CHAPTER 6

LIMITATIONS AND CONSTRAINTS FOR CONVERTING TO PESTICIDE-FREE VEGETABLE PRODUCITON

6.1 The past experience in the North

Chaiwan *et al.* (1999) studied the factors influencing farmers' decision on adopting sustainable agriculture in Mae Ta sub-district, Lumphun province, had shown that the main contributing factors were within community factors and external factors. The within community factors included farmer knowledge, farmer confidence, land ownership, working capital, and strength of community networking. The external factors were marketing systems, relationships with NGOs, and governmental officials. The research found that farmers who were looking for new alternatives were the first group that adopted sustainable agriculture and the next group was the farmers who would like to follow the neighbor and produced for household consumption.

Paranakian (1999) employed some sociological factors to explain the growers' adoption of IPM practices. The research indicated that the main factors were associated with adoption included appropriateness of IPM technology, source of technological information, government subsidy scheme, awareness of the danger of hazardous substances, organizational membership and the growers' perceived benefits of the adoption of IPM technology.

Pinthong (2000) studied factors relating to the success of the farmer growing non-toxic vegetables in Tambon Mae Tha, King Amphoe Mae On, Chiang Mai Province revealed that farmers' awareness on declining ecological conditions, kinship relation, and strong local organization enhancing the flow of information and knowledge were the major internal factors. While the external factors were role of mass media in providing information on devastating effects of main stream

agrochemical based production systems, association and partnership with NGO-led sustainable agriculture network, and market opportunities of non-toxic vegetable production. The networking activities such as people forum, study tour, etc. helped speed up the adoption.

Srikittikul (2001) studied the problems and obstacles of growing pesticide safe vegetables concluded that four factors discriminating pesticide safe vegetable growers and non-growers were attitude to self-reliance, farmers participation, family gross income and attitude to health. Problems and obstacles of pesticide safe vegetable growing were that less extension contact, lack of knowledge by farmers, low seed germination, disease and insect pests, less market output and water resource problems.

Sriwirat (2002) studied on the factors affecting farmers' adoption of safe use of pesticide in vegetable product in Songkhla province found that farmer adoption was related to farmer experience, credit source and extension workers' contact. Some problems encountered by farmers were disease and pest, lack of water, lack of extension workers' suggestion, low prices of products and good practices.

6.2 Potential of Ban Ping Noi in pesticide-free vegetable production

The major advantages of farmers in Ban Ping Noi were that they had formed good working relationship with Tambon and district agricultural extension agents, with University, and local trading partners. Farmers had over decades of vegetable production experience. The production plots were contiguous and the owners were operators. Local organization was strong with capable group leadership.

In relation to pesticide-free vegetable production process, farmers in Ban Ping Noi had been exposed to two times of FFS learning approach. One was conducted by the DOAE in 2001, and the recent by the research team of the MCC in this project in 2003. The site had been used by the district agricultural extension office as a training and study site for farmers from other areas.

The strong kinship relation and community cohesiveness also helped facilitate the flow of information and knowledge. A few farmer leaders were committed to conversion to pesticide-free vegetable production. One farmer, in particular, engaged in initiating his own experimentation, and had become a full converter. So all the

above observations pointed to the fact that Ban Ping Noi had the potential of producing pesticide-free vegetable production.

6.3 Problems in pesticide-free vegetable production

There were a few problems that would limit the adoption of pesticide-free vegetable production in Ban Ping Noi, despite the fact that the area seemed to have much potential for widespread production of pesticide-free vegetables as discussed earlier. The key problems will be presented as follows:

1. Marketing alternatives. All farmers indicated that marketing was the first problem in pesticide-free vegetable production. Pesticide-free vegetable market was still small from farmers' perspective. The main marketing outlet was driven by, and organized by the MCC. Framers in Ban Ping Noi had set up their own marketing outlet at Lumphun Jatujak, Lumphun province, but low daily demand of pesticide-free vegetables had forced farmers to abandon the project. Farmers in Ban Ping Noi were used to wholesale arrangement with local traders, who would make order for large quantity of a few selected species of vegetables. With pesticide-free vegetables, only small quantities were harvested daily for a numbers of selected markets. Income from such sale was much smaller than that of the conventional system. Habermann (2003) reported that the main constraint for PFV farmers in Ban Ping Noi was the dependency on wholesalers. Farmers decided on a less diverse planting design with high ecological and price risks, because they believed this would wield higher quantities and harvest. It was therefore deemed more suitable for wholesales shipment.

2. Too much time would have to spend on marketing activity. Table 6.1 was the comparison between value and net income from selling pesticide-free vegetables in 4 markets; Lumphun Jatujuk market (Lumphun province), Hang Dong district office (Chiang Mai province), Kad Gong Kong at Faculty of Agriculture, Chiang Mai University, and MCC shop. Net income, distance from field and time spent since leaving till arriving home affected farmers' decision on going to market. The result found that MCC shop was the most effective market that the farmers preferred to. For the distribution to MCC, apart from production cost, farmers had paid for transportation cost that ranged from 30 to 90 Baht per round-trip depended on the

amount of vegetables, and a 20 percent commission for the students to distribute PFV both within and outside the university campus. They had not wasted their production time to engage in marketing that ranged from 8 to 13 hours. However placing in the shop was effective in case of shop located in the community and had fast distribution with less unsold vegetables.

Table 6.1 The comparison of value and net income from selling pesticide-free vegetable

Market place	Average value (Baht)	Average cost (Baht)	Net income (Baht)	Distance from field (km)	Timing (hours)
Kad Gong Kong	1335.00	1004.50	330.50	25	13
Lumphun Jatujuk	371.30	337.80	33.50	10	9
Hang dong district office	389.00	274.00	115.00	12	8
MCC shop	758.00	424.50	333.50	25	0

Source: Survey, 2003.

3. More labour demand for PFV production. PFV production needed more intensive labour particularly on weeding. The limited household labour was the constraint of PFV production. Table 6.2 displays labour needed in conventional vegetable production and Table 6.3 shows the labour requirement for PFV production. The result found that PFV production was more labour intensive than the conventional production, especially on land preparation, watering, weeding, and harvesting. Farmers paid more attention on land preparation, broadcasting in the large planted area was replaced by the raise bed planting, manure fertilizer and dolomite were utilized for improving soil properties. Watering method differed from the conventional production, spreading water with pump as normally carried out in the conventional production system was not suitable and could be damaged for vegetables in the small plots. For PFV production, selective harvesting was preferred to bulk harvest. The post-harvest handling was also necessary for PFV as the product had to pack in plastic bag for convenience for the consumers. However, the farmer who had changed his production to PFV completely indicated that two family labours were enough for planting area of two rai of PFV. Diverse species of vegetables planted on

small plots would make labour use more efficiently than with one single species on one large plot.

Table 6.2 Total labour use in each activity in the conventional planting.

Unit: minute per 10 sq.m.

Management	Variety				
	Pak Choi	Eggplant	Chili	Garlic	Chinese cabbage
Land preparation	2.0	4.6	3.0	3.0	0.8
Planting	0.8	6.6	5.1	45.0	2.6
Mulching	0.4	-	-	-	-
Replanting	-	0.1	2.2	-	-
Withdrawing	7.4	1.1	-	-	-
Spraying herbicide	-	2.7	1.0	2.3	11.6
Spraying pesticide	1.0	4.6	3.7	1.7	30.0
Watering	9.9	5.3	22.5	6.0	22.5
Chemical fertilizing	1.3	2.8	8.1	7.9	13.5
Manure fertilizing	-	-	0.9	-	-
Weeding	7.8	2.7	1.3	-	-
Harvesting	14.3	88.7	88.0	60.0	9.0
Total	44.9	119.2	135.8	125.9	90.0

Source: Survey, 2003.

Table 6.3 Total labour use in each activity in pesticide-free vegetable production

Unit: minute per 10 sq.m.

Variety	Land preparation	Putting dolomite	Planting	Replanting	Thinning	Spraying bio-extract	Watering	Chemical fertilizing	Manure fertilizing	Weeding	Harvesting	Total
Pak Choi	4.3	0.1	2.1	-	-	-	43.2	2.0	0.3	30.8	20.1	102.9
Spinach	52.0	-	16.4	-	3.5	3.3	170.7	5.8	3.5	149.8	77.5	482.5
Chinese kale	41.3	-	3.4	-	-	2.0	96.8	4.7	2.2	43.5	35.3	229.2
Water spinach	15.9	-	4.5	-	-	0.2	68.5	2.5	0.1	18.1	49.3	159.1
Hong Te	31.8	19.6	13.5	-	-	2.4	164.5	2.4	2.4	49.0	59.4	345.0
Shallot	33.7	-	72.8	-	-	3.6	217.3	3.6	-	12.6	170.7	514.3
Chinese amaranth	11.4	-	9.5	-	-	-	225.6	17.7	-	-	535.4	799.6
Coriander	17.0	-	4.4	-	1.7	-	70.3	12.5	1.3	64.3	130.0	301.5
Sweet corn	4.2	-	2.4	0.2	0.3	0.9	33.9	1.8	1.5	3.6	-	48.8
Japanese cucumber	50.0	-	25.0	-	-	-	112.5	12.5	4.2	100.0	33.3	337.5
Angel loofa	13.3	-	26.7	-	-	-	61.3	22.2	-	106.7	168.0	398.2

Source: Survey, 2003

Table 6.3 Total labour use in each activity in pesticide-free vegetable production (cont.)

Unit: minute per 10 sq.m.

Variety	Land preparation	Putting dolomite	Planting	Replanting	Thinning	Spraying bio-extract	Watering	Chemical fertilizing	Manure fertilizing	Weeding	Harvesting	Total
Green leaf mustard	133.3	-	16.7	-	-	-	666.7	16.7	-	266.7	133.3	1233.4
Brush bean	15.0	-	15.0	-	-	-	100.0	10.0	-	120.0	-	260
Lettuce	188.9	-	9.3	-	-	-	148.1	11.1	-	622.2	177.8	1157.4
Celery	3.2	-	0.8	-	-	-	32.5	2.4	-	38.1	88.9	165.9
Chinese cabbage	25.0	-	12.5	-	-	-	215.0	15.0	-	-	375.0	642.5
Cabbage	0.3	-	13.5	1.5	-	1.9	9.8	3.0	3.0	-	2.3	35.3

Source: Survey, 2003.

4. Different species showed different cost and benefit relationship. Cost and return of different species of vegetables produced with pesticide-free system were different. Table 6.4 displays the average cost and return of PFV in the first crop under farmer management practices. The higher cost of spinach indicated that farmers were unfamiliar with the production practice of this crop, as it was introduced to farmers for the first time. Pak choi, which was a common vegetables grown widely in Ban Ping Noi, presented less production problem, and could be recommended for farmers who wanted to convert their production to pesticide-free.

Table 6.4 Average cost and return of PFV in the first cycle of production in Ban Ping Noi, Chiang Mai. 2003

Unit: Baht/sq.m

Variety	Inputs	Labour	Total cost	Return
Spinach	6.62	44.28	50.90	30.84
Pak choi	0.82	4.72	5.54	10.96
Chinese kale	1.48	4.67	6.15	5.82
Hong Te	3.47	2.21	5.68	4.05
Water spinach	3.39	6.89	10.28	11.50

Source: Survey, 2003.