การปรับเปลี่ยนไปสู่ระบบการผลิตผักอินทรีย์ของเกษตรกรรมบนที่สูงอำเภอสะเมิง จังหวัดเชียงใหม่

Transforming to Organic Vegetable Production Systems Of Highland Agriculture, Samoeng District, Chiang Mai Province

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Abstract: The study aimed to study farmers' practice and transforming to organic vegetable farming. Data were collected using the semi-structured questionnaires and focus group discussion from January to April 2013. The findings revealed that farmers in the study areas had experience in organic vegetable production. Organic vegetable farming practice included land preparation, seed, type of crop, planting method, soil nutrient management, pest management, weed management and harvesting. It is suggested that farmers who are serious about transforming their vegetable production to an organic vegetable production system should start from a pre-transition period, by slowly reducing conventional practices such as using fertilizer, pesticides and beginning organic practices. At present the reduced chemical use in agriculture is an alternative agriculture practice of farmers. The trend toward organic production is driven by great concern of consumers regarding possible negative impacts of chemicals on their health. For these reasons, organic production is the best solution to the present problems.

Keywords: Transformation, organic agriculture, highland

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บทคัดย่อ: การศึกษานี้มีวัตถุประสงค์ คือ เพื่อศึกษาการปฏิบัติและปรับเปลี่ยนในการผลิตผักอินทรีย์ของเกษตรกรรวบรวมข้อมูลโดยใช้แบบสัมภาษณ์กึ่งโครงสร้างและประชุมกลุ่มผู้เกี่ยวข้องการเก็บข้อมูลตั้งแต่เดือนมกราคมถึงเมษายน ปี พ.ศ. 2556 ผลจากการศึกษาพบว่า เกษตรกรในพื้นที่ที่ทำการศึกษามีประสบการณ์ในการผลิตผักอินทรีย์ ใช้หลักเกษตรอินทรีย์ในการผลิต เช่น การเตรียมดิน การเตรียมเมล็ด ประเภทของผัก วิธีการปลูก การจัดการธาตุอาหาร การจัดการแมลง การจัดการศัตรูพืช และการเก็บเกี่ยวเกษตรกรผู้ที่จริงจังในการปรับเปลี่ยนระบบการผลิตไปเป็นระบบการผลิตผักอินทรีย์ โดยเริ่มจากการลดการใช้ปุ๋ย สารฆ่าแมลง และเริ่มการปฏิบัติแบบอินทรีย์ เช่น การใช้ระบบการควบคุมแบบชีวภาพ กล่าวโดยสรุปปัจจุบันนี้การลดการใช้สารเคมีในการผลิตเป็นอีกแนวทางหนึ่งในการทำการเกษตรของเกษตรกร แนวโน้มการปรับเปลี่ยนการผลิตไปเป็นเกษตรอินทรีย์เป็นผลกระทบจากการความกังวลของผู้บริโภคเกี่ยวกับสุขภาพที่มีผลในด้านลบ เมื่อได้รับผลกระทบจากการบริโภคอาหารที่มีสารเคมีตกค้าง จากเหตุผลดังกล่าว เกษตรอินทรีย์จึงเป็นทางออกที่ดีที่สุดของผู้บริโภค

คำสำคัญ: การปรับเปลี่ยน เกษตรอินทรีย์ พื้นที่สูง

Introduction

Thailand is largely an agricultural country with a land area of 513,115 square kilometers and a population of around 66 million. The agricultural sector comprises mainly of small farms, 5.1 million in number, and farmers engaged in agriculture constitute 59.66 percent of the total population. The growth rate of the gross domestic product (GDP) from agriculture increased from minus 4.6 percent in 1990 to 8.9 percent in 2009. The gross domestic product (per worker) from the agricultural sector in 2008 was reported to be 381.1 million Baht (Nath, 1998).

Before 1940, when the population was smaller than it is today, it was common for farmers throughout the world to grow organic food, and yields were similar to those of prehistoric times. The farmers focus on growing enough food to feed themselves and their families. However, as the world's population increased, growing organically was no longer a feasible way to feed society. A more efficient way to feed a population that had almost doubled in size became necessary. This led to the introduction of intensive technologies, including fertilizers, mechanized cultivation, and biocides such as pesticides and herbicides, which helped produce greater yields for the larger population. These farming practices became integral parts of what we know as conventional farming (VanTine and Verlinden, 2003). Today the farmers in Thailand face a number of problems as the Thai government promoted high input, export orientated agricultural systems to increase the country's growth rate. This growth policy has resulted in retardation of the country's agricultural sector. Poor farm management techniques and inappropriate use of agrochemicals has resulted in soil erosion and soil exhaustion, further damaging the agriculture sector (Alternative Agriculture Forum, 1992).

Organic farming systems are a key to sustainable agriculture and have captured the interest of many countries throughout the world in response to the need to sustain the health of soils, ecosystems and people. Because of its commercial viability, it may provide solutions to the current problems of unconventional agriculture (Rovai and Jordan, 2011).

Samoeng district is a small farming community of perhaps 5,000 inhabitants roughly 50 km. from Chiang Mai and cool all year round which makes for temperate fruits, flowers, medicinal plants

such as strawberry and temperate flower like roses and herbs. Currently, this area has chemicals and pesticides used increasingly. Because the villager had been fired from their job since the economic is downturn. It must be returned to be farmers in the village. The students who graduated but cannot find work outside the area, they return of farmers in the village as well. The people in the village are farmers, and then there is the need to increase productivity even more to increase family income and improve the family's economic status. As a result, the village has more population of agriculture and expanded more agricultural area in the village. From the above reasons as a result, the village has the use of chemical pesticides increased. In addition, the village has also been affected by the entry of venture floriculture business that they used high effective chemical in larger quantities than the farmers in the village. It also affected to pests of flowers garden move away to interference productivity of farmers in the village instead. Farmers in the village had to use chemical pesticides strengthened and frequencies used more often than ever before. As a result, the village has the use of chemical pesticides is increasing as well. Farmers in the villages affected all chemical used to their health.

However, some farmers succeed in converting to organic vegetable farming, but some remain in chemically based farming systems. This might be true for every farmers as well, and therefore leads to low levels of perception and adaptation in organic vegetable farming, which would indicate that there is not enough information on the farmers' side about organic vegetable farming. So it must to be exploring how much perception of organic vegetable farming farmers already have, and how they would like to be more adapted. Therefore, this research attempts to explore farmers' practice in conversion to organic vegetable farming under vulnerable conditions, and to assess farmers' perception and adaptation under The North Organic Standard Association (NOSA).

Materials and Methods

Population and sampling technique

The purposive sampling technique was used to collect data from the organic farmers of Chiang Mai Organic Agriculture Cooperative. A list of farmers for each district was obtained from Chiang Mai Organic Agriculture Cooperative officials at the group level. Interview was carried out from January to April 2013 in Chiang Mai province. The study surveyed and collected data from 24 organic farmers in Samoeng district. Farmer's practice and transformation in organic vegetable farming, the data was gathered from interview with questionnaire and analyzed by using descriptive statistic.

Results

Organic production practice

1) Land preparation

Vegetable plot prepared by ploughing soil 20-30 cm deep (the depth of ploughing has direct effect upon vegetable root system), sun drying soil for 7-10 days, making ridge at 1.2-1.5 meter width and at the length depending on the population of planted vegetables. In rainy season, planting was done in single row with the ridge prepared higher for good ventilation, enough sunlight through vegetable plot and good drainage system to prevent flood/logging. These methods permitted the prevention of pest outbreak. Farmers ploughed soil before sowing seed or planting with the primary purposes of turning over the upper layer of the soil,

bringing fresh nutrients to the surface, while burying weeds and the remains of previous crops, allowing them to break down. Ploughing also aerates the soil, and allows it to hold moisture better. In modern use, a ploughed field is typically left to dry out, and is then harrowed before planting.

2) Seed

Farmers generally collected seeds from the last harvest season. In the case of Chinese vegetables that they cannot produce or collect the seeds themselves, they could get some from the Ministry of Agriculture and Cooperatives or simply bought the seed from stores.

3) Type of crop

Farmers grew Chinese kinds of vegetables which are short-season crops such as cabbage, broccoli, cauliflower, Bok Choi cabbage, Chinese celery, and carrot according to the crops' growing seasons. They also intercropped short-season native vegetables such as local tomato, spiny amaranth or pig weed, Indian tree basil, native green cabbage, rattail radish, and yard long beans with Chinese vegetables as well as with such perennial plants as acacia pennata, Gymnemainodorum Decne, chayote, eggplant, Turkey berry or devil's fig, bird chili, and herbal plant like galangal and lemon grass. If there was a pond in their farming area, they would as well culture fish. Animal pen and den were also built to raise chicken, swine, and cattle which could feed on crop residues and other farm wastes. Meanwhile, the animal excretes and faces were utilized as organic fertilizer.

4) Planting method

Mixed cropping of vegetables was common in this area. Diverse varieties of vegetable both native and Chinese kinds were cultivated year round depending on season. Many kinds of fruit tree were also established in large number. Large livestock were often kept in pen or stable while small animals like chicken and duck were allowed to roam freely for food in farm plots and areas nearby. Pond on farm was also common for raising fish.

5) Soil nutrients management

Soil fertility is the key factor for organic crop production in strengthening crop to resist pest outbreak. It can allow cultural practices without the use of pesticides which have impact on crop quality and nutrition. New area usually has high soil fertility which is an advantage for organic crop production. Low soil fertility area should be manipulated for improvement in soil chemical properties including pH and soil nutrients, in biological factor like soil microorganism and in physical properties (soil texture) for good drainage system and good soil aeration for the survival and viability of soil organisms. One of the best ways in organic crop production is the use of organic fertilizer in the forms of green manure and compost. Moreover, green manures are also used to increase the fertility of the soil in the case of organic farming.

6) Pest management

The farmers practiced cultural control by using existing biological measures such as proper cultivation and crop planting pattern (scheduled planting in specific period, so pests will be minimized as they will have no host after crop harvest) They learnt the life cycle of specific insect pests. Hand picking is a labor-intensive but effective way to control insects large enough to be seen. Cabbage worms can often be spotted, and many caterpillars are easy to grab. All caterpillars eat plant material, but some eat only a little.

Cutworms and slugs can be captured at night, if farmers patrol plants with a flashlight. But by hand picking, one will be forced to look at plants closely and he will soon become familiar with all the insects in his farm, bad ones and good ones.

7) Weed management

In this area, farmers avoided the use of herbicides which, like pesticides, leave harmful residues in the environment. Beneficial plant life such as host plants for useful insects may also be destroyed by herbicides. Farmers controlled weeds by hand weeding. However, at the beginning of transformation process, farmers used herbicides in the heavily weed infested fields, where hand weeding was not effective but the group monitoring systems stimulated farmers to reduce and stop using herbicide and apply hand weeding for organic management.

8) Harvesting

Hand picking was practiced and frequency of picking depended on the variety of vegetable.

From the study on organic farming practices, it is evident that farmers in Samoeng shared many similar features because they all received the training and field visit experience from the same sources such as extension staff, researchers from university. There was slight difference in terms of land preparation and soil management which varied with the land and soil conditions in each locality, and in terms of farmer's decision to cope with emergency and management problems which varied according to each individual's farming experience. Additional background information and cultural practices are presented in Table 1.

Transformation from chemical to organic farming

Organic production has been practiced in Samoeng district since 1995. The biggest challenge that farmers face is changing their thinking. Most current organic farmers switched to organic before there were financial incentives. They had environmental concerns. There are not many farmers from that segment left. Most farmers transitioning to organic today do it for financial incentives, which is fine. But they have to adopt the organic philosophy and mindset. Otherwise, it will be difficult for them to make it through the three-year transition to organic. Many farmers whose transition based on economics alone don't last two or three years because there is not enough motivation for them to last. But it is often not until the fourth and fifth years when the real transition in the mind of the farmer happens. From a financial point of view it makes sense to ease into organic and not risk financial disaster. The problem is farmers cannot change approach or mindset to organic if they're still farming conventionally. They would not open to organic solutions to pest control if they are still spraying pesticides.

Some benefits farmers will start noticing on their land during the transition are that the soil becomes softer with less compaction, an increase of beneficial insects and bird populations, and weeds, although present, do not affect crop yields in the way you might expect. Financially there will be less pressure from financing input costs, and the net income tends to be higher in relation to input cost than in conventional farming (Table 2).

Table 1 Current production practices used by organic vegetable farmers in Samoeng

Items	Farmers n=24	
	Frequency	%
Water resource		
- irrigation	13	54.17
- natural	3	12.50
- ground water	8	33.33
Soil preparation		
- compost application	10	41.67
-ploughing for weed control	9	37.50
-ploughing and drying soil for at least 7 days	5	20.83
Labor for soil preparation		
- human	8	33.33
- animal	2	8.33
- machine	14	58.34
Soil type		
- loam	13	54.17
- sandy loam	7	29.17
- clay	2	8.33
- sandy	2	8.33
Soil fertility		
- very good	10	41.67
- good	6	25.00
- fairy good	7	29.17
- poor	1	4.16
Weed management		
- hand-pull	9	37.50
- cutting	15	62.50
Pest management		
- predatory insects	3	12.50
- yellow trap	3	12.50
- light trap	3	12.50
- plastic or hay covered plot	4	16.67
- net	10	41.67
- bio-extract	1	4.16
Harvest		
- scissors	8	33.33
- picking	16	66.67
Post-harvest		
- refrigerator	5	20.83
- plastic bag	6	25
- foam packing	5	20.83
- basket	8	33.34
Market channel		
- shopping mall	4	16.67
- merchant	6	25
- local market	1	4.17
- organic market	13	54.16
How to sell products		
- retail	10	39.41
- middleman	14	60.59

Table 2 Summary of transformation period in vegetable production of Samoeng

Detail	Samoeng
Past period (1995-2005)	
1. Reason for change	Health/Debt
2. Group member	5 HH
3. Land tenure	Rent/own
4. Planting area	Upland
5. Seed	Buy
6. Farming systems	Monoculture
7. Market management	Individual
8. Market place	Middleman
9. Organization support	-
10. Products	Strawberry, vegetable
11. Harvest	Hand
12. Organic training	-
Transition period (2001-2010)	
1. Reason to change	Debt/health
2. Group member	20 HH
3. Land tenure	Rent/own
4. Soil preparation	Tractor
5. Seed	Collected/buy/free
6. Farming systems	Integrated
7. Market management	Group
8. Market place	JJ market
9. Organization support	NGO
10. Products	Stevia rebaudianaflowers, Chrysanthemum tea, Chinese vegetables
11. Harvest	Hand
12. Certification	NOSA
13. Organic training	Organic practice
Current period (2011-2013)	
1. Group member	27 HH
2. Land tenure	Rent/own
3. Planting area	Upland
4. Seed	Buy/collect
5. Farming systems	Integrated
6. Market management	Group
7. Market place	Middleman and local market
8.Organization support	NGO/cooperative
9. Products	Strawberry, vegetable
10. Harvest	Hand
11. Organic training	Organic practice

Discussion

It was concluded that the organic vegetable farmers will be able to succeed and obtain reasonable profitability in organic vegetable farming by carrying out adaptation and organic management. Furthermore, training and information about organic farming, standard and technology are very important for farmers to change their practices to enhance knowledge on farming, technology, and production and market situations. Networking and organic farming model should be encouraged for the sharing to organic agriculture knowledge and the promotion of network among different farmers groups, including government agencies and private sectors. The factor of land preparation was positive and significantly contributed to farmer's adaptation toward organic vegetable productionthe findings are in agreement with the findings by Pichetporn (2003) who found that attended farmers had brought more about knowledge into practices. Also, Thong-on (2015) found that the community rice production process at Ban Nong Ping Kai was produced based on the principles set forth by Bureau of Rice Research and Development (BRRD). Ban Nong Ping Kai farmers used a mixed method of community learning process and indigenous knowledge. These included learning to question, learning to search, learning to construct, learning to communicate and learning to service in the community's learning process.

In Samoeng district, farmers explained that he started increasing the diversity of his crops to fill in gap areas or to keep continuous work, as year round work was available for the people working on the farm. Another strategy that these farmers described is having a diversity of tasks that workers can do in a given day. On one organic strawberry farm, farmers will typically work on several different operations in a single day even though the farmer noted this makes supervision more complicated. Those are perception and adaptation in organic vegetable farming among farmers, enabling them to integrate organic farming in their livelihood strategy in a sustainable way.

Conclusion

The reason that farmers try to convert their practice from chemical to organic because it uses their traditional knowledge of the natural environment and of the unique relationships between various crops or animals and the environment. It is thus somewhat easier for small farmers to understand. At the same time, it avoids chemical inputs, which for small farmers are generally higher priced (because of increased transportation costs in rural areas and higher unit costs brought about by lower volumes), and to which they have not become as dependent as large-scale conventional farmers often have. Furthermore, the health factor of not having to handle harmful chemicals is particularly important to small farmers.

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