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Socio-economic Implication of Medicinal Plants Grown by Hill Tribes in Northern Thailand

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Introduction

Kinki University and Chiangmai University have been conducting a research project since 1989 on medicinal plants in the northern Thailand. Main objectives are to up-grade living conditions of Hill tribes, who were compelled to grow opium poppy which caused the formation of drug. Thai goverment and the United Nations were eager to eradicate opium cultivation in the so-called "Golden Triangle" bordering of Thailand, Laos, and Myanmer. But, so far no remarkable achievement was observed.

Both universities tried to introduce new and high value medicinalplant (e.g. Jinsen Panax) and to find indigenous Thai medicinal plants which may have some impact on curing high per tension and diabetes merits.

This report highlights the marketability of these medicinal plants in Thailand and near-by countries.

Marketing Prospect of Medicinal Plants

There are hundreds of species of medicinal plans existing world wide. Some of these plants are cultivated only in limited scale due to the uncertainty of the market's demand and the specific characters these plants have. In addition to these, medicinal plants are often used for pharmaceutical purposes, and thus, have more restrictions for the purchase and selling when compared to normal agricultural products. In Thailand, people have been cultivating wide variety of medicinal plants for more than 300 years.

The market of medicinal plants can be classified according to its usage as follows:

Direct consumption
Pharmaceutical and health
Food and beverage
Cosmetic

1. Direct consumption

1.1 Types of business, business operation, and types of products

According to field surveys, the following facts have been identified:

66.13% of the traders were individual owners, 27.42% were partnership owner with company, 6.

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45% were traders.
61.29% of the medicinal plants were traded in Bangkok and 38.71% in the suburbs.
Most of the traders were engaged in the wholesale business (59.68% of total traders)

The medicinal plants in the market are classified into two major groups; Fresh or dry form products. 28 entrepreneurs or 45.16% of the total entrepreneurs sold primitive medicine and Chinese medicinal plants for food flavoring in the dry form. 34 entrepreneurs or 54.84%of the total entrepreneurs engage in the trading of fresh medicinal plants. Fresh products are consumed as food or used as ingredients of chilli sauce.

1.2 Types of medicinal plants for direct consumption

(Dry Product)

According to the interview with 28 traders who sold dry products, it was understood that 14 traders or 50% of them were selling *Curcum Tumeric*, the remaining 50% were selling other medicinal plants, such as *Siam Cardamom* (Krawan), *Zingberaceae* (Phlai), *Bustard Cardamom* (Reo), peper, and *Acanthaceae* (Fah-Talaichon).

(Fresh Product)

34 traders or 47.06% of fresh medicinal plants traders sold chilli. The remaining 50% sold *Kaemferia Pandurata L.* (Krachai), fresh ginger, young pepper lemon grass (thakrai) etc.

1.3 Marketing Channel

The people who are engaged in the trading of medicinal plants can be classified as the following:

- *Natural assembler*

  Natural assemblers are people who collect and harvest medicinal plants, which grow in the forest, and sell such plants to local wholesaler and retailer. If harvesting is in great volume, the trader will sell directly to traders in Bangkok or processing industries.

- *Growers*

  The growers will sell their products to the local wholesaler within the province, wholesaler in Bangkok, and various processing industries.

- *Importer*

  The majority of imported medicinal products are used as the ingredient of Thai or Chinese medicine. The importer will sell directly to the wholesaler in Bangkok and medicine processing industry. Bsides, some importers will also act as a wholesaler.

- *Wholesaler*

  Wholesalers are mainly located in Bangkok. They will trade with the wholesaler in the province, retailer, and processing industries.

- *Processing industry*

  Processing industries including medicine, food, beverage, and cosmetic, use medicinal plants as raw-material. The processing industry will purchase medicinal plants from the grower, assembler, and the wholesaler in Bangkok.

- *Retailer*

  The retailer will sell the product directly to the consumer according to the needs of the consumer, as an ingredient of medicine.

1.4 Sources of medicinal plants sold directly to the consumer

(Dry medicinal plants)

Dry medicinal plants are collected directlyfrom forests where medicinal plants are wildly grown or cultivated by the grower. The following list shows where medicinal plants are obtained:

- Tumeric (Khamin) comes from the central plain province of Thailand: Ratchburi, Kanchannaburi, Nakorn pathorm, and Nonthaburi province.
- Bustrad cardamom (Phlai), Acanthacease (Fah-Talai-Chone)、Kesorn Tang Hah, Nguaek

Pla-Moh, and Proh-Mom are grown and obtained in Ratchaburi Kanchanaburi and Nakorn Pathorm province

- Chanthaburi province is considered as the main source for Black pepper, glove (Kanphlu), and Thaowan Priang
- Several medicinal plants come from China, Indonesia, and Burma.

(Fresh Medicinal plants)

In the case of fresh medicinal plants, Nonthaburi Patumetanee and Nakorn Pathom, which are located near Bangkok, are considered to be the source. Chilli, ginger, garlic, and shallot mainly come from Northern and Southern region of Thailand.

1.4.1 Trading place of medicinal plants for direct consumption

Dry medicinal plants are mostly sold at Chakrawad, Sua-Pa, and Vorachak in Bangkok. On the other hand, fresh medicinal plants are sold at Pak-Klong-Talad in Bangkok and at Talad Si-moom-muand in Rangait of Patum Thani Province.

1.4.2 Methods of collection and sale for direct consumption

Wholesales and retailers purchase the medicinal plants, which are natural grown or cultivated, from the villagers. Besides this, they also purchase it from brokers who act as assemblers.

Stores that sell medicinal plants out of Bangkok, purchase 40% of the medicinal plants directly from villagers and 60% from wholesalers in Bangkok.

1.4.3 Price

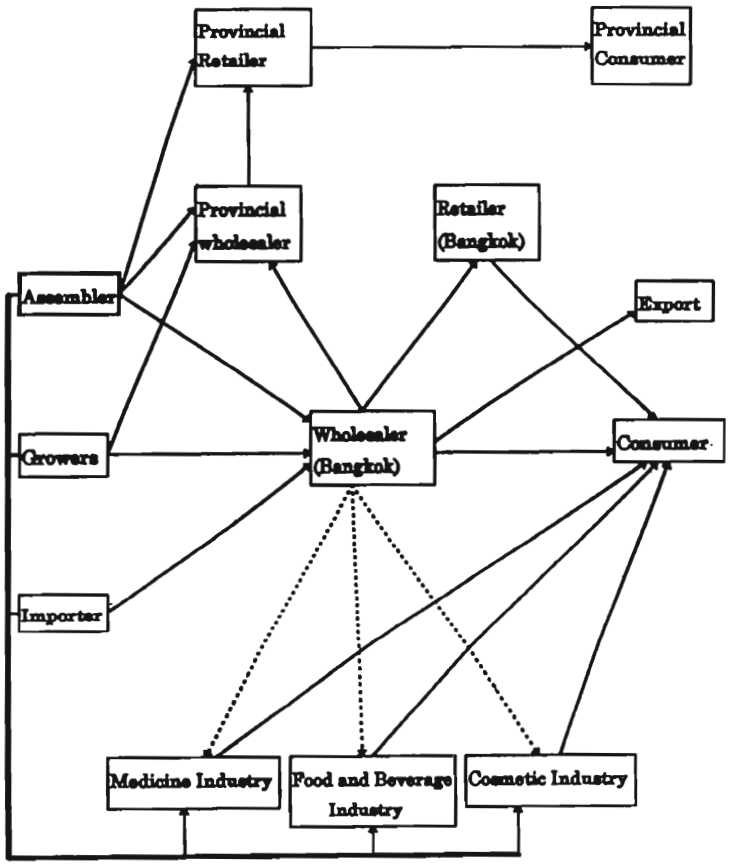

Fig. 1 Marketing channel of medicinal plants (1993)

The critical factor that determines the price of medicinal plants is quality. In addition to this, the more laborious the acquisition of medicinal plants is, the more expensive it is. It is also known that cleanliness seed, bacteria, and fungi are important factors that influence the determination of price (Nanthawan 1992). The medicinal plants of the same spices vary in price according to these factors. In the case of Tumeric (Khamin Chan), the lowest price was 5 Baht/kg, whereas, the highest price was 80 Baht/kg.

Although it was unclear whether price varied from season to season, it is known that certain species have different price depending on the season it is sold, such as:

- Ob-Choei, ginger (Mawawng), and Thaowan-Priang are expensive through February to March, and cheap through May to September.
- Ginger (Khing), Galangal (Kha), Kamferia Pandurate L. (Krachai), and toung peper are expensive during the rainy season because these plants are relatively perishable compared to other plants.

Table 1. Price of dry medicinal plants for direct consumption

Type of crops	Minimum price Baht/Kg.	Maximum price Baht/Kg.
Dried Produce		
1. Turmeric	5	80
2. Cardamon	75	240
3. Genus or Zingiber SP.	18	60
4. Bastard cardanum		
—Domestic	18	60
—Imported	230	400
5. Black Peper	20	30
6. Creat (Creyat root)	7	60
7. Eagle wood tree	45	90
8. Smilad	10	40
9. Indian Long pepper	50	80
10. Cinamon	80	80
11. Star anise	100	125
12. Sea-holly	7	20
13. Kidney tea plant (Java tea, or Cat's whiskers)	10	60
14. Sparrow's brenjal (Solanum trilobatum)	25	25
15. Clove	150	200
16. Ginger	9	9
17. Bridelia ovata	10	20
18. Licorice (or Glyeyrrhiza)	100	300
19. East-Indian galangal	100	150
20. China canthus nasutus	15	30
21. Chrysanthemum	40	250
22. Safflower	150	150
23. Derris scandens	10	10

(Source: From survey.

1.4.4 Quantity

Total exports of Tumeric (Khamin Chan), dry ginger (Bastard Cardamon), and Put-Sa-Pa was about 300 to 400 metric tons.

According to interview with wholesalers, it was understood that sales of fresh ginger, Kamferia Pandurata L. (Krachai), and Lemon grass (Tha-Krai) was 15,220 kg/day, 7,800 kg/day, and 17, 400 kg/day, respectively.

1.4.5 Demand

86.67% of fresh medicinal plants tranders stated that sales growth of the past 5 years was small. Because medicinal plants are not basic requirements for food, and supply is growing faster than demand, 54.84% of the trader predicted that demand will increase in small quentity, while 41.18% of the traders predicted that demand will be unchanged.

1.5 Issues

Recently, due to reckless collection of medicinal plants in the forests, the government announced strict regulation for the collection to conserve the environment. Because the majority of the traders collect medicinal plants from forests, total quentity of supply is in shortage and is raising the market price.

On the other hand, fresh medicinal plants have less problems for supply. However, the intense competition in the market lowered price and increased demand. Therefore, it is predicted that supply will not satisfy demand in the future.

Table 2. Price of fresh medicinal plants for direct consumption

Unit : Baht/Kg.

Type of crops	Minimum price	Month	Maximum price	Month
1. Chilli	4—18	May-Sept.	15—50	Feb.-May
2. Chinese Keys	3—9	Jan.-May	10—28	July-Oct.
3. Ginger	6—22	June-Aug.	15—40	May-June
4. Peper	20—40	Jan.-March	50—100	June
5. lemon-grass	1.50—3	Feb.-Aug.	6—7	April
6. Greater galangal	7.50—8	May	8—12	July
7. Sacred basil	4—6	June	7]15	April
8. Sweet basil	4—7	June	7—15	April
9. Leaf of leechlime	10	July	25—30	May
10. Hairy basil	4	June	7—15	June
11. Garlic	15—23	*	28	*
12. Shallot	15 普	*	15	*
13. Turmeric	10	*	10	*
14. Genus or Zingiber SP.	10	*	10	*

* Not specifz

Source : From Survey

Table 3. Quantity of dried medicinal plants sold for direct consumption (1993) Unit : Metricton/year

Type of Crops	Quantity sold	Anaverage quantity sold/shop
1. Turmeric	1—300	90.38
2. Cardamon	0.1—1.8	0.67
3. Zingiber SP.	0—10	10.00
4. Bastard Cardanum	卷0.2—500	103.64
5. Black Pepper	>0.36	0.36
6. Creat (Creyat root)	0.25—10	5.12
7. Eagle wood tree	2—3	2.50
8. Smilax	0.25—5	2.28
9. Indian long peper	2.4—10	5.80
10. Cinnamon	0.5—15	7.75
11. Star anise	4—10	7.00
12. Sea-holly	1.75—10	5.50
13. Kidney tea plant	1.75—5	3.38
14. Sparrow's brenjal	2—7.2	5.07
15. Clove	0.12—2.4	1.26
16. Dried ginger	50—100	75.00
17. Bridalia ovata	0.25—1.75	1.05
18. Licorice	0.24—5	2.35
19. East Indian galangal	0—2	2.00
20. China can thus nasutus	0.36—3.5	1.93
21. Chinese Chrysanthemum	1—20	10.50
22. Safflower	0.72—3	1.86
23. Derris scandens	0.25—0.35	0.30
24. *Diospyros decandra* Lour.	0—2.4	1.20
25. Wild jujube seed	0—500	500.00

Table 4. Quantity of fresh medicinal plants sold for direct consumption (1993)

Type of Crops	Daily sold Kg./day	Total Quantity Kg./day	Average quantity Kg./day
1. Fresh Chilli	50—4,000	15,220	1,014.67
2. Kamferia	100—2,000	7,800	866.67
3. Pandurata L.	26—2,000	14,350	1,594.44
4. Young pepper	5—200	268	53.60
5. Lemon grass	30—800	1,740	435
6. Galangal	30—600	990	247.50
7. Sacred basil	10—500	840	210
8. Sweet basil	100—500	600	300
9. Leaf of leechlime	10—30	40	20
10. Hairy basil	10—50	70	35
11. Garlic	100—200	200	200
12. Shallot	100—300	200	200
13. Turmeric	30	30	30
14. Genus or Zingiber SP.	30	30	30

Source : From Survey.

Table 5. Imports of medicinal plants 1988-1992

Rank No.	Medicinal Plant And Spices	Imported Value (Million Baht)	Persent
1	Medicinal plant for medical purpose.	604.1	68.42
2	Cumin seed, Star anise, cariander.	86.7	9.82
3	Chinese licoricae	54.1	6.13
4	True Cinnamon, cassia	30.8	3.49
5	Nutmeg	26.5	3.49
6	Pepper	23.7	2.69
7	Cloves	14.9	1.69
8	Ginseng root	6.6	0.75
9	Siam Cardamon	3.3	0.37
10	Others	32.3	3.64
	Total value	883.0	100.00

2. Chamomile

Basic information for planting chamomile for commercial purpose (industry)

1. *Area Planted*
   - Area planted 1,600 sq. meter/ral.
   - Using seed 50 gm.
   - Seed 1 gm. 2,000-2,200 seeds.
   - No. of plant/sq. meter = 30 plants = 48,000 − 50,000 plants/rai.
2. *Production*
   - Harvesting period 5 months.
   - Harvesting (Fresh) 60-80 times/crop.
   - Fresh produce 1,362-1,700 kg.
   - Dry produce 272-340 kg.
   - Ratio Fresh/dry 5 kg/1 kg.
3. *Cost of production*
   - Lab2ur cost 8,800 Baht
   - Fertilizer, insecticide *4,480* Baht
     Total *13,280* Baht
4. *Income*
   - Sale price (fresh) 50 Baht/kg
   - Sale Price (dry) 230 Baht/kg
   - Total income for fresh 68,100-85,000 Baht
   - Total income for dry 76,160-95,200 Baht
5. *Net gain*
   - Marketing cost
     20% of sale price (fresh) 13,620 Baht
     20% of sale price (dry) 15,232 Baht
   - Farmers received Net gain Fresh 50,000 Bath
     Dry 56,448 Baht
6. *Marketing Cost*
   - Total sale including weight of fresh flower (20%) 7,627-9,520 Baht

— Total sale including weight of dry flower (20%) 15,232-19,040 Baht

7. *Farmers recived net gain*

— Total sale including weight of fresh flower 26,029-38,080 Baht

— Total sale including weight of dry flower 56,448-71,680 Baht

Remark

1 Acre=2.5 Rai

1 US$=25 Baht

Sale price will determined by

— Cost of production
— Purchasing by fresh or dry flower
— Customer program
— Production target
— Signing Contract

Estimated production of fresh and dry Chamomile produced by a farmer in an area of 100 square meters in 7 months.

Fresh flower		
Total weight (fresh	85.125	Kg.
Sale price/Kg.	50	Baht
Total income	4,256.25	Baht
Deduct cost of production from Royal Project	280	Baht
Net profit	3,976.25	Baht
Dry flower		
Total weight (dry)	17	Kg.
Sale price/Kg.	280	Baht
Total income	4,760	Baht
Deduct cost of production from Royal Project	280	Baht
Dedut marketing cost 20%	95.20	Baht
Net profit	4,384.80	Baht

Fragant extraction 10 : 0.26

2.1 Issues

Because the collection of the flower is time consuming (2.5-3.0 kg/person/day) and the flower rapidly blooms, each farmer is able of cultivating only small quantities of Chamomile. Large scale production requires an infusion of labor force which is hardly available in the rural areas.

2.2 Recommendation

It is recommended that individual farmers should establish Chamomile producer groups that will allow large scale production to increase productivity and revenue.

3. Conclusion

- Systematic database and statistical data of medicinal plants should be initiated.
- Publication of up-to-date statistical data of medicinal plants.
- Emphasize R&D of agro-technology, bio-technology, and post-harvest.
- Special attention should be paid on human resource development by international organization (FAO, UNDP, WHO), private sector, and public sector.
- Encourage cooperation between public and private sector for the establishment of national

institutes for medicinal and aromatic plants.

- On farm demonstration of medicinal and aromatic plants should be executed.
- Research on production and marketing system for medicinal and aromatic plants are necessary.

タイ国北部の山岳民族による薬草栽培の社会経済性について

筒井 暉・プラヨン サイプラサート

近畿大学とチェンマイ大学は過去6年間に亘りタイ北部山岳民族の社会経済的地位向上を計るために薬草栽培を奨励してきた。これは黄金の三角地帯と呼ばれるタイ国北部における山岳民族によるケシの不法栽培を中止させることにもつながり，タイ政府・国連などによる強い支援を得てきた。栽培の技術的困難以外に薬草の市場性が大きな問題となり，市場構造と経路の分析がおこなわれたが，より詳細な栽培と販売方法の研究が必要であることが結論づけられた。なおタイ国原産の薬草中，特に日本での需要が大きいと思われる耐高血圧，耐高血糖の数品種について，その実用的薬効が本学医学部において検討中であり，換金性の高いオタネニンジンについては大学研究室付においては栽培に成功したもの，農民レベルでの栽培はなお今後の試験，試作を必要とする。現在の固有薬草中ではChamomileの市場性が最も高い。