

# Coffee Production Status and Potential of Organic Arabica Coffee in Thailand\*

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## *Abstract*

*Coffee is a major income earner for Thailand. Robusta coffee (Coffea canephora) is grown mainly the south where 80,000 t are produced annually. Only 500 t of arabica coffee (C. arabica) are produced in the north. Present cultivation techniques are focused on producing high yields. Chemical fertilizers and pesticides are commonly applied to the coffee plantations. Thailand exports 60,000 t of robusta coffee, while 20,000 t are used for soluble, roasted, ground, and canned coffee in the domestic market. Arabica coffee is mainly used for roasted and ground coffee in Thailand.*

*Arabica coffee is mainly grown in the highlands at approx. 800 m asl. It is wet processed to give high quality green bean. The Catimor cultivar is recommended as it is rust resistant. Growing arabica coffee provides cash income for hill-tribe farmers and reduces the problem of traditional slash-and-burn shifting agriculture. Both shaded and full sun coffees are grown. With the policy of natural resource conservation and the limitation of land area, the hill-tribe farmers have to grow coffee to sustain natural resources on the highlands in the long term.*

*Agro-forestry systems have been introduced for arabica coffee. These systems involve coffee inter-planted with fruit trees and/or forest trees which can provide appropriate additional income to the farmers. Limiting the use of chemical inputs, including fertilizers and pesticides, is aimed at reducing water and soil contamination and improved ecological conditions as well as the health of the farmers. Organic coffee cultivation on the highlands meets with such objectives and is being encouraged.*

*Organic coffee cultivation involves: (i) no use of chemical fertilizers, pesticides, herbicides, fungicides, hormones, antibiotic, or growth regulators; (ii) use of compost, farm manure, green manure, and crop rotation to maintain and improve soil fertility; (iii) a balanced pest control farm eco-system, with healthy soil management and crop diversification; (iv) control of weeds through mechanical methods; and (v) use of good quality, clean, uncontaminated chemical-free composted materials and nursery seedlings from off-farm as well as on-farm.*

*With organic coffee production, the farm has to be visited and re-evaluated annually, before certification is given. Depending on market demand for organic coffee, there is a high potential for its production on the highlands, and organic production methods will be of mutual benefit to the farmers, the highland ecology, and the consumers. Organic coffee-growing areas must be special areas which can be strictly controlled and which follow the regulations specified for certification. The Royal Project Development areas mostly met the requirements and regulations needed, and should be able to produce best quality organic coffee.*

**Keywords:** *Organic coffee production, sustainability, slash-and-burn agriculture, arabica, robusta, chemical inputs, chemical fertilizers, pesticides, compost, manure, hill-tribes, highland ecology, crop diversification, mechanical methods.*

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## Introduction

Coffee is a significant cash crop for both producing- and consuming-countries. Thailand is the third largest producer in Asia (after Vietnam and Indonesia). Major production is of robusta coffee, of which 80,000-85,500 t are produced annually in the South. Sixty percent of the robusta coffee is exported and the rest is mostly used in domestic production of instant (soluble) coffee. Arabica coffee production is only 800-850 t per year. It is produced in the

cooler highland areas of the Northern part. It is totally used in roasted and ground coffee for domestic market.

Consumption demand for both instant and roasted/ground coffee is growing in Thailand. Imports of instant coffee have increased from 412 t in 1997 to 2,270 t in 2000. There are many coffee products of Thai and international origin on the shelves of the supermarkets and stores. Many more modern cafés or coffee-houses have been established in the big cities in recent years.

Table 1. Imports of instant coffee.

Criteria	1997	1998	1999	2000
Quantity (t)	412	116	324	2,270
Value (mill. Baht)	28.35	31.02	54.49	114.05

*Source: Office of Agricultural Economics (2001)*

Table 2. Green-bean coffee production.

Yield	1998/1999	1999/2000	2000/2001
World production (mill. t)	6,464	6,405	6,517
Thailand production (t)	54,871	80,293	85,000
Domestic usage Thailand (t)	28,000	30,000	30,000

*Source: Department of Internal Trade (2001)*

Table 3. Coffee green beans, harvesting area, production by region and yield by region, for crop years 1995 and 1998 in Thailand.

Region	Harvesting area (ha)		Production (t)		Yield (kg/ha)	
	1995	1998	1995	1998	1995	1998
Northern	1,509.4	1,341.0	863	730	571.8	544.4
Southern	69,914.0	64,219.3	85,371	77,484	1,221.1	1,206.6
Whole Kingdom	71,423.4	65,560.3	86,233	78,214	1,207.3	1,193.0

*Source: Office of Agricultural Economic (1999)*

The arabica coffee-producing areas on the highlands of Thailand, at the altitude 800 to 1,200m above mean sea level, are mostly categorized as watersheds or conservation areas. Under the National Forest Policy and Land Use Policy, many extensive agricultural activities will be limited in such areas, together with prohibition on agricultural chemical uses. In many arabica coffee-planting areas under

the Coffee Promotion Program of the Royal Project Foundation, it has been shown that growing arabica coffee with forest trees gives good returns to farmers. Although the farmers have less management work and less investment, they still receive some returns, and not a loss. Such diversification offsets the price fluctuations of coffee when these appropriate farming systems are introduced.

Table 4. Export of green coffee beans.

Green Coffee	1997	1998	1999	2000
Quantity (t)	71,295	53,513	28,336	59,311
Value (mill. Baht)	2,082.65	3,500.35	1,293.43	1,691.56

Source: Office of Agricultural Economics (2001)

Table 5. Export of soluble coffee.

Soluble Coffee	Jan-Aug 97	Jan-Aug 98	% of change
Quantity (ton)	302.81	208.75	-31.06
Value (million Baht)	92.93	95.85	+3.14
Value (million US\$)	3.48	2.08	-40.23

Source: Office of Agricultural Economics (2001)

## Types of Coffee Cultivated in Thailand

There are two main types of coffee cultivated in Thailand; arabica in the North and robusta in the South. While in the world market is dominated by arabica, in Thailand the main production (99%) is derived from robusta. Arabica coffee comprises only 1%.

### Robusta Coffee

#### Production

Robusta coffee is planted in six provinces in the South, namely, Chumphon, Surat Thani, Nakhon Si Thammarat, Krabi, Pang-nga and Ranong, covering a total area of 423,947 rai (6.25 rai = 1 ha) with a yield of 198 kg/rai in 1997/98. Planting density is 177 trees/rai and the spacing is 3 x 3 m. Total production for the year 2000/2001 was 85,000 t.

#### Domestic and International Trade

Thirty-seven percent of the green coffee production in Thailand is used for soluble (or instant) coffee, roasted and ground coffee and canned (or ready to drink) coffee. Sixty-three percent is exported both as green bean to the major importers comprising the United States, Republic of Korea, Germany, Japan and Poland, and others. Soluble coffee is mostly sold to Greece, Myanmar, Taiwan, Vietnam and Malaysia along with other of less importance. As the larger share of coffee goes to the international market, the farmers' sale

price is based on the world market price, specifically the London market.

The world market share for Thai coffee is 1.58%, while Vietnam and Indonesia, the significant producers in the Asian region, have shares of 7.38 and 7.16%, respectively.

#### Impacts of WTO and AFTA

According to the World Trade Organization (WTO) Agreement, Thailand has to open its coffee market and adjust its tariff and tax as related to the regulations of the agreement. Also for the Asian Free Trade Agreement (AFTA), coffee is listed as one of the sensitive commodities, which has to reduce the import tax over the years 2001 - 2003, and the tax in the year 2010 has to be reduced to 0.5 %.

### Arabica Coffee

#### History

From 1972-1979 The Thai / UN Crop Replacement and Community Development Project was implemented as a pilot project to explore the viability of replacing opium poppy cultivation with a variety of substitute crops and alternative sources of income, combined with related community development activities. It was found that arabica coffee is a cash crop that can be promoted to replace opium in the long run and can provide high cash incomes, not only to poppy growing farmers, but to a large number of other farmers in the highlands as well. The main reasons for this are that land

and climate are suitable for coffee growing, transport and storage of coffee is relatively easy, yields are good and that there is a strong demand for good quality highland coffee. Thus arabica coffee is very appropriate and viable as a cash crop to replace opium in the highlands of Thailand.

### **Variety**

Coffee extension and development were conducted since 1957. Many cultivars of arabica coffee from different parts of the world were introduced. Firstly, the high yielding variety Caturra was introduced by the UN pilot project under the patronage of the Royal Project, but the Caturra had a serious problem from leaf rust (*Hemileia vastatrix*). Early research on various aspects of arabica coffee was conducted by the Department of Agriculture and the Highland Coffee Research and Development Center, Faculty of Agriculture, Chiang Mai University. Then, in 1974, the most promising Catimor derivatives were introduced and selected lines were screened on the basis of compact tree size, leaf rust resistance, high yield, vigor, good bean, cup quality, and drought tolerance. Though all these combined characteristics are hard to find in one variety, certain selected Catimor lines have shown good potential, both for production and market. Tummakate (2001) has elaborated on this selection process and the most promising lines.

### **Cultivation**

In the early period of the Arabica Coffee Extension Program, the recommended spacing for planting was 2 x 2 m, which gives 400 plants per rai (6.25 rai = ha). The original concept on highland coffee growing was based on high levels of inputs. Coffee was grown in a pure stand, open-system without shade. With technical and marketing support from the Highland Development Project, about 500 t quality arabica beans were in the market by 1990/91.

Unfortunately the drop in coffee prices in 1990-92 had a big impact on the coffee market. The price drop also coincided with the lack of support from the Highland Development Project, and some of the coffee growers cut down their coffee trees because they could not

get any net income from coffee during that period. Gradually the system has been changed in favor of incorporating coffee in a mixed multi-cropping system, using shade trees and inter-crops, based on low external inputs and sustainable production.

At present, there are three coffee cultivation systems on the highlands of Thailand, viz.:

1. *The pure-stand or un-shaded coffee system* introduced to Thailand from Brazil where the aim is high yield.
2. *The home garden or mixed cultivation*, especially in the backyard gardens of hill-tribe people, where they grow coffee along-with fruit trees like peach, pear, apricot, banana, etc.
3. *The agro-forestry system* where hill-tribe people grow coffee with fruit trees, and tea is put into the system as an inter-crop. The trees used do not heavily compete with coffee, but can give shade and benefit to coffee. The shade system became the most appropriate recommendation for coffee farmers because of its advantages for coffee cultivation on the highlands. Comparison of the characteristics of shaded and un-shaded systems is given in Table 6.

The *shaded coffee cultivation system* mostly uses more natural inputs to produce a healthy coffee. There are many reasons why the consumer needs a clean and chemical-free coffee that has positive outcome for an improved environment as well. Thus there is a high potential for organic coffee production. In addition, consumers are now demanding more and more organic coffee and it is quickly becoming a worldwide consumer preference.

Organic coffee production needs some strict controls over both cultural methods and management, and this will be described later.

## **Post-harvest Handling**

### **Processing**

The Wet Method is recommended for producing good quality coffee, which is favored by the market and attracts good prices. The process including pulping, fermentation, soaking, drying, hulling, and grading.

Table 6. Comparison of coffee cultivation system (shaded and un-shaded).

Characteristic	Un-shaded	Shaded
1. Coffee quality (coffee bean and taste)	Good	Good
2. Coffee production (yield : cost ratio)	High	Moderate
3. Bearing-life of the coffee tree	Short	Long
4. Inputs into Cultivation (fertilizers, pesticides, herbicides, chemicals)	High	Low
5. Farm environment (microclimate, humidity and soil condition)	Poor	Good
6. Management of coffee farm	High	Moderate

### Grading System

The grading system for green arabica bean was set in 1985, by the Marketing Committee representing relevant government agencies and multi-lateral highland development projects. It is described below:

Grade A: Bean size must be not less than 5.5 mm and the sample must not contain more than 1.5% damaged beans, 13% broken or immature beans, 0.5 % of impurities and not more than 13% moisture;

Grade X: Same quality as Grade A but the beans are discolored and stained;

Grade Y: Smaller beans and same quality as Grade A;

Grade YY: Damaged and broken beans of any size.

This physical grading system is being used only as a guideline for the farmer and buyer when they have first contact, then the sample of the grade mentioned will sent to the roaster to do the cup-test, and the result is used to settle the price.

### Pricing

Price is determined in direct contact between farmer and trader or trader and the Project. Every year a guiding price is set by some government agencies. This agreed price is applied throughout the year but has no impact on real market price. The agreed price is set to protect the farmers from underpayment caused by not knowing what their product is worth. The agreed prices are for a kilogram of green coffee of the various grades mentioned above. Since 1990, most of the roasters in

Bangkok have been stating the importance of cup-test (quality by tasting) for the price determination of green arabica coffee. Only the beans that have good flavor and aroma can be sold at a high price.

### Organic Agriculture

Organic agriculture is a system of food production and consumption aimed at environmentally and health-conscious consumers. Organic farming has the potential to provide benefits in terms of environmental protection, conservation of non-renewable resources, improved food quality, reduction in output of surplus products and the reorientation of agriculture towards areas of market demand. (Lampkin 1994).

The growing demand for organic produces (fruits, vegetables, cereal and beverage crops) has led to the development of both international and domestic markets and expanding from countries which have the premium markets. Many developing countries are trying to tap this opportunity market.

### Organic Food in Thailand

As people in Thailand and around the world have become more health-conscious and concerned about the environment, the demand for organic food has risen accordingly. It is thus an opportune time to expand the production base and market for organic products from Thailand.

Thailand has already distributed organic rice and organic baby corn to the world market with a good response, and it has set further goals for asparagus, ginger and banana.

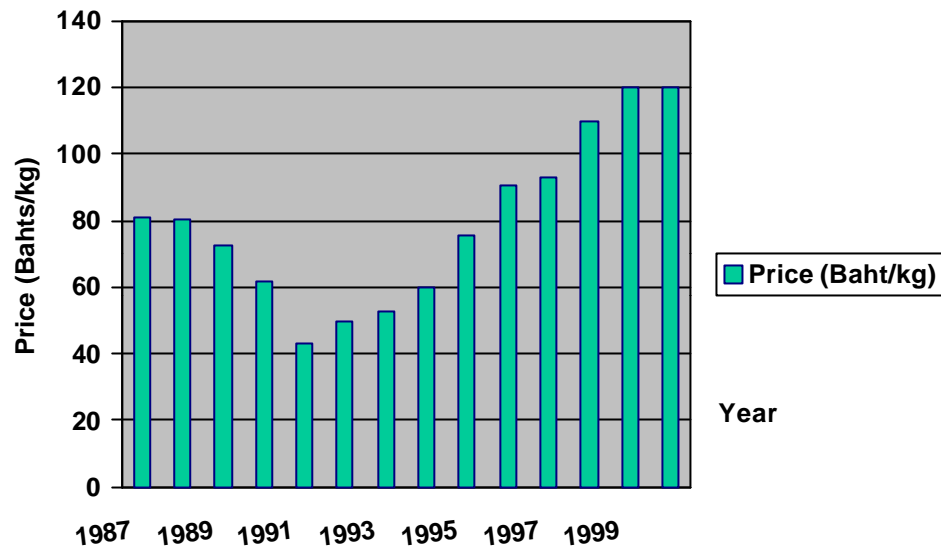


Figure 1. Arabica Green Bean Price during 1987 - 1999

Presently, there is a significant world demand for organic coffee from both the foreign importers - such as Japan, Netherlands, USA and Germany, and the Thai roasters (HCRC 1998).

The Department of Export Promotion and related agencies from both the public and the private sectors have developed a five-year plan (1999 to 2003) to promote organic farming in Thailand. This promotion is aimed at meeting the demand of the consumers and at the same time conserving the environment through reduction in the pollution of air, soil, and water.

### Organic Food Standards

Thailand has set standards for organic food production to be in line with international standards applied in developed countries around the world. The objectives are to provide the production guidelines for a progressive improvement towards sustainability, to guide the formulation of a national inspection and certification program for organic crops and to serve as an implementing model for agriculture certification in Thailand. It also meets the requirements of the International Federation of Organic Agriculture Movements (IFOAM); CODEX Alimentarius; the Council of the EU Regulation, EEC Number 2092/91; and the US Organic Food Production Act (OFPA).

### Organic Coffee Production and Its Potential in Thailand

Concerning organic coffee production, there are some requirements and criteria that

make the products acceptable to the consumer and which have to be strictly practiced. The requirements include (The Demeter Assoc. Inc.):

- No use of chemically-synthesized fertilizers, pesticides, herbicides, fungicides, or fumigants; no hormones, antibiotics or growth regulators.
- The basis of crop fertility is compost, farm manure, green manure, and crop rotation.
- The basis of pest control is the balanced farm eco-system, healthy soil management, crop rotation, crop diversification, animals, birds, etc.
- Weeds are controlled by cultivation practice and by other mechanical methods.
- Composting materials, transplants and animal feed imported from off the farm should be limited in quantity and must be of good quality.
- The farms are visited and re-evaluated annually. Contracts for use of the certification marks are also essential.

### Potential for Organic Coffee Production in Thailand

Considering the requirements and regulations described above, there is good potential for organic coffee production in Thailand. Besides the suitable natural conditions, which include areas of the highlands at 800 to 1,200 masl, with favorable climate and natural resources, organic coffee production will benefit environmental and natural resource

development, farmers livelihoods, and the highland community in general.

However, there are still some factors that have to be considered for a successful organic coffee production in the highlands; these include:

- Hill-tribe farmers have to understand the concept and be well-trained in organic agricultural practices and willing to follow the instruction.
- Market demand and prices of organic coffee must be such as to provide a highly attractive incentive.
- Methods of monitoring and evaluation for certification of production have to be strictly practiced.
- Extension personnel have to be well-trained for all steps of organic coffee production system so they can assist farmers in the correct manner.

### **Potential for Organic Coffee Production in the Royal Project**

The Royal Project Development area consists of 36 development centers where there are agricultural development activities according to resources available in each center. With strict control and a good extension program, the Royal Project areas have been able to produce agricultural products of a high standard and well accepted by the consumers. Arabica coffee is recognized as one of the main products that can earn income for the hill-tribe farmers. The Royal Project produces 40 t of arabica coffee annually and the quality of coffee is mostly preferred by the consumers because they know that the product is processed from arabica coffee varieties recommended for cultivation and that the production and processing techniques are strictly controlled by the project personnel.

Farmers are willing to follow the recommendations of extension personnel; that is why the products are of good quality. Thus, organic coffee produced by the Royal Project will have immediate acceptance and preference by the consumers. Furthermore, both the consumers and the farmers know that organic coffee will lead to a better environment and

quality of life for the highland communities. The Royal Project Development areas have a high potential to produce good quality organic coffee, and the regulation of this coffee will be undertaken by project personnel working with the hill-tribe farmers.

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