6.7%
Instant squid	4.926	844	5.050	760	5.200	780	2.6%
Smashed fish	72.990	684	50.000	577	55.000	660	14.4%
Frozen boiled shrimp	7.004	759	3.500	455	4.000	845	85.7%
Mining and Quarrying							
Tin	-	2.411	-	2.790	-	3.054	9.5%
Liquid LPG (000 barrels)	3.582	1.669	5.100	2.112	4.500	1.900	-10.0%
Agro-Industry Products							
Canned seafood	226.255	13.221	272.100	17.136	313.000	20.500	19.6%
White sugar	2,024.186	8.563	1,800.000	9.417	2,100.000	11.550	22.7%
Canned pineapple	259.805	3.728	275.000	3.920	290.000	4.150	5.9%
Rubber products	-	2.692	-	3.550	-	4.500	26.8%
Jute products	135.046	1.697	120.000	1.645	125.000	1.725	4.9%
Canned pineapple juice	28.220	448	39.500	650	45.000	750	15.4%
Molasses	483.603	684	400.000	594	850.000	893	50.3%
Other Manufacturing							
Garments	-	3.663	-	46.995	-	56.133	19.4%
Jewelry and gemstones	-	19.830	-	25.000	-	30.000	20.0%
Integrated circuits (million units)	-	15.179	-	19.500	-	23.500	20.5%
Textile products	-	12.199	-	13.280	-	13.660	2.9%
Shoes	-	5.918	-	12.000	-	20.000	66.7%
Furniture	-	3.387	-	4.600	-	5.500	19.6%
Plastic products	46.772	2.217	63.000	3.400	70.000	4.100	20.6%
Electronic bearings (metric tons)	-	2.421	-	3.300	-	3.900	18.2%
Cloth and plastic bags	-	2.019	-	3.000	-	3.750	25.0%
Steel pipes and sockets	195.911	2.190	-196.000	3.000	197.000	3.200	6.7%
Toys	-	1.643	-	2.500	-	3.500	40.0%
Passenger cars (units)	487	69	13.500	1.965	20.000	2.920	48.6%
Artificial flowers	6.111	1.506	6.800	1.875	7.000	2.250	20.0%
Ceramics	-	1.022	-	1.740	-	2.200	26.4%
Wood products	-	934	-	1.200	-	1.600	33.3%
Imitation jewelry	-	609	-	800	-	1.000	25.0%
Construction materials of wood	-	606	-	650	-	1.000	53.8%
Goldware	-	740	-	600	-	650	8.3%
Total Exports	-	299.853	-	400.000	-	509.000	27.3%

Notes: volumes, when available, are expressed in metric tons except where noted. values are in million baht

* - provisional. ** - estimated

Source: Department of Business Economics, Ministry of Commerce

Imports by Economic Classification

(million baht)

	1983	1984	1985	1986	1987	1988p
Capital Goods	69.814	73.607	75.404	78.316	105.916	193.659
(share in total imports)	29.5%	30.0%	30.0%	32.4%	31.7%	39.7%
Machinery and parts	49.433	53.077	50.568	57.860	81.883	137.941
Nonelectrical	33.061	34.992	34.720	32.299	49.653	87.861
Electrical	16.372	18.085	15.848	25.561	32.230	50.080
Metal manufactures	4.046	3.952	4.977	4.221	5.920	9.365
Fertilizers and pesticides	6.232	6.162	6.748	6.660	6.676	9.262
Scientific and optical instruments	4.598	4.088	4.356	4.779	5.320	9.537
Construction materials	292	298	317	227	401	283
Other	5.213	6.030	8.438	4.569	5.216	27.171
Intermediate Products and Raw Materials	66.474	69.613	75.772	84.333	119.792	172.534
Chiefly for consumer goods	44.122	47.089	51.107	61.191	84.737	112.744
(share in total imports)	18.6%	19.2%	20.3%	25.4%	25.4%	23.1%
Chemicals	20.790	20.730	23.061	26.106	36.140	45.250
Textile fiber	4.516	5.388	5.673	5.638	8.389	9.706
Paper and paperboard	3.109	2.914	3.656	3.370	4.856	6.020
Tobacco	603	974	1,409	1,252	399	806
Textile yarn and thread	1,399	1,514	1,445	2,359	4,350	6,071
Other	13,705	15,569	15,863	22,466	30,603	44,891
Chiefly for capital goods	22.352	22.524	24.665	23.142	35.055	59.790
(share in total imports)	9.4%	9.2%	9.8%	9.6%	10.5%	12.3%
Iron and steel	13,860	14,035	15,942	15,737	23,707	40,183
Other base metals	7,387	7,339	7,405	6,439	10,148	17,922
Other	1,105	1,150	1,318	966	1,200	1,685
Consumer Goods	22.308	22.692	23.966	24.466	33.844	36.661
(share in total imports)	9.4%	9.3%	9.5%	10.1%	10.1%	7.5%
Nondurable goods	12.251	12.184	12.905	12.982	16.707	18.900
Food and beverages	6.057	6.051	6.364	6.103	8.022	9.973
Clothing and footwear	2.158	2.065	1.816	2.111	2,915	2,922
Medicinal and pharmaceutical products	2.786	2.733	3.072	3.136	3.713	3.717
Other	1.250	1.335	1.553	1.632	2.157	2,288
Durable goods	10.057	10.508	11.161	11.484	17.137	17.761
Household goods	2,985	3,044	3,524	3,646	5,149	6,375
Electric appliances	5,263	5,549	5,682	5,777	9,419	7,988
Cycles, motorcycles, cars	1,310	1,284	947	842	1,248	1,724
Other	599	631	1,008	1,219	1,321	1,174
Other Imports	78.013	79.243	76.027	54.243	74.657	85.017
(share in total imports)	33.0%	32.3%	30.3%	22.5%	22.3%	17.4%
Fuels and lubricants	57.065	57.353	56.719	32.354	44.177	36.199
Vehicles and parts	11.416	11.834	9,292	8,939	15,217	23,002
Other	9,532	10,056	10,016	12,950	15,263	20,816
Total Imports	236.609	245.155	251.169	241.358	334.209	487.871

Note: p - preliminary
Source: Bank of Thailand

Balance of Trade of Thailand 1978-1987

Unit: million baht

	Export	Import	Balance
1978	83,065	108,899	-25,834
1979	108,179	146,161	-37,982
1980	133,197	193,618	-60,421
1981	153,001	219,026	-66,025
1982	159,728	196,616	-36,888
1983	146,472	236,609	-90,137
1984	175,237	245,155	-69,918
1985	193,366	251,169	-57,803
1986	233,383	241,358	-7,975
1987	299,853	334,340	-34,487

Source: Center for Agricultural Statistics,
Office of Agricultural Economics

Agricultural Balance of Trade

Unit: million baht

	Export	Import	Balance
1978	56,341	17,255	+39,086
1979	72,058	20,255	+51,803
1980	81,443	23,999	+57,444
1981	101,475	27,871	+73,604
1982	107,820	24,796	+83,024
1983	96,655	30,306	+66,349
1984	112,694	33,603	+79,091
1985	115,231	36,930	+78,301
1986	133,339	40,563	+92,776
1987	152,163	53,490	+98,673

Source: Center for Agricultural Statistics,
Office of Agricultural Economics

Agricultural Production - Main Products

	1983	1984	1985	1986	1987	1988p
A. Major Crops ('000 metric tons)						
Paddy	19.436	19.888	20.599	19.026	17.072	20.060
Rubber	587	629	722	790	910	950
Maize	3.900	4.500	5.030	4.300	2.310	5.000
Tapioca roots	19.000	20.000	19.263	15.255	19.550	22.300
Sugar cane	23.325	25.053	24.000	24.441	27.200	32.600
Mung beans	288	352	323	301	267	280
Ground nuts	147	172	171	169	158	165
Soyabeans	207	253	308	350	312	440
Sesame	16	22	25	27	25	27
Coconut	882	902	981	1.024	850	860
Castor seeds	25	33	33	36	20	30
Cotton	119	79	102	57	74	106
Jute and kenaf	233	205	266	240	212	169
Kapok and bambax fiber	40	41	44	40	37	35
Tobacco leaves (Virginia)	40	39	35	31	23	26
B. Livestock Products ('000 head)						
Cattle	4.833	4.789	4.829	4.879	4.969	n.a.
Swine	4.193	4.263	4.224	4.201	4.209	n.a.
Chicken	78.189	78.198	78.717	79.265	84.495	n.a.
Ducks	14.240	14.475	14.779	15.092	15.620	n.a.
Raw milk (metric tons)	36.029	46.196	57.894	69.175	79.094	99,449
C. Forestry Products ('000 cubic meters)						
Teak	58	48	39	68	38	47
Yang wood	397	590	534	585	543	582
Other woods	1.362	1.394	1.309	1.362	1.567	1.529
Firewood	773	817	691	438	874	589
Charcoal	292	441	364	349	464	549
D. Fishery Products ('000 metric tons)						
Marine fisheries	2.100	1.973	2.058	2.349	2.000	n.a.
Freshwater fisheries	150	162	168	188	165	n.a.
Marine shrimps and crabs	190	164	154	177	183	n.a.

Notes: p - provisional. n.a. - not available

Sources: Office of Agricultural Economics. Royal Forestry Department. Department of Fisheries

**Value of Agricultural Exports
1983-1987**

Unit: Millions of baht

Products	1983	1984	1985	1986	1987
Rice	20,157	25,932	22,524	20,314	22,703
Rice Products	505	577	705	781	655
Food Crops	11,451	13,463	11,891	12,178	6,605
Cassava Products	15,387	16,600	14,966	19,086	20,661
Sugar and Products	6,968	6,111	7,059	8,354	9,349
Oil Seeds	246	361	425	393	365
Vegetable Oils	262	409	572	209	280
Fiber Crops	3,256	4,970	4,929	5,307	7,279
Vegetables	687	719	953	1,262	2,320
Fruits	3,031	4,205	5,114	5,534	6,281
Spices	168	322	292	290	238
Miscellaneous	627	623	1,170	710	756
Tea and Coffee	465	552	905	1,738	1,104
Food Products	782	1,030	1,003	988	1,278
Tobacco/Products	1,836	1,650	1,589	1,490	1,288
Rubber/Products	12,406	13,891	14,807	16,929	23,328
Live Animals	107	112	200	143	96
Animal Feed	1,861	1,831	1,970	2,479	2,868
Animal Products	1,920	2,990	3,341	5,450	7,215
Milk Products	165	121	101	250	457
Fertilizer/ Pesticides	66	64	76	94	65
Machinery/Appliances or Agriculture	24	53	22	44	46
Fishery Products	11,192	13,463	16,768	24,678	30,220
Paper and Products	225	281	613	1,192	1,572
Forestry Products	400	608	761	607	541
Other Agricultural Products	7	19	40	58	57
Total Value of Agriculture Exports	95,627	112,706	115,060	133,330	152,161
Percentage of Total Exports	65.29	64.32	59.50	57.13	50.75
Total Value of Exports	146,461	175,237	193,365	233,382	299,853

Source: Department of Customs

**Value of Agricultural Imports
1983-1987**

Unit: Millions of baht

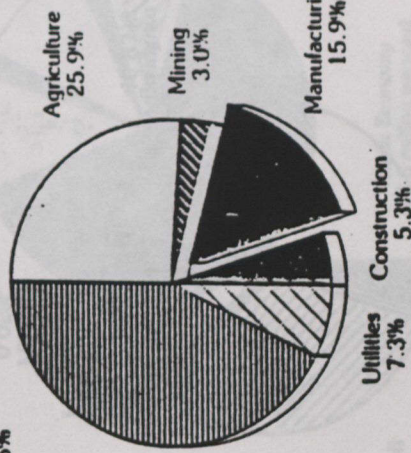
Products	1983	1984	1985	1986	1987
Food Crops	1,664	1,558	1,614	1,382	1,622
Sugar and Products	10	14	16	17	16
Cocoa and Products	69	75	91	103	140
Tea and Coffee	70	60	67	67	67
Spirits/ Beverages	581	605	735	617	965
Oil Seeds	2	4	4	37	39
Vegetable Oils	725	1,028	434	129	139
Fiber Crops	4,817	5,636	6,091	6,543	10,790
Vegetables/Products	187	226	201	200	231
Fruits/Products	223	245	273	243	276
Spices	104	62	103	100	118
Miscellaneous	16	23	16	30	31
Food Products	432	431	477	567	712
Tobacco	687	1,078	1,520	1,364	546
Rubber and Products	1,368	1,395	1,426	1,414	1,750
Live Animals	139	163	154	301	682
Animal Feed	1,511	2,224	1,249	1,839	2,467
Animal Products	528	719	1,092	1,433	2,550
Milk Products	2,140	2,084	2,195	2,098	2,442
Fishery Products	1,089	2,115	3,854	7,585	7,007
Paper and Products	4,557	4,064	5,103	4,805	6,963
Fertilizer	5,122	4,663	1,751	1,778	2,170
Pesticides	1,260	1,634	1,751	1,778	2,170
Machinery/Appliance for Agriculture	1,229	1,549	1,543	1,354	1,996
Wood and Products	2,368	2,359	2,238	2,048	3,717
Forestry Products	479	534	413	381	457
Other Agricultural Products	5	12	11	4	2
Total Value of Agriculture Imports	31,393	34,569	38,195	42,085	53,489
Percentage of Total Imports	13.27	14.10	15.21	17.44	16.0
Total Value of Imports	236,608	245,155	251,169	241,357	334,340

Source: Department of Customs

Sectoral Shares of GDP at Current Prices

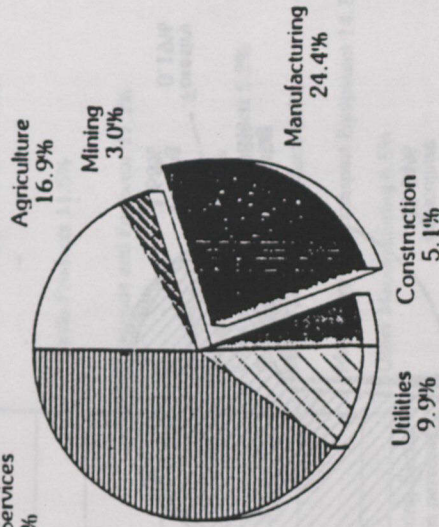
The Growing Importance of Manufacturing

Trade and Services
42.6%



1970

Trade and Services
40.7%

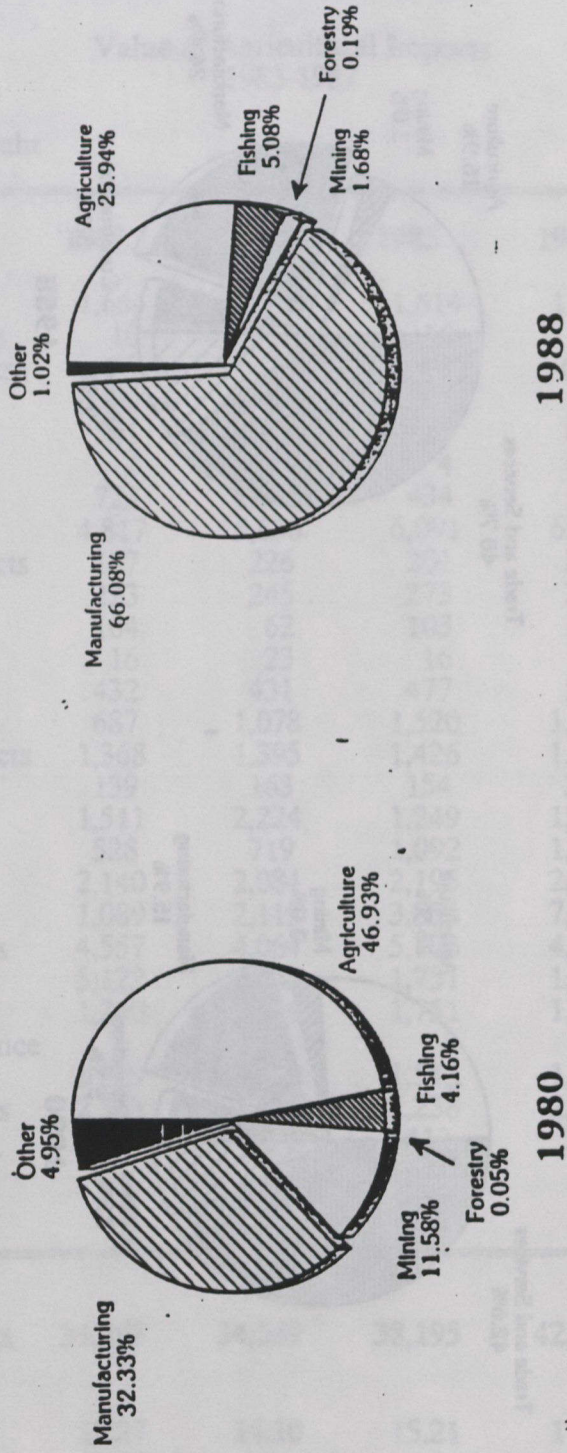


1988

Source: National Economic and Social Development Board

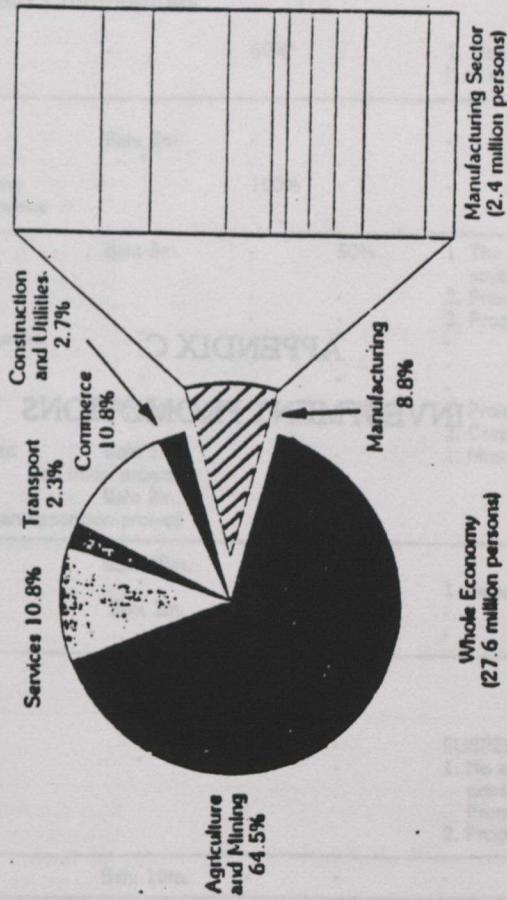
Sectoral Shares of Exports

A Dramatic Shift in the 1980s



Source: Bank of Thailand

Employed Persons by Industry

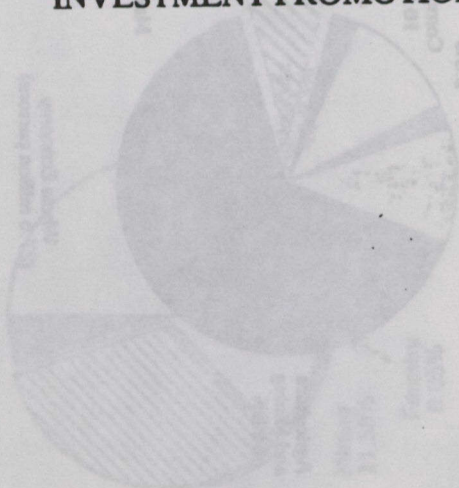


Source: National Statistical Office

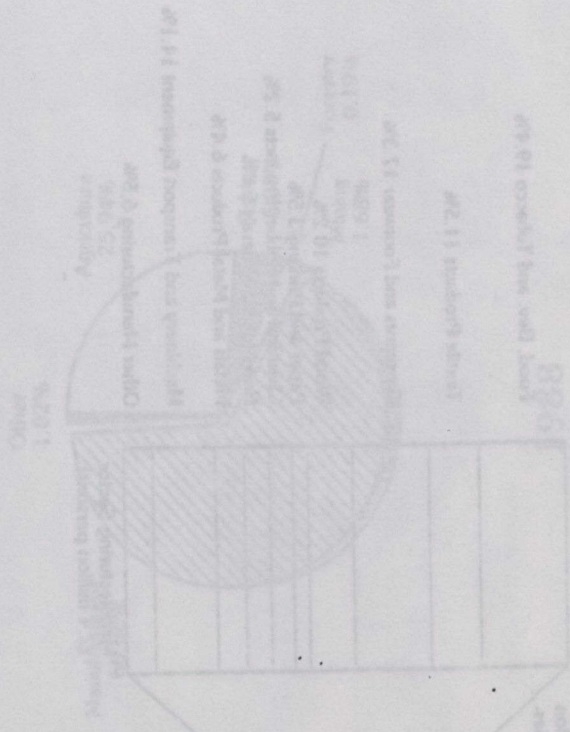
Societal Shares of Exports

A Dramatic Shift in the 1980s

Services: 40.0% (1980), 50.0% (1988)



APPENDIX C
INVESTMENT PROMOTIONS



Services: 40.0% (1980), 50.0% (1988)

Services: 40.0% (1980), 50.0% (1988)

ACTIVITIES ELIGIBLE FOR INVESTMENT PROMOTION

NOTES :

1. The MCR [Minimum Investment Capital Required] EXCLUDES the cost of land and working capital.
2. The MTS [Minimum Thai Shareholding] is the percentage of shares which Thai nationals must hold.
3. The MEL [Minimum Export Level] is the percentage of sales value which must be exported.
4. The products listed under each type of activity are examples only. The list is not exhaustive, and many other activities not listed here may be eligible for promotion if they are considered to be of benefit to the Thai economy and are in accordance with national development objectives.
5. A Rai is a Thai measurement equivalent to about two fifths of an acre (one acre = 2.5 rai).
6. The Ministry of Agriculture and Cooperatives is referred to as the "MinAgCo".
7. Promotional privileges have been suspended for some activities, and a separate list follows in Section 18.

No.	Type of activity	MCR	MTS	MEL	Other Conditions
1. Agricultural Products and Commodities					
1.1	Large-scale cultivation		60%*		1. Minimum 1,000 rai* [* or as the Board approves]
1.2	Processing of agricultural products	Baht 2m.	-	-	
	- Alfa starch		-	-	
	- Nursery block for planting made from agricultural waste		100%	-	
1.3	Processing or preservation of food	Baht 5m.	-	50%	1. The export condition is not restricted for soyabean milk production. 2. Projects for which import duty is not exempted. 3. Production of pasteurized and/or sterilized milk.
	- Canning (air-tight containers)		-	-	
	- Food preservation		-	-	
	- Fruit juice		-	-	
	- Sticky rice crackers	Baht 5m.	-	100%	1. Project approval for experience and marketing. 2. Corporate income tax is not exempted. 1. Must use local fresh fluid milk.
	- Production of pasteurized and/or sterilized milk	Baht 5m. (an initial project) Baht 2m. (an expansion project)	-	-	
1.4	Animal feeds	Baht 10m.	-	-	
	- Prepared animal feeds.		60%	-	1. Factory must be outside Bangkok Metropolis.
	- Animal feed mix	Baht 2m.	-	-	
	- Aquatic animal feeds		-	-	
1.5	Oil production from agricultural products	Baht 5m.	-	-	SUSPENDED
	- Castor oil		-	-	1. No exemption from corporate income tax or privileges when setting up a factory in an Investment Promotion Zone. 2. Processing crude oil into cooking oil is not permitted.
	- Palm oil		-	-	
	- Crude rice bran oil		-	-	
1.6	Corn products	Baht 10m.	-	-	
1.7	Products from stick lac	Baht 2m	-	-	
1.8	Rubber products	Baht 10m.	-	80%	1. Production of rubber wear and rubber sheet for reservoirs is exempted from the MEL.
1.9	Livestock raising or meat processing	Baht 1m.	60%	-	
	- Hogs		-	-	} Processed meat must be exported
	- Poultry		-	-	
	- Aquatic animals		-	-	
	- Buffaloes	Baht 1m.	-	-	1. Main project must be to breed bulls from the promoted farm with cows from that farm or from nearby. 2. Minimum of 3,000 rai of land. 3. MinAgCo must approve the raising and breeding. 4. Must start with not less than 200 head, the age, height and size of which must be approved by the MinAgCo.

No.	Type of activity	MCR	MTS	MEL	Other Conditions
	- Beef cattle	Baht 5m.	60%	-	<ol style="list-style-type: none"> 1. Main project must be to breed and raise beef cattle. 2. Must own minimum of 500 rai of land. 3. Minimum of 4 bulls and 100 cows. In cases where artificial insemination or embryo implantation is used, bulls may not be required.
	- Beef cattle raising	Baht 2m.	-	-	<ol style="list-style-type: none"> 1. Must own minimum of 30 rai of land. 2. Must have adequate lodgings and equipment for a minimum of 200 cattle.
1.10	Animal products	Baht 5m.	-	-	
	- Bone products	"	-	-	
	- Leather products	"	-	80%	
	- Reformed enamel leather	"	-	-	
	- Gelatin	"	-	-	
	- Fresh fluid milk	Baht 2m.	-	-	<ol style="list-style-type: none"> 1. Must own, or have the right to use not less than 500 rai. 2. Minimum of 80 dairy cows. 3. Ratio of bulls to cows must be at least 1: 20, or artificial insemination must be used. 4. There must be adequate pasture land: at least 2 rai of irrigated pasture per head, or 4 rai of non-irrigated pasture land per head. Milch cows fed in stables may not require pasture. 5. Must have adequate stables or lodgings for cattle, including a dairy farm with proper sanitary safeguards. The Board must be satisfied that the cattle are free from tuberculosis, brucellosis and are checked once a year. Fresh milk can be sold only after a veterinarian has certified that the cattle are disease-free.
1.11	Mulberry cultivation & silk worm farming	-	-	-	<ol style="list-style-type: none"> 1. Cultivated area of not less than 100 rai
1.12	Silk reeling	Baht 2m.	-	-	
1.13	Deep-sea fishing	-	-	-	<ol style="list-style-type: none"> 1. Minimum 150 gross tons. Must have radar, radio, communication equipment, sonar equipment or water depth finder, winch, and a suitable size of refrigerating unit (not packed ice).
	Off-shore fishing	-	-	-	<ol style="list-style-type: none"> 1. Minimum 50 gross tons.
1.14	Slaughtering and disem-bowelling of poultry for export	Baht 10m.	51%	100%	<ol style="list-style-type: none"> 1. Only the inner parts with no overseas market may be sold locally; blood, bones, feathers, legs and wings etc.
1.15	Rattan, bamboo or palm leaf products made for export	Baht 3m.	60%	100%	
1.16	Multiplication of vegetable seeds	Baht 5m.	-	-	<ol style="list-style-type: none"> 1. Must observe the laws concerning seeds. 2. Grading machines must be approved by the Board. 3. The Board must approve the hybrid planning and research program.
1.17	Rabbit raising and processing for export	Baht 5m.	-	90%	<ol style="list-style-type: none"> 1. Exports must account for 90% of sales of meat and skin.
1.18	Slaughtering and processing of hog carcasses	Baht 10m.	51%	-	<ol style="list-style-type: none"> 1. A hog slaughterhouse with modern dissecting facilities which meet the standards set by the Livestock Department (MinAgCo) must be set up. 2. There must be a freezing room of a size appropriate to the project. 3. From the 4th year of operation, the annual local sales of cut meat must not exceed 70 % of the total meat cut. The head, shank, legs, tail, intestines, hair and processed meat are not counted as cut meat and can be sold locally. This condition will be relaxed each year if the investor is unable to develop an overseas market. 4. Corporate income tax exemption will be at the discretion of the Board.

No.	Type of activity	MCR	MTS	MEL	Other Conditions
1.19	Slaughtering and processing of cattle carcasses	Baht 50m.	50%	-	<ol style="list-style-type: none"> 1. A modern slaughterhouse which meets the standards set by the Livestock Department (MinAgCo) must be established. 2. The freezing and refrigeration rooms must be of appropriate sizes. 3. From the 4th year of operation, the annual local sales of cut meat must not exceed 50% of the total meat cut. The head, shank, tail, hair, intestines, and processed meat are not counted as cut meat, and can be sold locally. 4. There must be appropriate machinery and equipment to process meat into food products. 5. Should be able to satisfy the Board concerning the supply source. 6. Corporate income tax will be exempted, according to the conditions the Board sets. 7. Local Govt. authorities will charge Baht 15 per head of cattle and Baht 18 per head of buffalo.
1.20	Production of milk powder	Baht 80m.	51%*	-	<ol style="list-style-type: none"> 1. The source of fresh fluid milk must satisfy the Board. 2. Amount of fresh fluid milk to be used must be the same as fixed by the Board.

(* or as the Board approves)

Projects Receiving Board of Investment Promotion by Product Group

	1986			1987			1988		
	Number of Projects	Number of Workers	Total Investment*	Number of Projects	Number of Workers	Total Investment*	Number of Projects	Number of Workers	Total Investment*
1. Agricultural Products	92	19,513	7,043	159	39,372	9,740	543	90,233	33,053
Rubber products	16	1,510	710	28	3,572	1,639	209	22,211	9,579
Gloves and rubber gloves	-	-	-	6	1,205	605	113	25,026	8,151
Fruit and vegetable products	37	5,914	2,865	28	2,745	1,436	65	8,236	3,694
Parawood products	6	897	660	12	1,471	568	16	3,198	3,657
Shrimp culture	7	403	232	13	1,221	561	51	4,656	3,206
Other agricultural products	26	10,789	2,576	72	29,158	4,931	89	26,906	4,766
2. Chemical Products	16	1,398	5,094	32	2,659	4,880	57	4,716	35,440
Electrical appliances	3	547	693	21	4,469	19,091	306	92,003	56,753
Electronic products	14	3,088	1,351	38	29,541	2,363	40	12,161	11,250
Machinery and parts	29	3,589	9,267	42	8,042	9,234	110	52,698	22,781
Processed metal products	15	1,585	1,787	39	4,613	3,177	95	17,981	14,626
4. Light Industry	63	18,438	2,838	233	104,461	29,033	396	132,274	35,676
Textiles (excluding garments)	6	2,386	769	63	43,548	22,310	65	16,957	14,345
Plastic products	10	1,399	205	31	4,877	1,183	100	20,520	9,303
Shoes	8	4,566	321	28	18,522	1,375	43	30,064	3,363
Other light industry	39	10,087	1,543	111	37,514	4,165	188	64,733	8,665
5. Others	66	10,076	6,730	62	10,956	5,005	159	33,415	40,483
Paper products	3	270	798	4	350	145	23	6,063	14,794
Ceramic and glass products	2	211	210	6	1,801	426	25	6,914	14,417
Industrial estates	-	-	-	2	63	572	9	743	4,795
Other products and services	61	9,595	5,722	50	8,742	3,862	102	19,695	6,477
Total	298	58,234	34,803	626	204,113	67,749	1,461	352,641	201,405

Note : * - million baht
Source: Board of Investment

COOPERATIVE FEDERATION OF QUEBEC
 CANADIAN COMPANIES IN THE AGRO-INDUSTRY
 Product: Milk Powder
 Agribusiness

DALTON LTD.
 PHEM PONG FISHERY CO. LTD.
 Bahi Industries Inc. of Vancouver, B.C. and Bahi Industries represent the interest of
 and farm in Phuket Bahi Industries represent the interest of
 twenty private Canadian investors.
 Product: Fish
 Fish

MULTIFRUIT
 Represented By: Linc Co. Ltd.
 AGRODEV CANADA INC.
 Worked with the Department of Fisheries regarding the Northeast
 Fishery Project in cooperation with CIDA.
 OCH VIE MILLS LTD.
 Represented By: Linc Co. Ltd.
 Product: Starch
 Canned Foods

RECKITT & COLEMAN CANADA INC. (CANADA) LTD.
 Represented By: King Hui Co. Ltd.
 Product: Canned pineapples
 EAST ASIATIC CO. (CANADA) LTD.
 Represented By: King Hui Co. Ltd.
 Product: Canned pineapples
 Represented By: Linc Co. Ltd.
 Product: Starch

APPENDIX D
COMPANIES AND CONTACTS IN THE AGRO-INDUSTRY

GENERAL DISCOVERY & SUPPLY LTD.
 Represented By: King Hui Co. Ltd.
 Product: Canned seafood
 SHAFER HAGGART LTD.
 Represented By: King Hui Co. Ltd.
 Product: Canned seafood

MIDLANSIA
 Represented By: Thai Seri Cold Ltd.
 Product: Fruit
 REED LIGNIN
 Represented By: Chemfiter Co. Ltd.
 Product: Agricultural Chemicals

B.C. TREE FRUITS LTD.
 Represented By: King Hui Co. Ltd.
 Product: Fruit
 OCEAN FISHERIES LTD.
 Represented By: Thai Union Manufacturing Co. Ltd.
 Product: Tuna Fish

ELECTOWELD CO. LTD.
 Represented By: King Hui Co. Ltd.
 Product: Fish products
 BRITISH COLUMBIA
 Represented By: King Hui Co. Ltd.
 Product: Fish products

MASSEY FERGUSON LTD.
 Represented By: Linc Co. Ltd.
 Product: Tractor and Spare Parts
 AULT FOODS LTD.
 Represented By: Linc Co. Ltd.
 Product: Food ingredients

THOMAS EQUIPMENT (THAILAND) LTD.
 Represented By: King Hui Co. Ltd.
 Product: Agricultural Machinery
 Represented By: Linc Co. Ltd.
 Product: Agricultural Machinery

CANADIAN COMPANIES IN THE AGRO-FOOD INDUSTRY IN THAILAND

Aquaculture

PERM PONG FISHERY CO., LTD.

Baht Industries Inc. of Vancouver owns 40% of this shrimp hatchery and farm in Phuket. Baht Industries represents the interests of twenty private Canadian investors.

AGRODEV CANADA INC.

Worked with the Department of Fisheries regarding the Northeast Fishery Project in cooperation with CIDA.

Canned Foods

EAST ASIATIC CO., (CANADA) INC.

Represented By: Kiang Hua Co., Ltd.
Product: Canned pineapples

K.J. PREISWERK

Represented By: Kiang Hua Co., Ltd.
Product: Canned seafood

SHAFFER HAGGART LTD.

Represented By: Kiang Hua Co., Ltd.
Product: Canned seafood

Chemical

REED LIGNIN

Represented By: Chemfleet Co., Ltd.
Product: Agricultural Chemicals

Fish

OCEAN FISHERIES LTD.

Represented By: Thai Union Manufacturing Co., Ltd.
Product: Tuna Fish

BRITISH COLUMBIA PACKERS LTD.

Represented By: Thai Union Manufacturing Co., Ltd.
Product: Fish products

Food Ingredients

AULT FOODS LTD.

Represented By: Anglo-Thai (Thailand) Ltd.
Product: Sweet Whey Powder (Cloverdale Brand)

COOPERATIVE FEDEREE DE QUEBEC

Represented By: Eureka Products (Thailand) Ltd.
Product: Milk Powder

DALTON LTD.

Represented By: Daily Foods Co., Ltd.
Product: Food Products and Spices

MULTIPRO FOODS

Represented By: Inthaco Co., Ltd.
Product: Speciality Meat Binder and Food Ingredients

OGILVIE MILLS LTD.

Represented By: Inthaco Co., Ltd.
Product: Starch

RECKITT & COLEMAN CANADA INC.

Represented By: Daily Foods Co. Ltd.
Product: Bulk Mustard Powder
Represented By: Lamsoon (Thailand) Ltd.
Product: Mustard Powder - Finished Products

Frozen Foods

GENERAL DISCOVERY & SUPPLY LTD.

Represented By: Asoke International Trading Ltd.
Product: Frozen Marine/Canned Food

MIDLANSIA

Represented By: Thai Seri Cold Storage Co., Ltd.
Product: Frozen Foods

Fruit

B.C. TREE FRUITS LTD.

Represented By: Bangkok Soon Huat Ltd. Part.

Technology/Equipment/Machinery

ELECTOWELD CO., LTD. Aquamarine Division

Represented By: Bangkok Motor Works Co., Ltd.
Product: Aquatic plant and harvesting equipment

MASSEY FERGUSON LTD.

Represented By: Louis T. Leonowens Ltd.
Product: Tractors and Spare Parts

THOMAS EQUIPMENT LTD.

Represented By: United Motor Works (Siam) Ltd.
Product: Agricultural Loaders

WESSAR DIVISION OF WESTERN PACKAGING SYSTEMS INC.

Represented By: East Asiatic (Thailand) Co., Ltd.

Product: Packaging Machinery

Livestock

ADSGO TRADING CORPORATION

Represented By: Phillips International Co., Ltd.

Product: Livestock

DONALDSON LIVESTOCK INTERNATIONAL LTD.

Represented By: American marketing Co., Ltd.

LAEMTHONG PROTEIN FOODS CO. LTD.

Protein Foods Ltd. has entered into a joint venture with Laemthong through which technology has been transferred for chicken deboning and production of processed chickens.

SHORE HOLSTEIN CO., LTD.

Represented By: Yenwa (Thailand) Ltd.

Product: Dairy Cattle

SEMEX CANADA

Represented By: Yenwa (Thailand) Ltd.

Product: Semen

Local Companies with Canadian Connections

OBOE (THAILAND) COMPANY LTD.

The Canadian company Oboe Engineering has transferred technology to Thailand for the production of solar dryers for use in agroprocessing.

SAMROIYOD CORP., LTD.

Imperial Flavours Inc. of Toronto has a joint venture for manufacturing and marketing of tropical fruit products and juice concentrates.

SIAM CANADIAN TRADING COMPANY LTD.

Exports Thai food products to Canada

LEADING THAI COMPANIES IN AGRO-INDUSTRY

Slaughtering, Preparing and Preserving Meat

CHAROEN POKPHAND GROUP OF COMPANIES (CP GROUP)

36 Soi Yenchit, Chan Road

Bangkok 10120

No. of Employees: 12,000

Type of Business: Animal feed, poultry, swine, aquaculture, chemical importing and other agricultural products.

SAHA FARMS COMPANY LIMITED

44/4 Sukhapibal 1, Bangkok

Bangkok 10240

No. of Employees: 4000

Type of Business: Exporter of frozen chicken, frozen eel.

LAEMTHONG CORPORATION LTD.

1126/1 Vanich Building

New Petchburi Road

Bangkok 10400

No. of Employees: 630

Type of Business: Production of animal feed, poultry, swine and other agricultural products.

SRITHAI PASUSUK CO. LTD.

23/15-16 Thaniya Rod, Saladang

Bangkok 10500

Type of Business: Production of animal feed, poultry, swine and other agricultural products.

BETAGRO CO., LTD.

1-7 Yukol 2 Road

Suan Mali, Bangkok 10100

Type of Business: Production of animal feed, poultry, swine and other agricultural products.

CENTAGO FARM CO., LTD.

7/3 Phaholyothin Road

Patumthani 12120

Type of Business: Producer of animal feed, poultry, swine and other agricultural products.

P. CHAROEN PHAN FEED MILL CO., LTD.

Type of Business: Producer of animal feed, poultry, swine and other agricultural products.

Dairy Products

THAI DAIRY INDUSTRY CO., LTD. (THE)

140 Wireless Road, Kian Gwan House II
Bangkok 10500

No. of Employees: 622

Type of Business: Manufacturer of sweetened condensed milk, evaporated milk, butter and UHT milk.

NESTLE (THAILAND) LTD.

Head Office: 500 Ploenchit Road
Bangkok 10500

Mail: P.O. Box 326, Bangkok 10501

No. of Employees: 1,400

Type of Business: Manufacturer of food products bearing such trademarks as Nestle, Nescafe, Milo, Maggi, Libby's, Bear Brand, Carnation, Coffee-mate.

FOREMOST FRIESLAND (THAILAND) CO., LTD.

6th Floor, SP Building
388 Phaholyothin Road, Bangkok 10400

No. of Employees: 286

Type of Business: Manufacturer of condensed & evaporated milk, UHT milk, ice cream, frozen novelties and cultured products.

DAIRY FARMING PROMOTION ORGANIZATION OF THAILAND (THE)

Muang Lek
Salaburi 1800

Type of Business: Dairy processing.

CHOKECHAI DAIRY FARM CO., LTD.

630/198 Phrapinklao
Bangkok

Type of Business: Milk, artificial insemination and feed mill.

Fruit and Vegetable Canning

DOLE THAILAND LTD.

9th Floor Vanich Building
Bangkok 10400

No. of Employees: 3000

Type of Business: Manufacturer of "Dole" canned pineapple, pineapple juice concentrates.

SIAM FOOD PRODUCTS CO., LTD.

235/9 Sukhumvit 21 Road
(Asoke Road) Bangkok 10110

No. of Employees: 350

Type of Business: Producer and exporter of canned pineapple, canned fruits and vegetables and fruit juices.

SIAM AGRO-INDUSTRY (PINEAPPLE) CO., LTD.

21/196 Bangan-Trad Road

Bangkok 10260

No. of Employees: 2000

Type of Business: Manufacturer and exporter of canned pineapple, aseptic pineapple juice.

MALEE SAMPRAN FACTORY CO., LTD.

122-122/1 Soon Hua Seng Building

North Sathorn Road

Bangkok 10500

Type of Business: Manufacturer of canned fruit such as pineapple, longan, rambutan, lychee, mango, bamboo, juices, etc.

PEACE CANNING (1958) CO., LTD. (THE)

207 Soi Phantachit

Maitrsechit Road, Pomprab

Bangkok 10100

No. of Employees: 250

Type of Business: Manufacturer of canned seafood and canned fruits and vegetables.

CHIN HUAY CO., LTD.

386/1-3 Soi Planganusorn

Suksawad Road, Bangpakok

Bangkok 10140

No. of Employees: 700

Type of Business: Manufacturer & exporter of dehydrated fruits, canned foodstuff.

THAI FRUIT CANNING CORP. LTD.

114 Soi Lang Suan

Ploenchit Road

Bangkok 10500

Type of Business: Pineapple, Pineapple Juice Concentrate, Frozen Fruits and Vegetables.

GREAT FOOD (DEHYDRATION) CO. LTD.

365/1 Siphya Road

Bangrak

Bangkok 10500

Type of Business: Producer & exporter of dehydrated fruits.

Seafood Canning and Preserving

AQUASTAR LTD.

92/14-5 North Sathorn

Bangkok 10500

Type of Business: Aquaculture, shrimp farming and processing.

THAI UNION MANUFACTURING CO., LTD.

28-32 Yukol 1 Road
Suan Mali, Bangkok 10100

Type of Business: Manufacturer & exporter of canned seafood brands, Ocean Wave, Chicken of the Sea, Bumble Bee and Empress.

UNICORD CO., LTD.

606-608 Luang Road
Phomprab, Bangkok 10100

Type of Business: Manufacturer & exporter of canned seafood and petfood.

SAFCOL (THAILAND) LTD.

135 Ard-Narong Road
Klongtoey, Prakanong
Bangkok 10110

No. of Employees: 3000

Type of Business: Processor and exporter of canned and frozen seafood products.

PAK PANANG COLD STORAGE CO., LTD.

1668/81 New Road
Yannawa, Bangkok 10120
No. of Employees: 200

Type of Business: Exporter of frozen seafoods.

TA KONG FOOD INDUSTRIAL CO., LTD.

1668/78 Soi 54 New Road
Yannawa, Bangkok 10120

Type of Business: Manufacturer of canned seafood products, tuna, sardine, mackerel.

KIANG HUAT SEAGULL TRADING FROZEN FOOD CO.

15/6 Sripumvanart Road
A. Haadyai, Songkhla 90110

Type of Business: Producer and exporter of canned seafood.

SURAPON SEAFOODS CO., LTD.

247 Theparak Road
Samrong-Nua Samutprakan 10270
No. of Employees: 600

Type of Business: Manufacturer and exporter of frozen fresh and cooked shrimp, frozen fresh squid, octopus, cuttlefish and other frozen fresh seafoods.

PATTAYA FOOD INDUSTRIES LTD.

17 Soi St. Louis 3
South Sathorn Road, Yannawa
Bangkok 10120
No. of Employees: 1100
Type of Business: Manufacturer and exporter of canned seafood in both own label "Pataya" brand and private label.

Vegetable and Animal Oils and Fats

THANAKORN VEGETABLE OIL PRODUCTS CO., LTD.

99 Soi Thanakorn
Prasamutchedee Road
Samutprakarn
No. of Employees: 250
Type of Business: Manufacturer, distributor and exporter of edible vegetable oil, soybean meal, cotton seed meal, kapok seed meal and vegetable pitch.

BETTER RICE CO., LTD.

293/23-26 Surawong Road
Bangrak, Bangkok 10500
Type of Business: Distributor of vegetable cooking oil.

NAKORNCHAISRI OIL INDUSTRIAL CO., LTD.

829-835 Therdthai Road
Bangkok 10600
No. of Employees: 214
Type of Business: Manufacturer of soyabean oil and soyabean meal.

Grain Products

CHAO PHYA CO., LTD.

177 Rajawongse Road
Bangkok 10100
No. of Employees: 471
Type of Business: Manufacturer of tapioca flour and pellets.

MAH BOONKONG RICE MILL CO., LTD.

1060 Petchburi Road
Phyathai, Bangkok 10400
Type of Business: Miller of rice.

SRIRACHA PELLETIZING CO., LTD.

690 Sukhumvit Road
Bangkok 10110
Type of Business: Manufacturer and exporter of tapioca pellets.

KROHN & CO., BANGKOK LTD.

16/Floor Sino-Thai Tower

32/41 Sukhumvit 21

Bangkok 10110

No. of Employees: 210

Type of Business: Producer and exporter of tapioca pellets.

Baked and Steamed Products

THAI PRESIDENT FOOD CO., LTD.

2154/1 TF Building

New Petchburi Road, Bangkok

No. of Employees: 778

Type of Business: Manufacturer of instant noodles, rice vermicelli, rice sticks, biscuits.

C.P. FOOD PRODUCT CO., LTD.

2140/4-5 Chan Road

Chongnonsee Yannawa

Bangkok 10120

No. of employees: 100

Type of Business: Manufacturer of noodles.

THAI PRESERVED FOOD FACTORY CO., LTD.

42/1 Moo 2 T.Om-yai,

A. Pharnthong, Nakornpathom

No. of Employees: 870

Type of Business: Manufacturer and exporter of instant noodle and rice vermicelli.

Animal Feeds

BANGKOK FEEDMILL CO., LTD.

36 Soi Yenchit, Chan Road

Bangkok 10120

No. of Employees: 440

Type of Business: Manufacturer of animal feed.

KRUNGTAHI FEEDMILL CO., LTD.

69/10-13 Suksawad Road

Rachaburana, Bangkok 10140

Type of Business: Manufacturer of animal feed.

BANGKOK AGRO-INDUSTRIAL PRODUCTS CO., LTD.

4th Floor, Tavich Building

61 Kasemraj Road

Klongtoey, Bangkok 10110

No. of Employees: 336

Type of Business: Manufacturer and distributor of feedmill, conducting pig and chicken farming.

CHAROEN POKPHAND (NORTH EASTERN) CO., LTD.

61 Tavich Building
Kasemraj, Klongtoey
Phrakanong, Bangkok 10110
Type of Business: Manufacturer of animal feed.

General Agro-Based Industries

BERLI JUCKER CO., LTD.

542/1 Ploenchit Road
Bangkok 10500
No. of Employees: 1352
Type of Business: Importer/distributor/manufacturer.

ADAMS INTERNATIONAL LTD.

5/26-29 Soi Saladaeng
P.O. Box 844
Silom Road
Bangkok: 10500
No. of Employees: 1600
Type of Business: Processed tobacco leaves, vegetable seeds.

THAI WAH CO., LTD.

Thai Wah Tower
21-22 Floor
21 South Sathorn Road
Bangkok 10102
Type of Business: Manufacturer, distributor and exporter of tapioca starch and pellets and trader in other agricultural products.

METRO CO., LTD.

180-4 Rajawongse Road
Bangkok 10100
Type of Business: Marketing and production of agro and industrial chemicals; interests in raw material or processed products.

LUXCO FOODS CO., LTD.

1075 Charoennakorn Road
Klongsarn, Bangkok 10600
Type of Business: Canned and frozen seafood/food processing.

USEFULL CONTACTS AND ADDRESSES

Government Agencies

MINISTRY OF AGRICULTURE AND COOPERATIVES

Ratchadamnoen Nok Road
Bangkok 10200
Phone: (662) 281-5955, 281-5939
Fax: (662) 280-1823

MINISTRY OF COMMERCE

Sanam Chai Road
Bangkok 10200
Phone: (662) 222-0827, 223-9551
Telex: 82389 MINOMER TH
Fax: (662) 221-4135

MINISTRY OF INDUSTRY

Rama VI Road
Bangkok 10400
Phone: 246-1137
Telex: 84375 MINIDUS TH
Fax: (662) 245-8085

Public Sector Agencies

CUSTOMS DEPARTMENT

At Narong Road, Klong Toey
Bangkok 10100
Phone: 249-0431
Telex: 82355 DEPCUST TH

DEPARTMENT OF BUSINESS ECONOMICS

Ministry of Commerce
Ratchadamnoen Road,
Bangkok, 10200
Phone: 282-6171
Fax: (662) 280-0775

DEPARTMENT OF EXPORT PROMOTION

Ministry of Commerce
22/77 Ratchadapisek Road,
Bangkok, 10900
Phone: 511-5066
Telex: 82354 DEPEP TH
Fax: (662) 512-1079

DEPARTMENT OF FISHERIES

Rajadamnoen Nok Road,
Bangkok, 10200
Phone: 281-5577
Fax: (662) 280-1823

DEPARTMENT OF FOREIGN TRADE

Ministry of Commerce
Sanamchai Road,
Bangkok, 10200
Phone: 223-1481
Telex: 72277 DEPFORT TH
Fax: (662) 224-7269

DEPARTMENT OF INDUSTRIAL PROMOTION

Ministry of Industry,
Rama 6 Road,
Bangkok, 10400
Phone: 246-0033
Fax: (662) 246-4285

DEPARTMENT OF LIVESTOCK DEVELOPMENT

Phayathai Road,
Bangkok, 10400
Phone: 251-5136

EASTERN SEABOARD DEVELOPMENT COMMITTEE

618 Nikhom Makkasan Road, Phayathai,
Bangkok, 10400
Phone: 253-3533
Telex: 72391 ESB TH

NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT BOARD

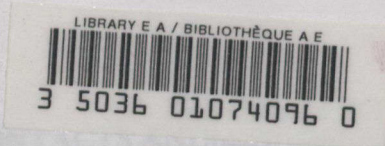
962 Krung Kasem Road,
Bangkok, 10100
Phone: 282-1151
Fax: (662) 280-0892

NATIONAL STATISTICS OFFICE

962 Lan Luang Road,
Bangkok, 10100
Phone: 281-3022

THAILAND DEVELOPMENT RESEARCH INSTITUTE FOUNDATION

Rajapark Building 163 Asoke Road
Bangkok 10110
Phone: 258-9012, 258-9017
Fax: (662) 258-8010



Trade Associations

ANIMAL HEALTH PRODUCTS ASSOCIATION

69/26 Soi Athens Theater
Phayathai Road
Bangkok, 10400
Phone: 252-8773

FISH MARKETING ORGANIZATION

Charoenkrung Road
Yannawa,
Bangkok, 10200
Phone: 211-0307
Fax: (662) 211-0946

FISHERY ASSOCIATION OF THAILAND

1575 Charoen Nakorn Road
Bangkok, 10600
Phone: 437-0158
Telex: 82812 THAISERI TH

PALM OIL REFINERS ASSOCIATION

312 Soi Yotse, Bamrungmuang Road
Bangkok 10100

POULTRY PROMOTION ASSOCIATION OF THAILAND

Phyathai Road
Bangkok, 10400
Phone: 251-8205
Fax: (662) 236-7384

THAI AQUACULTURE DEVELOPMENT AND EXPORTING ASSOCIATION

1575 Charoen Nakorn Road
Bangkok, 10600
Phone: 437-0158
Telex: 21952 ITSILOM TH

THAI FEED MILL ASSOCIATION

61/2 Sukhumvit 26,
Bangkok, 10110
Phone: 391-9517
Telex: TAIFEE TH
Fax: 420-2815

THAI FERTILIZER PRODUCERS TRADE ASSOCIATION

6/2 Rangsit-Nakorn Nayok Road
A. Thanyaburi,
Pathumthani,
Phone: 253-6814

100

CA1 EA968 89A77 ENG DOCS
Meiklejohn, Richard.
An assessment of Thailand's
agriculture sector and agro-food
43278288

 **ACCO.USA**
25971 ILLINOIS 60090

M
A
D
E
I
N
U
S
A



50505 25971

BLACK/NOIR/NEGRO

