

Analysis of Contract Farming in Thailand

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ABSTRACT

The objectives of this paper are to review contract farming experiences in Thailand, including the role played by government and to partly evaluate the effectiveness of contract farming as a means to stabilize farmers' income. Can contract farming serve as a strategy for agricultural development? The paper is based on a review of literature as well as the authors' previous and updated field research.

Experiences suggest the need for government to create a favorable environment and infrastructure to encourage investment in agribusiness, effective coordination among concerned parties and increased agricultural production.

The poorest farmers have not been excluded from contract farming but special measures may be needed to gain their full participation in the livestock system. In the long run, small holders will be able to accumulate skill in production and management, thus improving their bargaining power. When increasing demand makes the market more competitive, contract farming may no longer be farmers' best choice.

Key words: Thailand, Contract farming, Marketing development, Access to the market, Government roles

INTRODUCTION

Thailand's agriculture has been diversified to promote export. Diversification was facilitated by the build-up of infrastructure during the early National Economic and Social Development Plans. The resulting expansion of cash crops included cassava, sugar cane, kenaf, maize, etc., for dry land and soybean, peanut and mungbean for both dry land and irrigated land. It was in the 4th Plan (1977–81) that the policy first clearly indicated the promotion of value-added products for export. Agro-industries grew rapidly, especially canned fish, pineapple and tomato products. The Sixth Plan promoted integration of farming and processing and export of high value-added products. Compared to other Asian countries, by early 1990 Thailand probably had the most extensive experience with contract farming and the widest range of crops (Glover, 1992). By the middle of the 7th Plan, the export value of agro-industrial products had reached 78,100 million Baht and had grown to 255,800 million Baht by 2004 (<http://www.ops2.moc.go.th/meeting/ExstrucB.xls>, September 28, 2005), a growth rate of 14% per year.

Over the past three decades, Thailand has experienced a tremendous progress in contract farming. As happened elsewhere, at the beginning, farmers were not aware of their role and responsibility, benefits and limitations of the system while contractors did not recognize growers' problems, constraints and cultural way of life. Consequently, contractors failed to obtain desirable quality in required time and quantity. Misconception by both parties caused

failure at the early stage of contract farming systems despite of the fact that the government supported the policies.

Contract farming carries both a positive and a negative image. It has been viewed as a means for contractors' exploitation of small growers as well as a means for agricultural development in a broad sense. For the latter, the private sector usually plays an active role in provision for services in rural area. Contract farming may facilitate market participation of the poor and transfer technology to farmers as well as bring foreign investment.

The major concern is that the contract farming may be arranged on an unequal basis and thus growers are left with the normal wage rate while the arrangement creates more debt to small growers. Asian Development Bank Institute (ADB) indicates that the governments in both Republic of Laos and Cambodia are interested in gaining a better understanding of the advantages and disadvantages of the development of contract farming, so as to promote a proper policy environment for pro-poor contract farming. This paper intends to review experiences in Thailand from the past 3 decades. Lessons learned will be drawn for the following issues: the roles of public sectors in supporting the favorable environment; profit and risk sharing via market environment; farmers' attitudes towards, and adoption of, contract farming as a means for agricultural development. The paper is based on a review of literature as well as the author's previous and updated field research.

ANALYSIS

Government policy and implementations

Contract farming in some form had been practised before the government chose it as a policy objective in the Sixth National Economic and Social Development Plan (1987–1991). Processed food was initially targeted for export markets, e.g., canned fish, pineapple and tomato products. The canned vegetables exported in the 1970s mostly carried foreign brand names. Contract broiler production started in the early 1980s. Even prior to this period, sugar cane and tobacco were produced under contract arrangements.

The Sixth Plan included guidelines for development of agro-industries. The goal was to promote export of value-added products and import substitute commodities. Guidelines emphasized on improving product quality and management systems, assisting agro-industrial plants in transferring appropriate technology to farmers and supporting farmers in production planning so that a consistent supply of high-quality raw materials could meet the requirements of agro-industrial plants. Manarangsan and Suwanjindar (1992) concluded that the guidelines were in many respects similar to contract farming.

Government augmented the guidelines with the so-called "Four-Sector Co-operation Plan to develop agriculture and agro-industry" (4-sector plan). Under this plan, agro-industrial firms, farmers, financial institutions (Bank for Agriculture and Agricultural Cooperatives, BAAC) and government agencies were to work together. The plan aimed at improving the production system to reduce price risk and market uncertainty while improving farmers' technical knowledge and raising production efficiency. In addition to general extension services, the government placed 250 million Baht in BAAC. The capital gain was used as interest compensation for the farmer participants in the program (3.5% *p.a.*) to encourage more farmer participants and to reduce production cost.

During 1987–1993, 12 projects proposed by 20 private firms were approved. However up to 1993, two of them did not operate: eucalyptus and integrated hog production. Three projects ceased after one year of operation—asparagus, ramie and bamboo for paper pulp (OAE, 1993). Currently, we have successful asparagus groups who have been contracting with three companies since 1989 (Naritoom, 2000).

The remaining seven projects continued their operations after 1993. These included castor bean, basmati rice, sunflower, wheat, barley, hybrid corn and sorghum and cashew nut production (Wiboonpongse et al., 1998).

The Office of Agricultural Economics (OAE), responsible for monitoring the plan, concluded that the results of the 4-sector plan were unsatisfactory since some of these projects actually relied heavily on government support (e.g., provision of free seeds for sunflower growers). Plan failure was caused by several factors. Firstly, the contract term was too rigid because it was thought to be fairer to both the industrial firms and farmers. Secondly, farming participants felt they needed time to adapt to new crops which usually required new technology. When new crops did not provide desirable yield and return, farmers were discouraged and shifted back to their old crops. Thirdly, the extension service was also blamed for this failure (MOAC, 1994). The commodities chosen required more inputs and exhibited high risk. The technological support and delivery systems could not cover all the project areas.

Most private contract farming schemes failed in the early 1990's (Baumann, 2000). The evaluation of the 4-sector plan revealed important lessons: it is not necessary for every farmer to participate in contract farming, government agencies should not get involved directly in the contract between farmers and firms and business under contract should be expanded without perpetual support of the government. (NESDB, 1995 cited by Wiboonpongse et al., 1998).

By the end of the Sixth Plan, NESDB noted as recommended, "contract farming has proved viable and shown to need to be further promoted on the condition that the provisions of agreements are amended to be more effective and beneficial to all parties concerned" (Singh, 2004). There should be an assurance that production, selling and purchasing of farm produce by the firms is conducted fairly. In addition, there should be risk guarantees for farmers, firms and financial institutions. The Subcommittee came up with several measures in response to the mentioned issues so as to modify cooperation between the governmental agencies and the firms. All measures centered around arrangement of coordination and risk sharing, such as setting up a "project fund" to provide compensation for production and marketing risk or "group farming" or "cost sharing" amongst farmers and firms. The last alternative was considered as a new and prospective measure but it was not implemented.

In 1995 (the Seventh Plan), the Subcommittee consented to support agro-industrial projects (under the 4-sector plan) that met 3 conditions, namely, ability to reduce production risk, ability to reduce marketing risk and ability to identify potential target areas and farmers.

The agro-industrial firms' proposals were to be approved based on the highest benefit provided to participating farmers by the firms. Finally, the Subcommittee also improved the 4-sector plan and indicated 2 target-commodity groups: -

- Agricultural produce that has high export potential, e.g., high-quality rice, fruit, flowers, fresh-water, and coastal-swamp fish.
- Industrial crops, e.g., vegetables, sunflower, maize and fast-growing trees.

Farmers participating in the approved project would be able to obtain low-interest-rate loans (5% p.a.). Eight projects covering a production area of 3.42 million rai were approved which required credit up to approximately 4,984 million Baht (MOAC, 1994). These projects involved trees for pulp, sunflower, maize, eucalyptus, teak and dairy production. The 4-sector plan was expected to continue into 1996–2000 (The 8th National Economic and Social Development Plan) (NESDB, 1995 cited by Wiboonpongse et al., 1998).

Though there is no explicit mention of contract farming in the 9th National Plan (2002–2006), many state departments have implemented it. For example, a 1999 order of the Department of Internal Trade which issued a standard contract farming agreement for companies and farmers, not only said that their agreement should be used, but also it would regulate contract compliance (Singh, 2004). Also in 2004, to alleviate the controversial issue

of the FTA between China and Thailand, the government compensated farmers for a reduction of garlic production area if farmers switched to annual crops under contract farming or to perennial crops.

The Ministry of Agriculture and Cooperatives (MOAC) still provides training in contract farming for farmers and local officials in various aspects, including contract arrangement, providing clear understanding of the concept of contract farming and the need for it and coordination between public-private sectors and choice of relevant area and farmers. Production and marketing plans, as well as multiple market outlets, are advised to both contract and non-contract farmers (MOAC, 2002 cited by Singh, 2004).

Market Competition and Pricing

Thai agricultural marketing systems generally are competitive. In contract farming, one might expect quasi-monopsony to be a crucial condition for success. This is to be explored in Thailand's experiences.

Japanese cucumber contract farming in the early 1990's appeared to be monopsony when the produce had a small and specific market. There was only one company making contracts with farmers. The nature of contracts and the close supervision was similar to other crops new to farmers, and where the final market required high quality specific to product specification. Presently, the crop has become more common despite the strict specification and quality is maintained by the few companies exporting to Japan. In a broader sense, farmers in the original producing areas have more choices of crops and more competing firms to contract.

In high-demand crops like potatoes and other vegetables, contracted markets are highly-competitive. In 1990, there were only two potato processing companies contracting farmers in two different districts in Chiang Mai, thus no competition for farmers in the same location was found. Five years later, the number of potato processing firms increased to 7 companies, of which some are located in Bangkok, and the competition for farmers has become intense. As Onberg (1998) observed, "there is not much difference in the price offered by brokers or middlemen (hired by or worked in contract to firms). Competition between middlemen and dissemination of information within and amongst potato farmer groups has made it impossible for companies to offer different terms. Besides, farmers are not loyal to any specific company. They do not hesitate to switch to another company when offered a better deal."

After 20 years of potato production and development, it is the farmers' market. This is partly, on one hand, due to the existence of strong farmer groups, farmers' production experience in the market and that their production skill enhances their bargaining power. On the other hand, the rapid growth of market demand for potato chip puts pressure on firms' raw material procurement. The companies find it easy to obtain potato at lower cost and less risk when farmers become skillful. (The companies now do not invest in technical advice, nor engage in close supervision in this particular area). Our visits to companies (2004) revealed that competition for farmers, within and between crops, was fierce in the 1990's before the economic crisis broke out in Asia.

Contract farming has been expanded, from Chiang Mai and Lamphun, to all provinces in the upper north and many provinces in the lower north. Commodities range from poultry and hogs to Japanese rice, Basmati rice and most recently, organic rice, vegetable seed, corn seed and various kinds of fresh vegetables for frozen and pickled products. These mentioned commodities have been formally contracted by large and medium firms owned by multinational companies and joint ventures, or merely by domestic companies. After the economic crisis in 1997, smaller firms dropped out of the industry, yet competition carried on among fewer, but larger, firms. At present, there are at least 3-4 companies competing for the same crops. As disclosed by a company manager, for the same crops, firms need to exercise

different tactics to keep their farmers.

For example, when a company accepts ungraded produce at a lower price for eggplant, another company pays a higher price for graded produce. Or, if a company pays 6 Baht / kg. for eggplant of superior grade for the 3-month harvesting period, the other would pay 5 Baht/ kg. for good grade for a 4.5-month harvesting period. (Eggplant can be harvested longer than 4.5 months when well maintained).

Companies either use price strategy or quality strategy. This implies high market force to obtain labor and suitable land and desirable production environment among industrial firms. For some crops, e.g., eggplant and sweet corn which require processing within 24 hours, distance from plant location is limited to a shipping period shorter than 12 hours, thus competition for all mentioned resources are even stronger.

Farmers' bargaining power increases when they have more alternatives. For example, farmers in the lower north (i.e., in Sukhothai, Phitsanulok and Tak) whose main crop is either rice or sugar cane, or soybean or maize, the contracted vegetable appears to provide higher return despite lower net farm price, compared to the farmers in the upper north. The company also stated that they did not experience farmers in the lower north often changing to other companies.

The market seems to work both ways. While companies compete for farmers, they also mention that there are farmers in the area seeking contracts and the current contracted farmers desire to expand their contract sizes. This, in a way implies success.

Pricing

Pricing is one of the most important issues concerning the public and academics. Prices paid for contracted crops are usually lower than prevailing market prices. As cited by Singh (2004), "most farmers try to sell their produce to market instead of the factories since they get higher prices and are not required to comply with the conditions specified by the factories. Thus this is seen as a weak point of buying raw materials by factories." The above was a common problem to inexperienced factories, entering the business over the past 20 years in Thailand (at least in Chiang Mai) and is likely to happen anywhere that contract farming exists. The Eisenberg Group and others followed the same path.

The experiences have transferred to latter generations and the problem has been solved quite successfully using various tactics. For example, for crops demanded by processing firms and fresh markets, e.g., tomato, firms allowed 20% of the crop at early harvest to be sold in the fresh market while factories make no attempt to compete at high cost. During the peak season, prices decline, then factories purchase large volumes of high quality at the guaranteed price. This arrangement should be a better solution for both farmers and firms. The economic rationales to the pricing issue are trade-offs between risk and return to farmers, and stable prices of raw material at levels for firms to maintain competitiveness in the global market.

However, it is questionable if farmers actually receive reasonable guaranteed prices when given market certainty. To answer this question by comparing farmers' share is rather irrelevant, if not inappropriate, since product has a long process before reaching final consumers. Besides, production supervision costs, processing costs and other costs accrued by companies are strictly confidential. One would expect a guaranteed price could be expectedly reasonable where market competition is high.

According to Baumann (2000), "the Commonwealth Development Commission (CDC) projects in various countries would have failed if there had not been some attempt by the project authorities to stabilize the price". However, the price that companies pay to farmers is partly dependent on quality. This can work as an incentive for farmers to deliver high-quality product. For example, for grade A, farmers receive 5 Baht / kg but the price drops sharply to

1 Baht / kg for grade-B egg plant. The quality difference between the two grades is only the appearance of the skin, given that the other attributes of the product are right. Crop quality consistency and standards are often the most contentious factor in a contract. However, it is easy for a company to manipulate and suppress the price when the market is competitive and prices are volatile (Baumann, 2000). For example, in the case of shrimp culture, the contract firms, for the purpose of cost control, usually set the limit of the return for shrimp farmers. However, the same farmers rejected cooperative approaches after experience with poor market prices (Falvey, 2002). This indicates that farmers avoid risk in exchange for income. It should be recommended that companies and governments try to counter the volatility of the market and find ways to stabilize the price for growers. A good formula can help in sharing the costs and benefits between producers and processors.

Models of Contract

Contract farming can be constructed in a number of ways depending on the crops, the objectives and resources of the contractor and the experience of the farmers (Eaton and Shepherd, 2001). Contracting out production is a commercial decision to facilitate an adequate supply at the firm, and at an economic price. The contractor could be private firms or cooperatives. As suggested by Ellman (1986), Glover and Kusterer (1990), Baumamm (2000) and Eaton and Shepherd (2001), the types of contract farming arrangements could fall into one of 5 models: the centralized model, the nucleus estate model, the multipartite model, the informal model and the intermediary model.

They suggest decisions on which type of model should be made on the basis of market demand, production and processing requirements and the economic and social viability of plantation versus small holder production. The nucleus estate model, for example, is likely to best suit crops requiring immediate processing after harvest, crops which require long-term investment and farmers that have little or no experience on crop production, for example, oil palm, sugarcane and tea. In Thailand, flower, sugarcane (and oil palm) contract arrangements fall in the so-called centralized model as defined by Eaton and Shepherd (2001). Using their definitions, we example the cases in Thailand as follows:

1. The centralized model

Eaton and Shepherd (2001) cited the case of the Thai sugar industry as a representative of this model. The country produced 3,786,000 tons of sugar in 2003, of which 57.7 percent (2.5 million tons) was exported. The industry involves 46 individually-owned sugar mills. Over 200,000 farmers grow sugar cane for these mills on approximately 6,831,640 rai or 1,093,062.4 hectares. There are also many farmers who grow crops for large-scale farmers through agreements with brokers. The tri-party Committee on Sugarcane and Sugar (comprising growers, private-mill companies and government) closely regulates prices, issues quotas and monitors the sugar distribution. The government has introduced the net revenue sharing system under which growers receive 70 percent, and the millers 30 percent, of total net revenue. The government also promotes and manages technical research centers and encourages growers' associations.

2. The nucleus estate model

A common approach is for the contractors to commence with a pilot estate, then after trial period, introduce to farmers or satellite growers the technology and management of the crop. The central estate primarily produces hybrid seedlings or rears parent stock. Hog and broiler business in Thailand exemplifies this model by large corporations CP and Betagro. Falvey (cited by Angasith, 2002) asserted that CP has been the leader and commercially successful in the arrangements, although the group was unable to successfully apply the

same concept to rice. The CP Group modified the arrangement and funded 20 shrimp aquaculture centers throughout Thailand, involving some 10,000 contract farmers.

3. The intermediary and multipartite model

The intermediary model is the most common practice in Thailand and Southeast Asia. The large food processing companies and fresh vegetable firms purchase crops from individual “collectors” or from farmers. When a large firm is a joint venture, the model may also be called multipartite. In the frozen-vegetable industry in northern Thailand, three companies directly contract out to middlemen or quotamen (case study presented in the appendix). The largest company’s quotamen organize over 20,000 farmers to grow almost 40,000 rai of vegetable soybean, green beans, sweet corn, carrot, spinach, etc., primarily for the Japanese market. One of the companies is a joint venture of Taiwanese processing technical skill and Japanese skill for marketing and export management. In general, quotamen are responsible for collecting produce for the company to meet certain granted quotas. They act as middlemen to farmers in relation to input supply. They make informal contracts with farmers, but formal contracts with the company. To acquire standard quality, these companies rely on their employed extension-personnel staff’s supervision of cultivation management. One of the companies has adopted extension methods practised by the Royal Project, i.e., an extension staff to stay in the village of which he is in charge. The approach is found to be successful in many respects, especially in quantity and quality control. Besides these advantages, the quotamen are closely monitored.

4. The informal model

The informal arrangement was long practised before any other models. Verbal agreements in vegetable and soybean have been used for over thirty years, tomato processing in the last decade, fresh vegetables like cabbage in the remote areas in the north, cut flowers including chemical-free vegetables and chrysanthemum for feed are contracted for Chiang Mai and Bangkok markets. (As for chemical-free chrysanthemum for pharmaceutical use, it is arranged under formal contract). Generally, firms do not provide technical advice. However, input supplies and credit are often made available to farmers at a high implicit interest rate. Wiboonpongse et al., (1998) revealed that a case of processing tomato under informal contract was risky to farmers. The brokers made verbal contracts via processing firms. Secondary informal contracting was between brokers and farmers. No minimum guaranteed price was specified. The farmers were obligated to supply as much as possible from the seed they acquired from the brokers. Selling produce to open market was considered dishonest. However, there was no commitment for the firms to buy the production from farmers. This was confirmed by the fact that in 1992, a large amount of tomato was left rotten by roadsides and in front of a factory when one of the machines broke down and processing became slow. There was no compensation for farmers. As a consequence, the farmers shifted to potato and other crops where contract was formal and farmers have better access to open markets. Many temperate crops have been introduced to the north by the Royal Project Foundation, e.g., strawberry, carrot, lettuce and spinach. All of these vegetables were delivered to the Project for marketing. Recently spinach has been partly grown for processing firms whereas arrangement has turned from informal to formal.

Effectiveness of Contract Farming Scheme: Failure and Success

To observe the effectiveness of contract farming, we briefly present an overview of its performances in terms of failure and success via a summary of cases. In the second part, specific responses of farmers in the secondary stage of contract farming and attitudes of Chiang Mai growers are illustrated.

Performances of contract farming projects are mixed. Several studies in the 1990 reported unsatisfactory stories that most contract farming schemes had failed. Examples often cited in literature are forest contract, oil palm and cashew nut (Glover and Ghee, 1992; Baumann, 2000; Falvey, 2002). In some cases, early successes in contract forestry (*Eucalyptus*) were not sustained when firms switched from artificially-supported terms (Baumann, 2000). However, the global rises in pulp price attracted large corporations, e.g., CP, Kaset Roong Ruang and Shell as well as at least 15 Japanese and Taiwanese joint ventures. The most recent one was a joint venture from China (The Sino-Thai Pulp and Paper Joint Venture Project). The role of government continues to facilitate smallholder growers and experiences of the pioneers in this industry provide lessons concerning social equity and flexibility of contracts with growers (Falvey, 2002).

According to Glover and Ghee (1992), one factor withheld the success of oil palm contracts was the lack of quasi-monopsonistic conditions which are crucial for contract farming. Baumann (2000) agreed that the competition environment and volatility of Thai markets were not conducive to contract farming systems since Thai farmers were able to acquire inputs, credit and buyers in the open market. However, from experience in 2003, one could argue that vegetable contract farming in northern Thailand has been expanding within the relative competitive environment (competition among contract firms for farmers despite of crops are exclusively produced for contractors).

In the case of cashew nut, the Agricultural Land Reform Office, BAAC program and private firm program were less successful. This program aimed to cover 175,000 rai (28,000 ha) in 1990, to expand to 300,000 rai and to include more than 31,000 farm households. The project exceeded its target in the initial stage until the rapid spread of pests. Poor feasibility analysis and an absence of regionally-specific research have bearing on the failure, and it introduced risks which unfairly accrued small holders (Falvey in Angkasith, 2000). Research on appropriate technology for productivity improvement and cost reduction, pertaining to local specifics seems necessary, and this is also requested by frozen-vegetable processing contractors in the north.

A number of successful cases could be exemplified. In a broader picture, contract farming in Thailand has been implemented and managed differently from other countries. This resulted in better overall agricultural growth and development effects through the shift to high-value crops (Benziger, 1996 cited by Singh, 2000; Burch, 1996).

For specific examples, in the western region, sugar cane, baby corn and asparagus, as well as broiler and hog contracts have proved successful. In baby corn, contracts were between village middlemen and farmers. The middlemen provided farmers with seeds, fertilizer, loans and tractor services. The contract involved guaranteed minimum prices and additional prices when the prevailing market price increased. No contract is made between middlemen and companies.

The outlets for baby corn are not restricted by processing firms but by the fresh market for both domestic and overseas. Therefore price risk is reduced by the minimum price guarantee with some flexible adjustments to price changes (Naritoom, 2000).

The case of asparagus is particularly interesting. The main condition of the contract is to guarantee a fixed price for the whole year for various grades. Technical advice was given by firms and devotion of local government officers. This is the same model used by potato contracts in Chiang Mai (local officials were active in supporting the link between firms and potato growers (see appendix for potato case)). The role of the producer groups and local officers are confirmed by the success of Nakhon Pathom "safe vegetable" groups and the expansion of this to the nearby provinces of Ratchaburi, Kanchanaburi and Suphanburi. This is a successful example of private-government-farmers cooperation (Naritoom, 2000).

Thailand is the world's second largest producer of Black Tiger shrimp. In the South,

smallholders were integral to the ultimate success, although overriding concerns have focused on environmental issues. Through the Fifth and Sixth Plans, multinational firms like Cargill, were encouraged to invest in parallel with smallholders, financed by the BAAC and other banks. At that time, Aquastar Limited and CP Aquaculture Business dominated. The former was more oriented to social and environmental emphasis. CP adopted its vertical integration model from the poultry business. Up to 1995, CP grew to contract some 5,000 ha of shrimp contract farming with smallholders. Apparently, returns to smallholders were substantial. However, there is need to assess risk accruing to growers and social costs. Small holders preferred operating under the contract farming system, to taking risks in a volatile market. They even rejected the cooperative approach after experience of poor market prices due to inadequate quality control (Falvey, 2000).

In the northeast, the key to the success of horticulture exports was the provision of irrigation water. Production could be extended in the wet season and the introduction of dry season crops and non-traditional crops of high marketability, supported by a technical advice contract farming scheme, was particularly effective for tomatoes supported by BAAC and other finance. The expansion of tomato contracting in this region also encountered disputes about spoilages, factory shut downs and other problems which later resolved through mutual-benefit contracts. "Viability of the government-agribusiness-smallholder relationship in this case was ascribed to government investment in necessary infrastructure" including physical, service and coordination support (Paopongsakorn, 1995 cited by Falvey, 2002).

In the north, the success of contract farming is pronounced in such horticulture crops as vegetable soybean, baby corn, sweet corn, potato, tomato and eggplant, as well as vegetable seed and maize seed. The number of processing firms for vegetables increased from 34 (1998) to 61 (1994) and to 78 in 2002. Potato contracts received most attention due to their development. Production in Chiang Mai, the major area, increased from 600 ha in 1983 (to 1,927 ha. in 1994), and to 3,638 ha in the 2002/03 crop year. Ninety percent of the production area is allocated for processing variety which accounts for 21% of total yield. Contract production has been expanded to 6 provinces in the North and other 3 provinces in the northeast. In total, production in 2002/03 reached 6,750 ha of harvesting area and 86,700 tons of total yield. The farmers, through their groups, contracted companies. In the first stage of contract, district agricultural extension officers had a very active role in coordination and extension in San Sai District of Chiang Mai. The government has promoted such a form of farmer organization in contract farming, in part, to better farmers' position in dealing with companies, for credit collateral and for technical assistance from firms and universities. However, the successful role of the officers in San Sai is not replicable in the adjacent district (Mae Taeng) due to different local socio-economic environment. Today, farmers in San Sai have turned to selling their processing potato to middlemen who gather produce and deliver to the companies. It is the middlemen who have contracts with firms but the individual farmers prefer to take risks for higher selling prices. The companies, however, adopted the contract approach to new farmers in other areas (more details of case studies in the appendix).

Farmers' attitudes towards contract farming

As we reported in 1998, viability of contract farming depends on the satisfaction of both farmers and firms, and profitability is certainly the key component. At the initial stage of contract, farmers perceptions regarding new crops and their attitudes towards contract farming are important. This section presents details from the farmer survey by Sribooncitta et al., (1996) in the hope of providing lessons learned for agencies attempting contract farming elsewhere.

Farmers joined contract farming for a number of reasons, namely:

- market certainty for their produce (52% of respondents),

- price stability (46%),
- and provision of input on credit (28%).
- after observing their neighbors gained higher income (35%).

Other reasons included lack of alternatives, expectation of higher price, etc. In addition from the survey in 2004, the landless farmers (40% of respondents) felt that contract farming provided them good opportunities to raise income while labor was the only resource they had.

Most of the contract farmers grew only 1 contract crop (78% of the respondents). Those growing Japanese cucumber had 2–4 different contract crops but only a few maize seed farmers had a second contract.

As it is often questioned whether new crops and new management could restrain farmers from continuing the contracts, evidence from Chiang Mai during the 1990's showed that 35% (of respondents) felt the new crops were more complicated, but 43% felt the opposite and 22% were indifferent. Their attitudes were affected by their production background and experiences. Farmers who had experiences in vegetable and horticulture crop production were likely to find production of all the mentioned contract crops relatively easy (Wiboonpongse et al., 1998). However, a company was more satisfied with the performances of farmers in the lower-north provinces whose agronomic crops are traditional (survey in 2004). Due to limited alternatives, these farmers tend to work seriously on the contract crops. The previous survey found farmers' main reason for keeping contracts was high return from the crops relative to their other alternatives (52%). Surprisingly, some farmers (16%) indicated they did not know other alternatives. The certainty of market outlet accounted only for 11% (Wiboonpongse et al., 1998).

The firms usually put production quotas on land for contract crops to maintain standard quality. The average sizes of the contract crops per household were only about half of what the farmers desired (only 40% of the farmers). Note that some farmers had 2 or more contract crops. The survey in 2004 found that the restriction has been relaxed since on one hand, demand for raw material increased and on the other hand, farmers become more experienced and hired labor was available (Wiboonpongse et al., 1998).

In a complete contract farming arrangement whereas a processing firm's product was to meet consumers' preference, the firm needed to provide the key input, i.e., seed of a selected variety and material inputs. Fertilizer and other chemical inputs were strictly controlled for "use with care" to ensure effective results and controlled residual levels (especially important for vegetables). All the inputs were provided on credit to farmers through cooperatives, groups or middlemen. On average, 80% of farmer respondents were happy with the advanced credit in kind because they did not need cash investment (the farmers felt that this was not their investment). This was also convenient for them (35%). For maize seed, potato and tomato, the farmers felt that the price of inputs were reasonable (Wiboonpongse et al., 1998).

Most of the farmers had no information about the price of seed (84%) but knew about the prices of fertilizer and chemicals (68%) since the latter were available in the open markets. The farmers who indicated that they found input prices to be higher than they could obtain from the market (31%) or inputs were of poor quality (9%) were mostly maize-seed farmers who obtained inputs from the Land Settlement Cooperative of Phrao. The largest group (40%) did not have any problem with advanced input services.

Regarding government services, the farmers indicated they had never received any service (46%) but about the same proportion did receive production advice (43%), input supply (7%) and meetings with farmers (3%). On average, 40% of the respondents were satisfied with officials' services.

The farmers also identified the types of information and knowledge that were most

important to them, namely:

- appropriate application of fertilizers and chemicals (38%),
- other alternative crops with available markets (20%),
- methods of increasing productivity (17%),
- appropriate production methods (12%)
- and others (13%).

Farmers' satisfaction with contract farming

One would expect that most farmers were not satisfied with the price agreement. This was also true in our case study (60% of the respondents). High proportions occurred to cucumber, potato and vegetable soybean (75% to 67%). Lower proportions were found in the case of maize seed (47.5%) and tomato (49%).

Price discount was usually expected when some part of the delivered produce was rejected. This did not normally happen except for tomato and potato. For tomato, the situation had changed since 1993/94. The resolution to improve terms of contract led to more certainty on price. Therefore, 62% of tomato farmers reported they received the price agreed in advance, only 2% of potato farmers reported they received discounted prices, and the farmers received the agreed prices for all other crops.

Except for cucumber farmers, those who grew other contract crops had varying numbers of choices with whom they would contract. Only two choices for maize seed and vegetable soybean but more were available for tomato and potato. However, only 25% of farmers reported they changed (at least once) to other contracted firms. Chances of changing contracted firms were influenced by a number of factors. The main factors included degree of competition among industrial firms (monopoly in case of cucumber, high competition in potato) and formality of the contract versus personal relationships between farmers and middlemen.

In spite of being satisfied with the firms, the farmers showed their desires for services from the firms. The most important was to raise the contract price closer to the prevailing marketing level (55%). Among others was a desire to reduce input prices (20%), especially in the case of vegetable soybean. (Wiboonpongse et al., 1998)

Performances of Contract Farming

Conceptually, contract farming is expected to provide several advantages for growers and agro-industrial firms. To farmers, they have an assured market, stable income, access to the firms' services, ease of credit access and technical knowledge. To the agro-industrial firms, they have assured supply of good-quality raw material at less fixed investment and low cost. Specific outcomes of the contract farming on these aspects discussed below are based on Wiboonpongse et al., (1998) except where indicated otherwise.

Farmers' income and risk and efficiency

In the Chiang Mai case study, 50% of the farmers earned off-farm income prior to, and after, joining contract farming. The contract had neither affected their off-farm activities nor their income from contract farming. However, after the contract, 74% of all respondents enjoyed higher household income. Only 5% reported their household income had reduced. Despite earning higher income after contract, some farmers (26%) could incur losses due to production risk and quality risk (all crops) and market risk (tomato). Most of these farmers (65%) had only 1 loss. The major problems were crop damage due to flood and diseases. (Sriboonchitta et al., 1996).

More specific comparison was limited to only 2 crops which had parallel markets, i.e., potato and tomato. Tables 1 and 2 show a series of net return and variation per rai of the crops

under contract and non-contract conditions. On average, the non-contract production of both crops provided slightly higher income (2.5–10%) but income instability of production for open market, for potato, averaged 185% over that of contract.

The variation of income earned from open market reflected price risk and production risk for both crops since the prices were determined by varying demand and supply in the market. However, the contract tomato farmers had higher income variation than their counterparts due to the informality of contract agreement and uncommitted responsibility of the processing firm. Potato price was more under supply control, even though it varied. On the other hand, the income variation of the contract came mainly from yield risk since prices were guaranteed and made known to the farmers in advance. Whilst, there could not be any difference in production management of contract and non-contract crops, the difference in income variations was highly affected by market risk.

Efficiency here refers to the combined effects of production and allocative efficiencies in order to minimize a unit cost and response to the short-run market situation. Comparison of the production costs between contract and non-contract was not available in other studies. Therefore the conclusion here should not be over-generalized. The unit costs of potato and tomato of the contract farms were lower than those of the non-contract farms. For vegetable soybean, it was compared with the grain soybean in terms of cost-price ratio. Again, the contract farmers outperformed the non-contract farmers. Farmers of both types proved to be profit-maximizers under their different production conditions.

Sukasem (1992) found that contract vegetable soybean, non-contract soybean, both types of tomato and potato farmers were all economic-rationale and highly-responsive to price (Wiboonpongse and Sriboonchitta, 1995).

Evidently, the contribution of agro-processing firms in productivity and quality improvement was pronounced. The frozen-food firm's new variety of vegetable soybean raised yield from 800 kg/rai (in 1991/92) to 1,300–1,700 kg/rai (in 1993). On the other hand, for loose contracts like tomato, the varieties used by farmers in the open market were those once introduced by contract firms. Therefore, fresh tomatoes available in the market were of processing type and consumers could hardly find table tomatoes.

The contract farming in Chiang Mai had presented an optimistic picture of assured raw material supply of desirable quality at low cost. Thirty years ago, when the word "quality" was foreign to farmers, the contract farmers did not realize the importance of specific varieties of seed, punctual harvesting and precision of cultivation practices. Lack of understanding led to improper care of crops and poor quality of produce, and thus it caused conflicts between the farmers and the processing firms on over-ripen tomato and other vegetables when raw materials of poor quality were being rejected. Both farmers and processing firms had long processes of learning and adjusting to install the raw material quality requirement. Presently, the contract farmers have gradually learned to accept the concept of "quality" while farmers in general, who sold their un-graded produce in the open markets, were less familiar with it (Survey, 2004). In the strict contracts such as vegetable soybean and Japanese cucumber, the contract farmers realized that the prices relied heavily on grades, and their income depended on the quantity of good grades they produced. Presently, the experienced farmers and additional new farmers (who grasp the concept quickly) appreciate the value of quality. The manager of one company revealed that his contract growers improve quickly, from grade B to A, within a few seasons. Fifty percent of new farmers, after receiving training and study tours, could deliver high-grade produce (Survey, 2004).

The agro-processing firms, for their own purposes, selected proper varieties and designed appropriate cultural practices and inputs in order to obtain high-quality raw material. Evidently, the farmers (in our case study) were ready to follow production instructions which coincided with the farmers' profit goals. The firms have been particularly careful in

screening farmers they contracted. Diligent and honest farmers received first priority. This is still true up to now. As mentioned, the farmers' production of contract crops was limited to ensure quality. The field supervision partly helped monitor production for quality produce as well as providing regular checks of predicted total production. However, the latter practice did not ensure supply of raw material. The firms, through middlemen, terminated the contract when a farmer was found to secretly sell his/her produce to open market or to other firms. This measure proved to be effective with most crops.

Table 1. Net return per rai from 1984/85 to 1990/91.

crop	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	Average	CV
Contract Potato	-	-	-	7,790	5,357	7,268	12,860	8,469	0.438
Noncontract Potato	3,931	5,346	1,620	15,288	12,847	-	14,395	8,676	0.818
Contract Tomato	3,435	960	6,874	4,424	8,623	2,910	5,686	4,658	0.556
Noncontract Tomato	6,120	4,279	4,536	4,381	3,710	6,095	6,706	5,118	0.226

Source : Gedgaew (1993)

Opportunities for farmers to gain new knowledge

Concerning technical knowledge, the contract vegetable soybean, cucumber and maize seed farmers had learned new knowledge directly from the firms' extension staff. For potato and tomato farmers, they had experiences and knowledge prior to contract. However, potato farmers did receive knowledge from universities under firms' support. Knowledge of fertilizer and chemical applications as well as intensive and scheduled production could be transferred to other crops. The potato farmers mentioned that they applied the same production techniques to potato produced for fresh market. Manarangsang and Suwanjindar (1992) reported differently that the farmers participating in contract farming projects of oil palm, pineapple and asparagus gained new technical knowledge from input suppliers who launched sales promotions (e.g., demonstration plots). The pineapple canneries were found to be most active amongst the others in disseminating knowledge to the farmers. The oil palm farmers were able to adapt the knowledge to rubber production.

However, Manarangsang and Suwanjindar (1992) noted that the knowledge learned from broiler production was difficult to apply to other types of agricultural production. As the farmers were closely supervised and instructed, they hardly exercised their decision in crop management, input purchasing and marketing their output.

Contract farming could lessen farmers' entrepreneurial ability but increase precise managerial skills. The farmers in contract prawn production in southern regions (OAE, 1989) and duck contract (OAE, 1991) in eastern regions expressed that they lost their freedom in farm management. This drew back their knowledge development and decision ability. Besides, they lost freedom to acquire inputs. The advantages and disadvantages were indicated in several contract farming studies (Table 2) (Wiboonpongse et al., 1998).

Table 2. Advantages and disadvantages of contract farming (CF).

Advantages/Disadvantages	Case of CF
Advantages	
1. Stable income	Baby corn ¹ , pineapple ² , vegetable seed ³
2. Higher income than non CF	Baby corn
3. Market certainty	Baby corn, pineapple, vegetable seed
4. Delivery service for inputs	Baby corn, pineapple, vegetable seed
5. Ease of obtaining input	Baby corn, pineapple, prawn
6. Loan made available through financial institutions	Baby corn, pineapple, vegetable seed
7. Learning new technology	Baby corn, pineapple, vegetable seed
8. Infrastructure: road and ditch	Prawn
9. Information, news and networking	Prawn
10. Quality development	Vegetable soybean, maize seed
Disadvantages	
1. Lack of freedom on farm management and decision	Prawn, duck ⁴
2. No freedom for buying input	Prawn, duck
3. No bargaining power, low price	Prawn, vegetable seed, asparagus ⁵
4. Slow or delay transportation from farm damaged the produce	Tomato

Source : Sriboonchitta et al. (1996)

Note : 1. OAE. (1993) 2. OAE. (1986) 3. OAE. (1990) 4. OAE. (1991a) 5. OAE. (1991b)

Rural Development

Literatures, in the early 1990's, asserted that contract farming had not done very well or had even failed in Thailand (Glover and Ghee, 1992 cited by Baumann, 2001) due to the competitive market. Both farmers and agribusiness had multiple potential business partners, products and non-agricultural income sources. Glover and Ghee believed that the condition of quasi-monopsony was crucial for contract farming. This is an indefinable conclusion when considering relationships between specific companies' contracts and specific farmers or groups. Farmers do seek favorable terms that they perceive to be better. In the broader sense, contract farming in Thailand, especially in the north had been increasing, at least prior to the economic crisis of 1997. The trend continued after the economic recovery, as confirmed by expansion of agro-industrial firms and production area. It is unlikely that firms would invest in the increasingly-expensive land to farm (for example, the official-appraised price increased by 13% to 23% during 2000–2003 and 2004–2007 in Chiang Mai, Payao and Mae Hong Son provinces). Any newly-opened land is not only costly but also in a less-favorable location and is more scarce.

Contract farming has been a key element of the Thai Government's development plan, reflecting a strategy of "private-led integrated agricultural development" (Glover and Ghee, 1992 in Singh, 2003 and Wiboonpongse et al., 1998). However, Siamwalla (1996) stated that in the past, the government has relied too much on the private sector to provide the new technology through contract farming. This can be successful in some cases, but not in all. Certainly a number of evidence support successful cases where smallholders acquired and applied new technology, more through contract farming than through traditional extension mechanisms, e.g., processing potato in Chiang Mai (Sriboonchitta et al., 1996; Ornberg, 1998; Falvey, 2002). In fact, the private sector in Thailand has played a significant role, and perhaps

a leading role in practice especially when dealing with farmers, e.g., in cases of the use of fertilizers, seed and chemicals, due to the profit motives of input suppliers and contractors.

With the limited work force of the public sector, government agencies should play roles in directing and facilitating private sector's implementation of technological transfer for fair business. This does not limit, but rather boost, the private sector's research and development and provide basic knowledge, e.g., open-pollinated seed varieties and alike.

As mentioned earlier, Baumann (2000) viewed that Thai markets were competitive. Farmers are able to acquire inputs, credit and buy on the open market. He believed that technical assistance and information were difficult to obtain in a volatile market which places farmers at a disadvantage with quotamen. He thus asserted that contract farming was not a suitable rural development strategy.

We do not totally agree with this conclusion. Our two-decade-long potato experience in northern Thailand suggests that contract farming has laid foundations for farmers in terms of production technology opportunity for risk management and a better income source. Potato growers in the main potato production area (Sansai District) today chose to grow processing potato and sell to brokers outside contract, as they are confident in production management and can afford to take risks in order to earn higher prices.

The case of potato supports the hypothesis that in the long run, contract farming could be a promising vehicle for agricultural development, provided the market is competitive.

To the question often asked, if smallest and poorest farmers are excluded from contract farming systems, there is no indication in the firms' criteria for selecting contract farmers. Wiboonpongse (1995) found that the farmers operating under contract farming were generally smaller than non-contract. Most of them were small farmers, their cultivated area was about half the average farm size of the upper north region (i.e., 3.74 to 4.8 rai for contract farming and 4.7–5.82 rai for non-contract farming, 2.5 rai = 1 acre). However, the potato growers have better economic conditions than the tomato and soybean growers in contract farming.

In annual crops like vegetable, firms value growers' diligence, hard working habits and honesty. Landless farmers do have equal chance to obtain the same quota providing they possess sufficient labor and crop experience. The situation could be different in tree crops and livestock (broiler and hog) where land and capital investment in animals is substantially higher, and despite the fact that farmers could obtain loans from cooperatives and BAAC.

CONCLUSION

Lessons Learned

This section attempts to summarize lessons drawn from the reviews as they relate to the objective of the conference and the mentioned hypothesis.

The conclusions are very much subject to case studies which are influenced by specific environments, so generalization in many instances is not possible and may not be appropriate. However, general directions can reasonably be stated as follows:

1. At the initial stage of contract farming development, it is necessary that both contractors and growers have clear understanding of the concept and the roles they play in order to reach an agreement.

Rigid contracts appeared to be inappropriate, as farmers do not fully understand the concept, nor understand standards of quality, or loss due to late or untimely delivery.

2. The rigidity of terms of contract which was purposively set forth for fairness to both parties across the board at the initial stage (and even recently in 2002) should not be applied to all types of commodities and to all, differing local social settings. The policy should be directed towards encouraging competition among firms for growers.

3. Farmers need time for technology adoption, also for working habit adjustment. New contract crops usually require precise working schedules and intensive management. With the complexity and novelty in the nature of new crop technology, farmers may not obtain high yields and desirable returns in the first year. Yield risk and quality risk appear to discourage farmers' continuation with contracts. The contract agreement designed to spread risks among parties have been appreciated as in the case of frozen-vegetable crops of new market entries. Minimum return guarantee to cover opportunity cost of farmers along with intensive and close supervision by firms to avoid crop failure could be an attractive alternative. It has long-term impact on farmers' skill, confidence in the crop performance and trust of the firms' commitment to the contract farmers.

4. Public sector has a role to play in technological and institutional interventions. Government needs to plan incentives and inducements which are proven to be appropriate for state to manage, e.g., the case of potato in Northern Thailand. Universities, with the support of firms and coordination of local officers, provide regular training in early years. Government policy encouraging group contract and import control on potato seed have proven effective interventions.

5. Although agribusiness took the lead in the contract farming system in Thailand, government policies augmented and provided a favorable environment for domestic and foreign investment through taxation and finance, and the 4-sector plan in response to the Sixth National Development Plan. For example, the success of tomato contract in the North-east was due to irrigation water and other infrastructures provided, i.e., road construction, a sound understanding by farmers of the contract-farming concept, efficient condition of government agencies, transparency in the development of procedures and timely supervision.

6. In annual crops, the contract farming system in the North appears to be an effective means to link smallholder growers to the market without excluding the poorest. No companies' criteria for farmer selection related to land size. Landless, but diligent and honest, farmers have an equal chance to join the project.

7. Contract farming grew in accordance with the growth of crop-industry. With rising land prices and high competition in the global market, it is irrational for agribusiness to invest in land. On one hand, firms need to minimize costs for given quality. On the other hand, competition has led firms to offer competitive prices for raw materials, e.g., in the case of potato, vegetable soybeans and eggplants. There is an emerging need for government biotechnology research into quality, efficiency improvement and cost reduction. Domestic firms with less capital for R&D also require adaptive research for specific locality.

8. To enhance farmers' management ability, farmers need information apart from technical knowledge. The case of potato growers is obvious, farmers chose to allocate risk between growing for contract and non-contract, or even terminated contract for higher return.

9. The commitment of local officers to promote the system is a key element of success at the initial stage. However, the incidence is not common. There should be a transparent non-financial incentive system to encourage involvement of local officers.

10. Contract farming seems to be a promising vehicle for agro-industry development. Design of arrangements needs to take into account local social and economic environments. To get the vehicle moving quickly and smoothly, it requires the efforts of local agencies in facilitating, guiding and monitoring the arrangement for fairness to all parties involved. It is highly important to control exploitation caused by private firms' superior bargaining positions with farmers.

11. Contract farming through price stabilization could help alleviate income risk. However, contract farmers were likely to be highly-responsive to output-input price relationships. The firms' quasi-monopsonistic power could dampen farm productivity. On the other hand, new varieties introduced by firms have had a pronounced contribution in productivity and

quantity improvements. But this role could be better performed when firms apply more competition pricing.

12. Thailand's experiences reveal that contract farming has been a successful means for market participation by the poor farmer majority. It has a potential for farmer's capacity-building in production and marketing, from contracting to open market participation.

13. Last but not least, as emphasized by Eaton and Shepherd "...the decision to use the contract farming modality must be a commercial one. It is not a development model to be tried by aid donors, government or NGO. Projects that are primarily motivated by political and social concerns, rather than economic and technical realities, will inevitably fail." Do we agree with them?

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APPENDIX

Case studies: Contract farming in northern Thailand

There were a number of studies in the 1980's and 1990's on different aspects of contract farming in Thailand.

As for Chiang Mai and the north, this includes The Northern Region Planning Office (1989), Sukasem (1992), Gedgaew (1993), Wiboonpongse and Sriboonchitta (1995), Sriboonchitta et al., (1996), Rawangsap (1997), Wiboonpongse et al., (1988), Ornberg (2003 based on her 4 surveys during 1994 to 1997) and Singh (2003).

Four case studies are drawn from Wiboonpongse et al., (1998) with some updated information from a survey in 2004, including Eisenberg Group, potato, vegetable for frozen vegetable firms and hybrid maize seed.

Northern Thailand is known as having comparative advantage in vegetable production. Numbers of vegetable and fruit processing firms have increased in the past decade (from 10 in 1984 to 100 in 1994). Among these, 36 firms are located in Chiang Mai, 16 in Tak, 10 in Lampang and 9 in Lamphun. Most of them are canneries. Numbers of potato chip and other potato product firms increased as the domestic demand for snack, chips, and French fries for fast-food restaurants increased rapidly. The existing frozen firms are also expanding their business.

The northern region has long experience in contract farming which began with the tobacco industry. The system worked successfully due to its market certainty since tobacco processing is a state enterprise. In 1973, a modern formal contract on vegetables was introduced. A foreign joint venture (Thai-Israel) began, which was a huge vertically-integrated corporation (The Eisenberg Group of Companies) running from farm production to processing and exporting. The Thai Farming Company was in charge of raw material supply in the streamline. The company cultivated tomato, bean, onion, etc., from its own plantation as well as purchased produce from contracted farms.

The Thai Farming Company was responsible for the supervision of crop production, starting from land preparation right through to harvesting and dispensing various inputs and farm equipment. The company also sought low-interest-rate loans (12% p.a.) for farmers. The company investment in supervision was enormous (construction of sub-office and hiring field supervisors).

During the early 1970s, the practice of growing crops for food processors was unknown to northern farmers. Written contracts were also unknown. Farmers dealt with companies directly, without middlemen involved (Laramee, 1975). To the farmers, educational level had some bearing on their ability to understand the imported technology. Besides, they lacked understanding of the commitment to deliver their produce to the firm, they sold their crops to local middlemen who offered higher prices in order to meet their need for cash. Disagreement often arose when farmers delivered produce untimely, and thus undesirable quality, e.g., tomato, were sometimes too green or too ripe. The general farmers in the north actively participate in cultural and religious functions. Coupled with lack of understanding, crops were not harvested at the right time for proper quality.

The failure of the Eisenberg Group was due to multidimensional factors which provided valuable lessons for later entrants to the industry. It was said that the Group was lacking in-depth feasibility studies to provide adequate understanding of social-economic backgrounds of the local farmers and economic environment (Wiboonpongse et al., 1998).

Potato: The marketing system of potato was somewhat complicated. There were two marketing systems, i.e., an open market and a contract system. However, the open marketing was not a free system. Among a few agricultural commodities in Thailand, potato supply for open market has been under government control via controlling imported tuber seed. This measure was used to limit supply and to keep prices in the fresh market stable. To obtain

seed, farmers needed to be members of The Potato Growers' Cooperative. In practice, farmers needed to sign up as members of existing groups for all kinds of crops (e.g., "Paddy Group") at the village level which was organized and initiated by government officials.

The role of the Potato Growers' Cooperative was significant as it controlled the supply of potato entering the fresh market so as to keep the price high and stable. It had a monopoly on the import of seeds for fresh market potatoes and decided on the seed quota for individual members.

The government did not impose import seed restriction on the processing potato production, since the processing firms absorbed all production. In 1992, Sukasem (1992) reported that two types of contract were observed. The complete contract between farmers and processing firms was made verbally. The firms provided seed, fertilizer and chemical inputs on credit to farmers, as well as close supervision on cultural practice. The farmers were committed to sell all production unguarded to the firms, at the price they agreed in advance.

The second type of contract was less complete. The processing firms made contracts with farmers' groups (not with individual farmers) under witness of the district agricultural extension officers. The officers were to act as coordinators and witness arranging meetings between companies and representatives from the farmers, groups, to supervise the formulation of contract and to ensure that both parties obey the contract. In 1995, there were altogether 8 groups of processing potato growers and 3 processing companies. These numbers increased by double when more groups were formed in the adjacent districts and new processors established in Chiang Mai and Lamphun provinces.

Some processing firms provided financial support for seminars and technical meetings for farmers. The seminars, meetings and an annual potato fair were organized by extension officers for the benefit of farmers.

The provincial government had favored and encouraged the contract farming. The office would grant permission to firms based on their business security status. Despite having responsibility in extension and technical services of extension, officers were found insufficient due to shortage of staff. However, their role as coordinator was pronounced. In San Sai District, where potato extension was successful, the district officer was said to be highly-active and supportive. The same officer was later assigned to promote potato production in an adjacent district. The success of contract due to local official support was confirmed by another incidence of the contract market for off-season mango in the same district (Wiboonpongse et al., 1995)

The price, for processing potato, was set in advance in each year and farmers would receive neither more nor less than that specified in the contract. Prices for different grades of potatoes were the same for all companies. Examples of guaranteed prices were 5.50 Bath/kg in 1993–4 and 5.90 Bath/kg in 1994–95 for big and medium sizes together. Small potato could not be used by the firms and received only 1.70 Bath/kg. The farmers preferred to get a minimum guaranteed price rather than a fixed, guaranteed price contract, since market prices for fresh potato were usually higher. Consequently, some farmers secretly sold part of their contract produce in the fresh market for the more-favorable price (as occurred in 1994).

Contract farming in potato has gradually changed. Presently, most growers either buy potato seed from the firms via brokers or use their own seed. They no longer have contract selling, but rather, sell their processing potato to brokers at market price (survey in 2004).

Vegetable (1989–1995): Vegetable soybean was produced and processed as frozen product for export to Japan. The Japanese cucumber was semi-processed into pickled cucumber and also for the Japanese market. Quality of both products was to meet international standards beginning with high quality of raw material in terms of physical properties and chemical-safety. Therefore the processing firms provided close supervision to farm

production, harvesting and post-harvest handling.

The agro-industrial firms selected the varieties (vegetable soybean) which provided high quality and high yield. Seeds were imported from Taiwan. The largest frozen firm in Chiang Mai started in 1989. It was a joint venture and it was one of the projects under the 4-Sector Plan, promotion program. The company had seriously developed working relationships with farmers to assure supply of produce matching market demand, while also conforming to the high-quality standards. The company initially contracted 4,000–5,000 farmers in Chiang Mai Province, and the number increased to 20,000 farmers in 8 provinces of northern Thailand (Bloomfield et al., 1996), and to almost 30,000 farmers in 2004.

Based on the firm's quality strategy, each farmer was allocated only limited acreage for the contracted crop, based on the farmer's ability to maintain quality standards. For each contract, a farmer was usually limited to 1 rai of crop (1,600 square meters). In some cases, as the farmer demonstrated the capability to maintain quality, he might receive a quota of 1.5–5 rai. Besides seed, the firm provided its farmers with fertilizer, chemical inputs on credit, as well as cash for hired labor for grading snap bean. The firm's direct link with the farmers was its 20 extension agents and 100 brokers. The extension agents, who had university degrees in agriculture, were stationed in the villages. They trained farmers in the cultural practices. They met together, at the company in Chiang Mai, to report progress and problems and to receive instructions for further activities.

The brokers, many of whom were village headmen, acted as middlemen. They made direct formal contracts with the firm but informal contracts with the farmers.

The brokers obtained seeds, fertilizers and chemicals from the company for distribution to the contracted farmers. They collected the harvested crop from the farmers and delivered it to the processing plant. The brokers worked on a commission basis which was based on quality of the produce delivered as well as the quantity. The brokers had to be knowledgeable and be able to diagnose field problems. We witnessed the close working relationship between the brokers and the farmers in vegetable soybean farming, and even when the control was informal, there was rarely incidence of conflict between the two parties.

The contracted farmers were required to follow a fertilization program but they could decide on insecticide use on their own. The farmers were also required to sell all marketable produce (grades A and B) to the company at prices fixed at the beginning of each production year. The prices usually varied from year to year depending on the processed product market in Japan.

Hybrid Maize seed: Farmers in the upland area of Phrao District used to grow maize, cotton, peanut, baby corn and chili prior to adoption of contract farming. Most of the contract farmers were from the Land Settlement Cooperative of Phrao (LSCP). In 1995, two multinational firms shared contract production of maize seed in cooperation with the LSCP. The farmers did not make direct contract with the companies but through the LSCP (if they were members) or brokers who were responsible for seed distribution from the companies. The direct link to the farmers was via technical supervision in the field. For seed production, the farmers following instructions from the firms was compulsory. Operations on land preparation, fertilization and especially cross-pollination management, were scheduled precisely. To ensure purity of seed, extension or field staff of the firms worked closely with the farmers. The farmer was to cut down his whole crop if he did not hand-pollinate the crop in a timely manner. There was no compensation for this mistake.