

VEGETABLE PRODUCTION IN THAILAND

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ABSTRACT

Data on the total area and production of major vegetables in the country are presented. The area planted to vegetables has shown a decreasing trend since 1984. The major constraints on vegetable production are high production cost due to intensive management, low quality of planting materials, improper pest management, inadequate post-harvest handling and disorganized marketing system. Research on various aspects of vegetable production has yielded promising results which need to be disseminated to the growers efficiently. Future research and development in Thailand will be focussed on the improvement of the quality in order to produce fresh vegetables and processed products for export and domestic use. Priorities for vegetable research and development will be concentrated in the following areas: post-harvest technology, varietal improvement, appropriate seed production technology, pest and disease management.

Introduction

Although the acreage of vegetables grown in Thailand is rather small compared to other crops of economic importance, vegetables play a significant role in the daily diet of the country. Vegetables are an important source of food for Thai people at all income levels. A large number of vegetables including several native wild types are being produced. Presently, the production is not only aimed at consumption within the country but a small part of the total amount is also exported mainly to Asian markets.

However, there are some factors that limit the vegetable production in the country. The major constraints are high production cost due to the intensive management required. Secondly, the unsuitability of production especially for processing and for foreign markets due to low product quality. The next constraint is the instability of the production due to weather and crop failure caused by pests and diseases. Unattractive farm prices of some commodities are also a major constraint on vegetable production.

The above constraints need improvement in the following areas: cultural practices, small mechanization systems, good quality of planting materials, disease and pest management and post-harvest technology.

Vegetable production

Among the Southeast Asian countries, Thailand has a high per capita vegetable consumption. As reported by FAO in 1986, consumption per capita in Thailand was 60 kg (Table 1). Based on vegetable statistics recorded by the Department of Agricultural Extension, Ministry of Agriculture and Cooperatives, the total area planted to 27 major vegetable crops in Thailand, from 1981-1987 ranged from 327,000 to 276,000 ha. There has been a slight decreasing trend since 1984 (Table 2) attributed to the alteration of land use, especially in the provinces near Bangkok where vegetables are grown and transported to the central wholesale market in Bangkok. Another reason is probably that some vegetable commodities are not given attractive price so that the farmers have switched the cultiva-

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Table 1 Per capita annual production of vegetables in 1986

Country	Annual production (kg)
Southeast Asia	
Indonesia	21
Malaysia	30
Philippines	14
Thailand	60
Bangladesh	12
Burma	55
Vietnam	54

Source : 1986, FAO Production Year Book.

Table 2 Area and production of major vegetables in Thailand

Year	Area ('000 ha)	Growth rate %	Production ('000 ton)	Growth rate %
1981	327.35		2,222	
1982	318.86	-2.59	2,004	-9.81
1983	318.95	0.03	2,030	1.29
1984	325.83	2.16	2,127	4.78
1985	305.40	-6.27	2,002	-5.88
1986	276.40	-9.50	2,118	5.79
1987	279.47	1.11	2,133	0.71
		Average -2.51		Average -0.52

Source : Department of Agricultural Extension, 1981-1987.

tion of vegetables to that of other crops.

Vegetables are mostly grown in suburban areas as they are perishable and cannot withstand damage during the transportation. Vegetable land can be divided into 4 major zones. The central part of the country is the largest vegetable-growing area accounting for about 40% whereas the northeastern and northern zones account for nearly the same acreage of about 25%. The southern part has the smallest area devoted to vegetable growing.

Statistics on planted area, yield, damage and export of major vegetables grown in Thailand are shown in Tables 3, 4, 5, 6 and 7. Among 27 kinds of vegetables, bird pepper, chilli, garlic, shallot, yard long bean are the predominantly cultivated crops. The extensive cultivation of these commodities is associated with the large amount of domestic consumption in addition to the small portion for export. Leafy vegetables such as cabbage, Chinese cabbage, Chinese kale, leaf type lettuce, etc. are grown all the year round in the central plain and during the cool season in the North. Tomato, ginger, Chinese mustard, Chinese radish, baby corn are grown for fresh consumption and a large amount of the products is also processed. Asparagus, bamboo shoot, mushroom, potato, cantaloupe, offer a good potential for development for foreign market in fresh and processed forms.

The expansion of vegetable production in the future is expected to become concen-

Table 3 Planted area of major vegetables (1,000 ha)

Crop	1981	1982	1983	1984	1985	1986	1987
1 Chilli	34.21	37.31	33.14	27.70	25.22	18.04	19.87
2 Bird pepper	48.36	41.98	41.76	39.54	42.73	40.48	42.06
3 Ginger	3.71	4.11	6.51	7.21	8.00	4.94	7.56
4 Garlic	41.46	30.45	37.72	40.12	35.59	30.36	30.53
5 Shallot	24.10	19.74	33.41	23.31	16.65	16.86	18.78
6 Chinese radish	7.57	7.23	6.38	7.66	6.02	5.43	5.38
7 Tomato	10.10	9.39	8.24	8.68	7.96	8.32	7.48
8 Garden pea	2.17	2.35	1.89	2.13	2.12	1.33	1.12
9 Cabbage	10.11	11.32	9.77	10.95	11.10	9.86	9.19
10 Short cucumber	13.59	13.95	12.39	9.30	9.94	10.28	9.69
11 Yard long bean	21.48	25.25	22.84	20.46	19.03	20.11	18.92
12 Long cucumber	19.88	23.02	18.02	18.00	17.24	16.17	15.72
13 Angled luffa	5.51	7.06	5.63	14.18	5.96	5.49	5.08
14 Bitter cucumber	2.73	3.33	2.48	2.95	3.02	2.55	2.25
15 Chinese cabbage	9.31	9.38	10.64	8.73	8.47	7.96	7.77
16 Lettuce	2.02	2.41	2.75	2.36	2.60	1.84	1.57
17 Leaf mustard Chinese	10.38	10.35	9.62	8.87	9.91	9.17	8.17
18 Pakchoi Chinese cabbage	7.17	9.35	10.18	10.11	8.93	8.82	7.72
19 Chinese kale	10.66	10.79	10.80	11.22	10.42	9.97	9.33
20 Water convolvulus	10.87	13.46	13.07	2.89	3.05	3.71	3.93
21 Yam bean	4.36	6.26	5.68	10.69	9.85	8.54	7.78
22 Pumpkin	13.02	14.19	1.35	13.27	11.01	10.18	11.04
23 White gourd	7.94	7.65	8.12	7.57	7.50	6.02	5.79
24 Taro	6.64	7.72	6.56	5.53	7.35	5.22	5.91
25 Baby corn	—	—	—	7.09	6.38	7.08	8.88
26 Onion	—	—	—	—	2.11	1.65	2.94
27 Multiplier onion	—	—	—	4.84	7.24	6.02	5.21
Total	327.35	318.86	318.95	325.83	305.40	276.40	279.47

trated on export commodities both fresh and processed depending on the development of advanced technologies to secure good quality and stable production. Marketing systems also need to be improved to match supply and demand to avoid reduction surplus.

Constraints

Vegetable production in Thailand is still facing several problems. The major constraints are as follows.

1 High production cost

Vegetable growing under intensive field management requires inputs which increase the production cost. Field activities such as bed preparation, transplanting, watering, fertilizer application, weeding, spraying, harvesting are mainly performed by hand and require skilled labour. This input accounts for 40 to 50% of the total production cost. The reduction of labour expenses can be achieved by using a semi-mechanized system to cut down labour in some activities for example bed preparation, watering, etc. Simultaneously, optimum amount of chemicals as well as fertilizers should be applied to avoid excessive use of these materials that would further increase the cost of production.

2 Unsuitability of production

This constraint deals with vegetable production for export and processing. The following factors are involved ;

Table 4 Average yield of vegetables in Thailand 1981-1985

Crop	1981	1982	Yield (mt/ha)		1985
			1983	1984	
Angled luffa	4.2	2.8	3.3	2.9	2.9
Baby corn	n.a	n.a	6.7	6.6	6.8
Bird pepper	1.6	1.3	1.8	1.8	1.9
Bitter gourd	4.3	3.7	3.8	4.1	4.0
Cabbage	9.7	9.2	10.3	9.6	10.1
Chilli	1.8	2.1	2.0	2.0	2.1
Chinese cabbage	5.7	5.9	7.1	7.7	7.6
Chinese kale	6.7	6.5	7.8	8.2	8.4
Chinese radish	11.5	10.2	10.9	11.1	12.0
Cucumber (large)	7.8	6.8	7.3	7.2	7.5
Cucumber (small)	7.3	7.2	7.8	7.2	7.0
Garden Pea	3.2	2.2	2.8	2.6	2.5
Garlic	8.7	8.8	9.2	9.9	10.1
Ginger	11.5	13.6	15.9	12.6	12.8
Leaf mustard chinese	6.6	6.6	7.2	7.4	7.6
Lettuce	3.8	4.0	3.6	3.8	3.9
Multiplier onion	n.a	n.a	5.8	5.9	6.1
Onion	n.a	n.a	6.9	11.0	12.1
Pakchoi	5.5	6.0	7.0	7.1	7.5
Pumpkin	13.4	12.8	13.7	13.8	13.8
Shallot	6.2	8.9	8.0	8.6	9.1
Taro	10.9	9.6	10.2	10.5	11.4
Tomato	7.4	8.6	11.4	7.8	8.0
Water convolvulus	4.5	4.2	4.0	3.7	3.9
Water spinach	n.a	n.a	5.8	5.2	6.9
White gourd	11.2	10.6	11.5	10.6	10.8
Yam bean	14.3	9.8	n.a	n.a	11.4
Yard long bean	4.5	3.6	3.8	3.4	4.4

Source : Department of Agricultural Extension, Ministry of Agriculture Bangkok, Thailand.

Table 5 Percentage of damaged vegetables in Thailand

Year	Total (^{'000} ha)	Damaged (^{'000} ha)	% Damaged
1981	327	6.4	1.96
1982	319	6.4	2.01
1983	319	4.8	1.50
1984	326	8.0	2.45
1985	305	4.8	1.57
1986	276	1.6	0.60
1987	279	1.6	0.57
Average	307	4.8	1.52

Source : Department of Agricultural Extension, 1981-87.

Table 6 Export of various vegetable products, 1984-1985

	1984		1985	
	Volume (t)	Value ^z (US \$)	Volume (t)	Value (US \$)
Dried salted vegetables	699	876,120	652	1,477,840
Canned baby corn	4,482	4,045,240	6,281	5,658,760
Canned seasoned vegetables	9,166	4,255,720	16,737	4,372,120
Seasoned vegetables	21,076	8,742,080	23,606	10,958,440
Vegetable juice	9	112,800	68	51,520

^zUS \$ 1.00=25 baht

Source : Seminar on export prospects for farm products.

Table 7 Export value of selected fresh vegetables 1986

Vegetable	1983		1984		1985		1986		1987 [†]	
	Quantity (t)	Value ^z (‘000 US\$)	Quantity (t)	Value (‘000 US\$)	Quantity (t)	Value (‘000 US\$)	Quantity (t)	Value (‘000 US\$)	Quantity (t)	Value (‘000 US\$)
Shallot	1,946	410	6,144	1,270	7,715	1,560	7,872	1,770	6,217	1,250
Garlic										
Bamboo shoot	231	90	289	200	339	1,410	761	500	225	110
Tomato	173	70	1,360	320	2,123	1,980	3,270	640	5,731	910
Mushroom	14	10	9	10	17	10	19	30	10	10
Potato	3	1	190	50	14	4	210	40	317	50
Others	13,499	3,440	16,674	4,010	17,103	4,310	12,656	3,800	10,110	3,120
Total	15,866	4,020	24,666	5,860	27,311	6,730	24,788	6,780	22,610	5,440

^zUS\$1.00=25 baht.

[†]Preliminary data.

Source : Anonymous 1986a.

- 1) There is a lack of good varieties with high quality, high yield and tolerance to important diseases which impair the production.
- 2) Improper cultural practices, for example inappropriate fertilizer application, poor water management.
- 3) Poor plant protection management
- 4) Poor post-harvest technology and facilities both in producing areas and during marketing.

3 Instability of production

Instability of vegetable production is mainly caused by unsuitability of weather and crop damage due to serious diseases and pests. In the rainy season the vegetable supply is reduced not only in quantity but also in quality. Instability of production is a limiting factor for the expansion of vegetable production for export and processing.

Improvement of vegetable production technology

Varieties, field management and post-harvest handling are the main factors if the yield and quality of vegetables are to be improved. Several government institutions, such as the Department of Agriculture, Kasetsart University, Chiang Mai University, Khon Kaen University, Prince of Songkhlo University are involved in varietal collection, varietal testing, breeding programs and field management studies with emphasis placed on varietal collection and selection. Many open-pollinated varieties have been released for commercial use. No hybrid varieties are available from these government institutions. Good varieties of chilli, baby corn, Chinese radish, leaf mustard and shallot have been

released by the Department of Agriculture. Among these crops, chilli and shallot are the most popular. Kasetsart University has released good varieties of tomato, Chinese radish and sweet corn which are widely used in Thailand. Chiang Mai University and Khon Kaen University have released heat-tolerant tomato varieties.

Location testing of varieties and extension activities are operated by the Department of Agriculture Extension. Good varieties released from other government institutions are tested in various locations in the country by this department that has a network of extension programs throughout the country, and has excellent facilities for seed processing which has not been fully disseminated in many regions. Although there are extension programs in all the regions, the deficiency in farmers' know-how remains quite obvious.

Seed companies play an important role in varietal improvement. Since there are 53 importers and 33 exporters of vegetable seed, competition is fairly high. These companies introduce new varieties, both open-pollinated and hybrid ones. They do their own location testing, and a few seed companies are now involved in research for varietal development,

Vegetable research program

Currently, research on vegetables in the country is being conducted by government institutions such as the Department of Agriculture and universities such as Kasetsart, Khon Kaen, Chiang Mai, Songkhla, Nakkarin. Also research on a smaller scale is being carried out by agricultural colleges and institutes. The research concentrates mainly on varietal improvement, production management, pest and disease control, post-harvest technology, processing and tissue culture.

Cooperative research among the institutes in the country is organized through the Subcommittee on Vegetable Research and Development Coordination (SVRDC). The Subcommittee consists of representatives from the universities and several departments in the Ministry of Agriculture and Cooperatives. The National Research Council serves as the coordinating agency. Research on vegetables under SVRDC is divided into four working groups as follows : tomatoes, legumes, crucifers and the corn industry.

Vegetable research carried out at the Department of Agriculture concentrates on the following vegetables ; asparagus, chilli, crucifers (Chinese Cabbage, Chinese kale, Chinese radish, leaf mustard), cucurbits (bitter gourd, cucumber, pumpkin), garlic, ginger, indigenous vegetables, mushroom, onion, potato, shallot, sugar pea, sweet potato, tomatoes, water convolvulus and yard long bean (DOA, 1987).

Areas of research

The following areas of research are currently being covered :

- 1) Evaluation and screening of vegetable germplasm for enhancing quality, resistance to diseases, insects and environmental conditions.
- 2) Varietal improvement by means of selection and breeding for new varieties.
- 3) Improved cultural practices to increase productivity, e.g. fertilizer application, water management and weed control.
- 4) Control of diseases and pests by using appropriate technology in plant protection, e.g. biological control, cultural control, minimize the application of pesticides, etc.
- 5) Development of appropriate and low cost post-harvest technology.
- 6) Development of simple processing technology for vegetables.
- 7) Standardization of technology for vegetable seed production.

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