

Baby Corn Production under a Contract Farming System

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ABSTRACT

The objectives of this research were to compare the production costs and returns between contract and non-contract farming systems of baby corn production, and to analyze the procurement costs of the company through contract versus non-contract (open market) channels. The data were collected during the crop year 2005/2006 from 60 farmers in Kanchanaburi and Nakhon Pathom provinces, with 30 contract farmers and 30 non-contract farmers.

The results of the study showed no significant difference in the socio-economic situation of contract and non-contract farmers. The comparative analysis of production costs and returns between the two groups demonstrated that the contract farmers had higher costs and higher net incomes than the non-contract farmers. The higher production costs mandated farmers to follow the specifications of the production line to meet the required standard. The investment in baby corn production by contract farming had lower risk than non-contract farming. In addition, the results showed that the procurement cost via the contract channel was higher than the non-contract channel because the contract prices, on average, were higher than non-contract prices. However, the contracting company was willing to accept higher costs for standard quality products, for which the source of origin was known.

Keywords: baby corn, contract farming, production costs

บทคัดย่อ

วัตถุประสงค์ของการศึกษาครั้งนี้เพื่อศึกษาเปรียบเทียบต้นทุนและผลตอบแทนทางการเงินของเกษตรกรผู้ผลิตข้าวโพดฝักอ่อนทั้งที่ทำและไม่ทำสัญญาฟาร์มแบบมีข้อตกลง ตลอดจนเปรียบเทียบต้นทุนในการรับซื้อข้าวโพดฝักอ่อนของบริษัทผู้นำปรุงจากเกษตรกรที่ทำสัญญาฟาร์มแบบมีข้อตกลงกับการรับซื้อจากตลาดทั่วไป โดยทำการเก็บรวบรวมข้อมูลการผลิตระหว่างปีการผลิต 2548/2549 จากเกษตรกรตัวอย่างจำนวน 60 ราย ในพื้นที่จังหวัดกาญจนบุรี

และจังหวัดนครปฐม

ผลการศึกษาพบว่า สภาพทั่วไปของการผลิตข้าวโพดฝักอ่อนของเกษตรกรทั้งที่ทำและไม่ทำสัญญาฟาร์มแบบมีข้อตกลงไม่แตกต่างกันเมื่อวิเคราะห์ต้นทุน ผลตอบแทนทางการเงินของเกษตรกรในการผลิตข้าวโพดฝักอ่อน พบว่า เกษตรกรผู้ผลิตข้าวโพดฝักอ่อนที่ทำสัญญาฟาร์มแบบมีข้อตกลงมีรายได้ฟาร์มสูงกว่าเกษตรกรผู้ผลิตข้าวโพดฝักอ่อนที่ไม่ทำสัญญาฟาร์มแบบมีข้อตกลงอย่างมีนัยสำคัญ ส่วนต้นทุนในการรับซื้อผลผลิตของบริษัทผู้รับซื้อผลผลิต พบว่า ต้นทุนในการรับซื้อผลผลิตภายใต้การทำ

สัญญาฟาร์มแบบมีข้อตกลงมีค่าสูงกว่าต้นทุนการรับซื้อจากตลาดทั่วไปแต่บริษัทผู้รับซื้อขึ้นคิดที่จะจ่ายแพงกว่า เพราะได้ผลผลิตตรงตามเกณฑ์ที่กำหนดไว้ อีกทั้งยังสามารถทราบประวัติและแหล่งที่มาของผลผลิต คำสำคัญ: ข้าวโพดฝักอ่อน การทำสัญญาฟาร์มแบบมีข้อตกลง และต้นทุนการผลิต

INTRODUCTION

In Thailand, baby corn is one of the major crops among fruits and vegetables exported to foreign countries. The export of baby corn draws thousands of millions of baht into Thailand each year and is on the rise. The USA, Australia, Japan and some European countries are the major importers of baby corn from Thailand. These countries have a strict policy regarding grading the quality of the products, especially for contamination by pesticide. These days, the consumption behavior of consumers has changed to become more health conscious and the Department of Agricultural Extensions (DAE) has been promoting toxic-free vegetable production nationwide in response to the health needs of customers, both domestically and internationally. DAE works with the private sector and farmers to promote contract farming between farmers and product collectors or purchasing companies for high quality vegetable production (Department of Agricultural Extensions, 1994).

Contract farming plays a crucial role in farming practices, which benefit the farmers when selling their products, since they have risk assurance in price, marketing and other production factors, which leads to a stable income (Bauman, 2000). The purchasing companies on the other hand gain in terms of stability of input prices and the amount of input supplied to the factories. In addition, the products meet the required standard quality without investing in costly quality control

projects. The study by Pornsuwan (2003) showed that contract farming allowed the companies to purchase raw materials at a small cost and to transfer knowledge and technology to farmers. The farmers were pleased with the contract system, since they received support for production inputs, price insurance and product purchase.

However, farmers have the responsibility to adhere to the contract farming regulations, such as meeting hygiene standards in managing the production process and product quality. These requirements may increase the cost of production, which increases the farmers' investment risk. Kaewmaneechai (2001) showed that the total investment cost in the asparagus production process of the farmers under contracts was higher than those without contracts. In addition, contract farmers were exposed to higher risks to their farm's net profit than non-contract farmers.

There are other factors besides price and income that should also be taken into the consideration in the farmers' decision to enter into contracts with the companies. These factors include production credit, production input supply, production knowledge and technology transfer. Thus, this study aimed to analyze the production costs and returns between contract and non-contract farmers involved in baby corn production. In addition, the study analyzed the procurement costs of the company between contract and non-contract (open market) channels.

The methodology and data collection are described in sections 2 and 3, respectively. Section 4 presents the results, and the last section, section 5, contains the conclusion and suggestions.

METHODOLOGY

The analysis of cost and return

This study used the total cost (TC), total revenue (TR) and profit (PF) to assess the

production efficiency of the farmers, by examining the relationship between the investment cost and the revenue of baby corn production as shown in Equations 1 to 5:

$$TR = P \times Q = NCI + CI \quad (1)$$

$$TC = TFC + TVC = NCC + CC \quad (2)$$

$$PF = TR - TC = TR - TFC - TVC \quad (3)$$

$$GM = TR - TVC \quad (4)$$

$$NCP = CI - CC \quad (5)$$

where TR = total revenue (baht), P = price of product (baht/kg), Q = total quantity of products sold (kg), NCI = non-cash income (baht), CI = cash income (baht), TC = total cost (baht), TFC = total fixed cost (baht), TVC = total variable cost (baht), NCC = non-cash cost (baht), CC = cash cost (baht), PF = profit (baht), GM = gross margin, which refers to the income over the variable cost (baht), and NCP = net cash profit (baht).

Analysis of the procurement cost

To study and compare the procurement costs of the contracting company, with and without projects, the evaluation concept assumed that procurement via the contract channel involved a project, where the company had the responsibility to support the farmer in the management processes and other aspects covering the assurance of the minimum purchasing price, which resulted in a higher investment cost. On the other hand, if the company purchased the raw material or had a procurement process via the non-contract farms or open market channel, the company spent nothing, which could be compared to the situation of not having the project.

Analysis of the procurement costs of the company involved multiplying the quantity of the products purchased in any certain time and channel by its unit price. Then, the incremental procurement cost could be calculated by the difference between the procurement cost of the contract channel and the non-contract channel.

To compare the procurement costs between the contract and non-contract channels, the incremental procurement costs were computed using Equations 6 and 7:

$$TC_{CF,i} - TC_{NCF,i} = (P_{CF,i} \times Q_i) - (P_{NCF,i} \times Q_i) \quad (6)$$

$$\Delta TC_i = (P_{CF,i} - P_{NCF,i}) \times Q_i \quad (7)$$

where $TC_{CF,i}$ and $TC_{NCF,i}$ = the total procurement costs through the contract and non-contract channels for the i^{th} month (baht), respectively.

$P_{CF,i}$ and $P_{NCF,i}$ = prices paid for the baby corn under the contract and open market for the i^{th} month (baht/kg), respectively.

Q_i = the quantity of baby corns purchased for the i^{th} month (kg).

ΔTC_i = the incremental procurement costs (or the differences between the budget paid for purchasing products through the contract and non-contract channels) for the i^{th} month (baht).

If $\Sigma \Delta TC_i > 0$, then the procurement cost through the contract channel is higher than that through the non-contract channel. The company should consider ways to purchase those items from the non-contract channel in order to decrease the cost.

If $\Sigma \Delta TC_i = 0$, then the procurement cost through the contract channel is equal to the non-contract channel. The company should continue purchasing from the contract farms, since there is no difference in price between the two sources and the company can control the price, quality and quantity of the products.

If $\Sigma \Delta TC_i < 0$, then the procurement cost through the contract channel is lower than the non-contract channel. The company should continue purchasing the products from the contract farms, since it costs less and has guaranteed quantity and high quality of the products.

DATA COLLECTION

The data used in this study were collected through a survey questionnaire and face-to-face interviews with both contract and non-contract farmers who grew baby corn in Kampaengsaen district, Nakorn Prathom province, and in Thamaka district, Kanchanaburi province. The data set was divided into two groups (contract and non-contract farmers), with each group comprised of 30 farmers. The data set consisted of general socioeconomic information on the farmer's households, the production costs and revenues from baby corn production and the problems found in production during the 2005/2006 crop year. Costs and returns were then estimated for baby corn production. Middle men and the company's representatives were also interviewed and asked about contract details, the quantity purchased in each period and the purchasing prices under the contract agreement. This information was used to analyze the company's budget for purchasing raw materials or the company's procurement cost.

RESULTS

Both groups of farmers shared similar socioeconomic characteristics, such as age and education level of the family head, experience in baby corn production, occupation, number of family members and household labor, and the source of credit.

The survey results also showed that the problems confronting both groups of farmers included high input prices, which led to high production costs, flooding and lack of bargaining power on the price with the collectors and the purchasing company. These findings were consistent with Sathitsirikun (1989).

The results from the cost and return analysis on the non-contract farmers group showed

the average total variable cost and the average total fixed cost were 4,266.64 and 390.48 baht/rai, respectively. In addition, the average total cost was 4,657.12 baht/rai. The average yield was 1,736.91 kg/rai. The average product price received was 2.54 baht/kg. The income from selling the baby corn and stems was 4,411.75 and 674.44 baht/rai, respectively. The average total revenue and the average total cost of the non-contract farmers was 5,086.19 baht/rai and 4,657.12 baht/rai (or about 2.68 baht/kg), respectively. The production net profit was 429.07 baht/rai. The gross margin and net cash profit were 819.55 and 1,466.86 baht/rai, respectively. In addition, the coefficient of variation of the net profit was 2.02 (Table 1).

The data in Table 1 also show that the average total variable cost and the average total fixed cost for the contract farmers was 4,591.73 and 323.22 baht/rai, respectively, and the average total cost was 4,914.95 baht/rai. The average yield was 1,830.00 kg/rai, with an average production cost of 2.69 baht/kg. The average product price received via the contract agreement was 3.13 baht/kg. The income from selling the baby corn and stems was 5,727.90 and 615.00 baht/rai, respectively. Thus, the average total revenue for the contract farmers was 6,342.90 baht/rai with a net profit of 1,427.95 baht/rai. The gross margin and net cash profit were 1,751.17 and 2,664.21 baht/rai, consecutively. The coefficient of variation of the net profit was 0.79 (Table 1).

The study showed no major differences in the socioeconomic conditions and the production problems of both the contract and non-contract farms. On average, the contract farmers had higher revenue and production cost than the non-contract farmers. The average production costs of both groups (2.69 and 2.68 baht/kg) were not significantly different, but the contract farmers had a higher gross margin, net cash profit, and net profit, but the coefficient of variation for their net

profit was lower. Therefore, the results indicated that the investment risk in baby corn production under the contract farming system was lower.

From the comparative analysis of the company's procurement costs via contract versus non-contract (open market) channels, based on monthly data throughout the 2006 production year,

it was found that the procurement cost through the contract channel (42,660,000 baht) was higher than that from purchase on the open market or non-contract channel (41,277,600 baht). This resulted in the purchase cost from the contract farms being 1,380,400 baht higher than from purchase on the open market (see Figure 1 and Table 2).

Table 1 Costs and returns on baby corn production for 2005/2006 crop year (contract versus non-contract farms)

	Contract farm	Non-contract farm	Difference
	(1)	(2)	(1) – (2)
1. Average yield (kg/rai)	1,830.00	1,736.91	93.09
2. Average price of product (baht/kg)	3.13	2.54	0.59
3. Total revenue (bath/rai) = (3.1)+(3.2)	6,342.90	5,086.19	1,256.71
3.1 Income from baby corns (baht/rai) = (1)×(2)	5,727.90	4,411.75	1,316.15
3.2 Income from stems (baht/rai)	615.00	624.44	-59.44
4. Total variable cost (baht/rai)	4,591.73	4,266.64	325.09
5. Total fixed cost (baht/rai)	323.22	390.48	-67.26
6. Total cost (baht/rai) = (4)+(5)	4,914.95	4,657.12	257.83
7. Cash cost (baht/rai)	3,678.69	3,619.33	59.36
8. Net profit (baht/rai) = (3)–(6)	1,427.95	429.07	998.88
9. Gross margin (baht/rai) = (3)–(4)	1,715.17	819.55	931.12
10. Net cash profit (baht/rai) = (3)–(7)	2,664.21	1,466.86	1,197.35
11. Average product cost (baht/kg) = (6)/(1)	2.69	2.68	0.01
12. Coefficient of variation of Net Profit	0.79	2.02	

Source: from 2006 survey data.

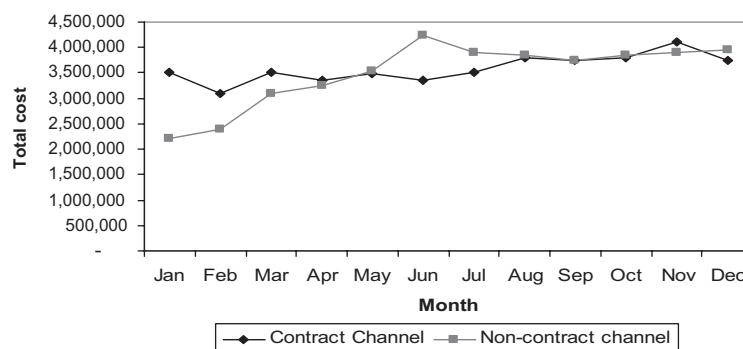


Figure 1 Purchase cost under contract farming and non-contract farming in the 2006 production year

Note: The average price of baby corn for Thailand was used to estimate the company's procurement cost through the non-contract (open market) channel.

Source: from 2006 survey data.

Table 2 Company procurement cost from contract versus non-contract (open market) channels in the 2006 production year

	Procurement cost (baht)
Procurement cost through the contract channel	42,660,000.00
Procurement cost through the non-contract channel	41,277,600.00
Difference	1,382,400.00

Note: The average price of the baby corn for Thailand was used to estimate the company's procurement cost through the non-contract (open market) channel.

Source: from 2006 survey data.

The survey results revealed that one of the advantages in baby corn contract farming was the guaranteed market for the products. Contract farmers received production technology knowledge and other support from the company. However, the farmers had to follow strictly the conditions and the practices set by the company and had no opportunity to bargain on the price. They were also responsible for products that did not meet the required standards. Thus, contract farmers incurred higher investment costs than the non-contract farmers. The benefits to the company from having a contract agreement with farmers were revealed as the company having control over the amount of products supplied to the processing factory. Moreover, the company could receive traceable and high quality products to meet the importer's requirements. However, the investment

cost paid under such a process was higher than buying the products from the non-contract channel (Table 3).

CONCLUSION AND SUGGESTIONS

The study results on the financial cost and return analysis between the contract and non-contract farmer groups revealed that the total revenue and the net profit of the contract farmer group were higher than for the non-contract group, because the farmers who were under the contracts had to follow the regulations and production guidelines of the purchasing company and in return, they received a higher price for their products. The coefficient of variation of the net profit showed that baby corn production under the contract farming system was less risky than under

Table 3 Advantages and disadvantages of the contract farming.

Farmer and collector		Company	
Advantages	Disadvantages	Advantages	Disadvantages
- Had a certain market for the products.	- had to strictly follow the conditions in contract.	- could control for the amount of the products supplied to the processing factory.	- higher investment cost than purchasing from the open market.
- Gained the knowledge and support from company.	- had no chance to bargain on the price.	- know source of origin of the products (traceability).	
- Had stable income and less risky.	- had to be responsible for the products in case of not being in required standard.	- received the required quality products.	

Source: From 2006 survey data.

the non-contract system. The result of this study contradicted the study by Kaewmaneechai (2001), which showed that production under a contract farming system had a higher risk than under a non-contract system in terms of the stability of the farm's net profit.

The current study results also showed that the company had a higher procurement cost when buying the product through the contract channel than the open market channel, because, on average, the product price under the contract agreement was higher than the price in the open market. However, the contracting company was willing to pay the additional costs for high quality and traceability (known source of origin) of the products. This result of the study contradicts Pornsuwan (2003), who found that the company had the lowest procurement cost when the product was obtained through a contract channel.

The results of this study suggest that farmers should produce baby corn under a contract farming system, since they would receive a higher income and return, and have a lower risk than producing under a non-contract system. In addition, the company should accept the opinions and suggestions of the farmers regarding contract details, and should adjust the terms of conditions in the contract to assure mutual satisfaction by both parties. Future study should be conducted into the model and the method or process used to determine the contract price, since this would enhance the efficiency of the contract farming system and price setting.

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