CONCLUSIONS

Ban Thung Soong Community Forest comprised of 65 species of trees, 50 saplings and 49 seedlings. In stands (20x50 m^2), the number of trees were 1,413 trees, 572 saplings and 303 seedlings. The three elevation levels of BTS Community Forest at 0-100 m altitude, 100-200 m altitude and 200-300 m altitude comprised different numbers of trees, saplings and seedlings. There were 36 families with 65 species found in BTS Community Forest. The highest level at 200-300 m had the highest numbers of trees and total basal area. For the Important Value Index (IVI), the dominant species in BTS Community Forest were *Xylia xylocarpa* (Roxb.) Taub. var. *kerrii* (Craib & Hutch.) I.C.Nielsen, *Homalium undulatum* King, *Mangifera caloneura* Kurz, *Vatica stapfiana* (King) Slooten and *Lithocarpus collettii* A. Camus. The dominant saplings were *Euonymus javanicus* Blume, *Prismatomeris* sp., *Xylia xylocarpa* (Roxb.) Taub. var. *kerrii* (Craib & Hutch.) I.C.Nielsen, *Calophyllum ployanthum* Wall. ex Choisy and *Mangifera caloneura* Kurz.

There were 49 species categorized as Minor Forest Products (MFPs). The categories of MFPs were divided into three categories as medicinal plants, edible plants and non-edible plants. The dominant MFPs used as medicinal plants were as follows: *Azadirachta indica* A.Juss. var. *siamensis* Valeton, *Bouea oppositifolia* (Roxb.) Meisn. *Cratoxylum maingayi* Dyer, *Mangifera caloneura* Kurz, and *Schima wallichii* (DC.) Korth. The dominant edible plant species were *Azadirachta indica* A.Juss. var. *siamensis* Valeton, *Bouea oppositifolia* (Roxb.) Meisn., *Gnetum gnemon* L. var. *tenerum*, *Garcinia cowa* Roxb. ex DC, *Cratoxylum maingayi* Dyer and *Eurya acuminata* DC. var. *acuminata*, and non-edible plants consisted of *Aporosa villosa* (Wall. ex Lindl.) Baill., *Diospyros undulata* Wall. ex G.Don var. *undulata*, *Homalium undulatum* King and *Memecylon garcinioides* Blume. The results from IVI study not only provide information regarding MFPs composition in the forest but also indicate the levels of sustainable uses and resources of MFPs in BTS Community Forest among people in BTS. Some of the plants have low IVI but the frequency and quantity of harvesting is high which will affect the plant composition in the forest. The sustainable uses of MFPs through resource conservation in the natural forest will manage MFPs harvesting and collecting activity in the community forest. Some of the plants may be threatened because of the in lower composition or because of the higher frequency of harvesting which will affect the status of plants that occur in the forest.

The sustainable resources of MFPs through distribution of MFPs in the natural forest and domestication in homesteads can improve the value of MFPs utilization. Perception of people in BTS to their community forest and MFPs indicated that people in BTS highly valued them and were aware of the importance of BTS Community Forest to their livelihood not only for collecting forest resources but also for sustainable resources. Most of people in BTS were willing to be involved in community forest management. The awareness of people in BTS to ensure the sustainable management of the community forest should be continuous not only as a village program but also for future generation heritage. The roles of BTS Committee

regulations to conserve their forest will improve BTS Community Forest management.

There were six species of bamboo available in the BTS homestead namely *Dendrocalamus asper* (Roem. & Schult.) Backer ex Heyne, *Bambusa bambos* (L.) Voss, *Bambusa blumeana* Schult.f., *Melocanna humilis* Kurz, *Cephalostachycum pergracile* Munro and *Bambusa tulda* Roxb. *Bambusa bambos* (L.) Voss was the dominant bamboo species in BTS Community Forest and also comprised the highest number of clumps in BTS homesteads with 835 clumps. The stocks of bamboo in homesteads were high and in the same time will help to sustain the bamboo resources in the forest. People try to minimize bamboo harvesting in the forest and encourage more bamboo planting in the homestead. Through bamboo planting, people can develop the bamboo plantation in their homestead and at the same time conserve bamboo resources in the forest. Through above-ground biomass study, the estimation of grand total biomass based on the total culms per clumps indicated that *Dendrocalamus asper* (Roem. & Schult.) Backer ex Heyne contained 2.40 tons/culm, *Bambusa bambos* (L.) Voss with 2.24 tons/culm, and 0.15 tons/culm for *Melocanna humilis* Kurz.

RECOMMENDATIONS

The study on sustainable uses of some Minor Forest Products in Ban Thung Soong Community Forest and homestead are useful for the future researches on MFPs primarily in Thailand even for the Southeast Asia regions. This study were covered some of MFPs which include medicinal plants, edible plants, non-edible plants, and bamboo. This study also provide information regarding the description uses of MFPs based on local traditional knowledges as well as to introduce some of MFPs that have high potential to develop for the future studies. Through this study, people in BTS have good opportunities and benefits to improved their knowledge and awareness to sustain the MFPs uses and resources. The roles and responsibility of people in BTS to conserve their community forest become as good example and to the other villages to manage their community forest. The recommendation on sustainable uses of MFPs as follows:

1. The importance of MFPs should be developed through products domestication and value added. Some MFPs have high potential to develop, for example, the wood of *Schima wallichii* (DC.) Korth used as medicinal plants to curing the cancer. The edible fruits of MFPs also can be developed as commercial fruits such as *Bouea oppositifolia* (Roxb.) Meisn., *Ficus hispida* L.f. and *Syzygium diospyrifolium* (Wall. ex Duthie) S.N.Mitra. The non-edible plants such as for decorative plants, handicrafts, construction materials also will improve the value of MFPs.

2. The local knowledge and information of MFPs should be conserved and developed for future generation. The roles and importance of local parataxomist can conserved the traditional knowledges, plant uses decription and also as references for studies the new drugs.

3. The guideline for local community to sustain the uses of MFPs should be proposed and become one of the main priority aspects in community forest management. Rural people are willing to conserve their community forest but lacking with knowledge and management practices. The guideline will help rural people conserved and managed community forest in the sustainable management. The guideline such as harvesting techniques, planting methods, sustainable management, and etc, can help rural peole to learn and conserve the forest resources.

4. Local people should conserve the resources of MFPs in the natural habitat with the sustainable management. The awarness of rural people should be continued and develop not only to conserve the community forest management but also for benefits for the future generations.

5. The development programs which include MFPs planting and domestication in the homestead should develop. The agroforestry programs as example, will improve MFPs in the homestead as well as for socio-economic benefits for the rural people.

6. The cooperation among village committee, local people and government agencies to encourage the sustainable uses of MFPs should be improved. The cooperationa are important in various aspects such as policy, financial support, monitoring and technology transfer among government agencies and rural pepole.

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APPENDICES

Appendix 1 Forestry laws and regulations relating to Minor Forest Products

Forest Act B.E.2484 (A.D. 1941)

Section 4 in this Act states that (1) ' forest' means land which has not been taken up or acquired by other means under the Land Law, and (7) 'forest products' means all thing that naturally exist in the forest; thing which originated from, or are found in the forest by nature:

(a) timber and all parts thereof, charcoal, wood oil, resin and all other things derived from trees or timber;
(b) all kinds of plants, mushrooms and things derived there from;
(c) birds' nests, lac, bees-wax and guano;
(d) rock, minerals which are not prescribed in accordance with the Law on Mining and also includes charcoal which is man-made.

Chapter 1: Logging and the collection of forest products
Part V: Reserved Forest Products

Section 27:

In this regard, any kind of forest products which shall become reserved in any locality a Royal Decree to that effect shall be issued.

Section 28:

Any addition or deletion of forest products as reserved forest products which has been prescribed by a Royal Decree, or determining any forest products as reserved products in any locality other than the locality which has been prescribed by a Royal Decree under the provisions of the aforesaid Section, can be carried out by the issuance of Royal Decree to that effect.

The Royal Decree issued under this section shall come into force after days from the date of its publication in the Government Gazette.

Section 29 [18]**:**

Any person collects or in any way cause damage to any reserved forest products in the forest must be obtained permission from the competent officer, paid royalty, and compiled with the terms as specific in the ministerial regulations or permission.

Section 29 (bis.):

No person shall trade or process reserved forest products exceeding the amount stipulated by the Minister published a notice in the Government Gazette,

unless written permission has been obtained from the competent officer and as complied with the terms specified in the ministerial regulations.

National Reserve Forest Act B.E. 2507 (A.D. 1964)

Chapter II Control over and maintenance of the National Reserve Forest

Section 14.2

Within National Reserve Forests, no person shall occupy, possess, exploit and inhabit the land, develop, clear, burn the forest, **collect the forest products** nor cause by any other means whatsoever any damage to the nature of the National Reserve Forest, except:

(1) logging or collection of forest products under Section 15,
(2) logging of reserved timber species or collection of reserved forest products under the Law on Forests.

Section 15

Logging or collection of forest products in the National Reserve Forest shall be made after permission has been obtained from the competent officer or when permission has been granted by means of notification by the competent officer in respect to any particular area of National Reserved Forests.

In granting permission, it shall be in accordance with the forms, rules and procedures specified in the ministerial regulations.

Section 21

The permission for logging or collection of forest products in the National Reserve Forest under Section 15 shall be valid for a specified period of time therein according to the rules determined by the Director-General, but not exceeding one year from the date of its issues. The renewal of permission shall be in accordance with the forms, rules and procedures specified in the ministerial regulations.

Section 34

Whoever received by any manner or conceals or disposes of or assists in taking away from view any timber or forest products which he knows to have been acquired through the committing of an offence under this Act, shall be liable to the penalty as principal in committing such offence.

The Constitution of the Kingdom of Thailand (1997): Section relating to natural resource management

Section 46

Persons so assembling as to be a traditional community shall have the right to conserve or restore their customs, local knowledge, arts or good culture community and of the nation and participate in the management, maintenance, preservation and exploitation of natural resource and the environment in a balanced fashion and persistently as provided by law.

Section 56

The right of a person to give to the State and communities participation in the preservation and exploitation of natural resources and biological diversity in the protection, promotion and preservation of the quality of the environment for usual and consistent survival in the environment which is not hazardous to her health and sanitary condition, welfare or quality of life, shall be protected, as provided by law.

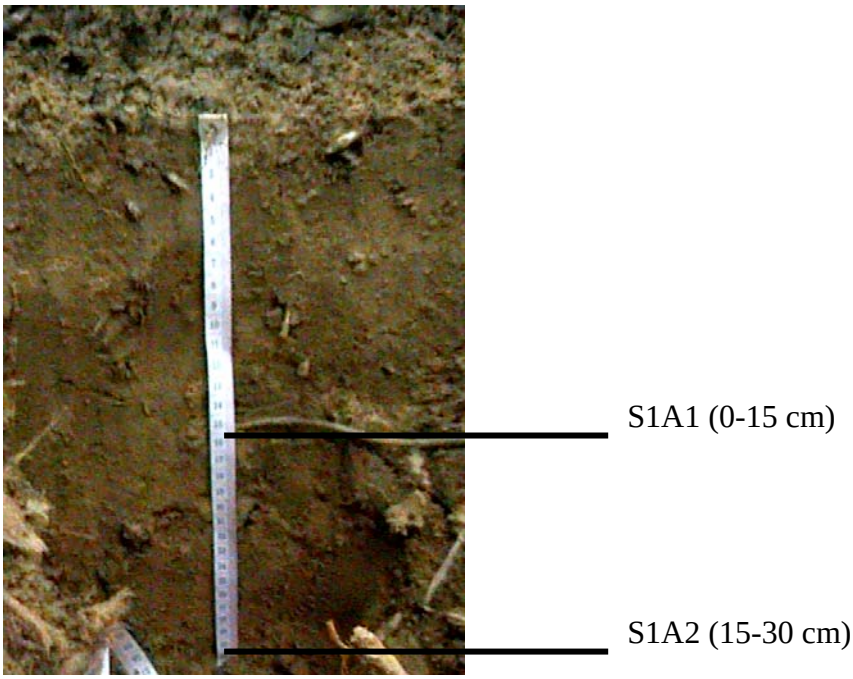
Section 79

The state shall promote and encourage public participation in the preservation, maintenance and balanced exploitation of natural and biological diversity and in the promotion, maintenance and protection of the quality of the environment in accordance with the persistent development principle as well as the control and elimination of pollution affecting public health, sanitary conditions, welfare and quality of life.

Appendix 2 Ban Thung Soong Community Forest soil profile

Soil property and profile data

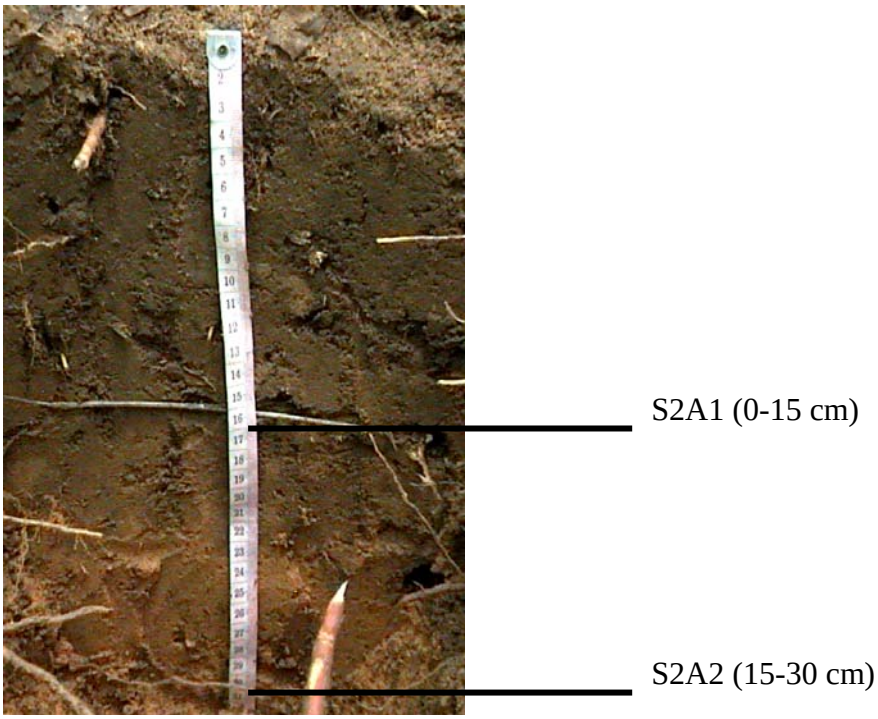
1. Soil name: S1
2. Sample no: S1A1 and S1A2
3. Date of collection: 10th January 2005
4. Name of collector: Hardawati Yahya
5. Location: Ban Thung Soong Community Forest (Khao Ying Wua Hill)
6. Vegetation: Moist tropical forest
7. Landform: Flat
8. Land use: Community forest
9. Topography:
    i. Site position: (X) 471272
    (Y) 938400
    ii. Elevation: 75 m
    iii. Slope pattern: 1-2%
10. Soil depth level:
    i. 0-15 cm (A1)
    ii. 15-30 cm (A2)



Appendix 2.1 Soil profile at 0-100 m altitude

Soil property and profile data

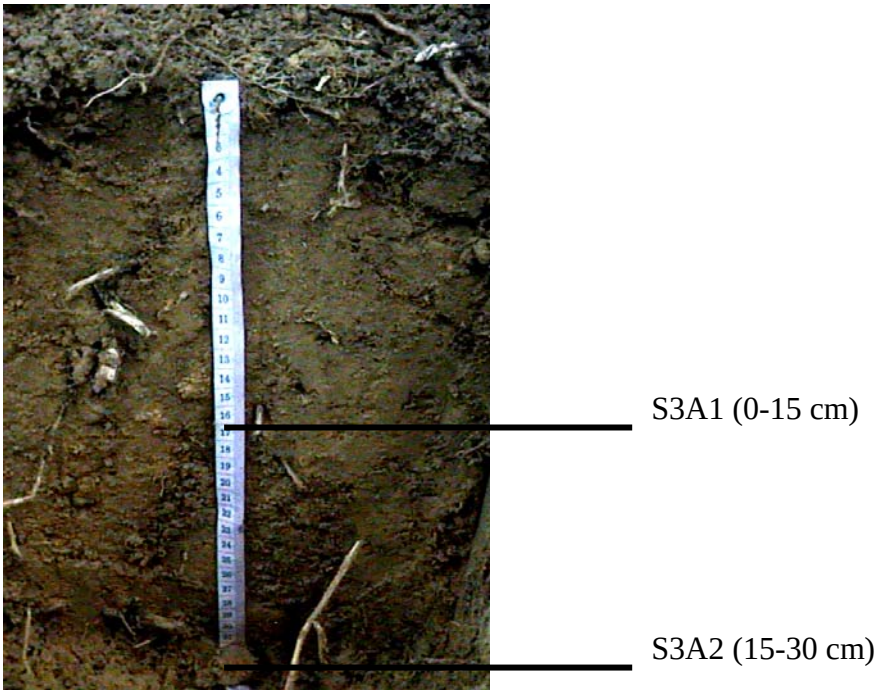
1. Soil name: S2
2. Sample no: S2A1 and S2A2
3. Date of collection: 10th January 2005
4. Name of collector: Hardawati Yahya
5. Location: Ban Thung Soong Community Forest (Khao Ying Wua Hill)
6. Vegetation: Moist tropical forest
7. Landform: Flat
8. Land use: Community forest
9. Topography:
    a. Site position: (X) 471500
       (Y) 938308
    ii. Elevation: 110 m
    iii. Slope pattern: 5-6%
10. Soil depth level:
    a. 0-15 cm (A1)
    b. 15-30 cm (A2)



Appendix 2.2 Soil profile at100-200 m altitude

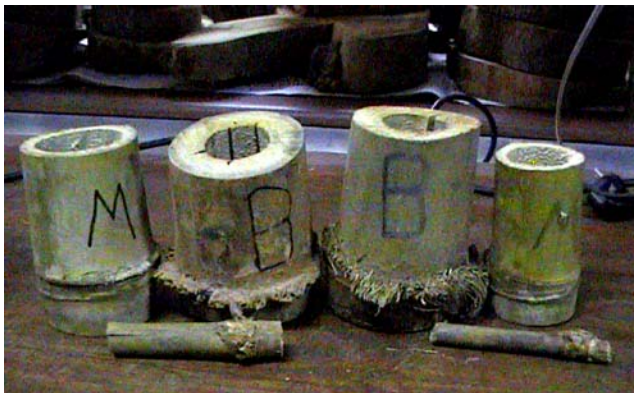
Soil property and profile data

1. Soil name: S3
2. Sample no: S3A1 and S3A2
3. Date of collection: 10th January 2005
4. Name of collector: Hardawati Yahya
5. Location: Ban Thung Soong Community Forest (Khao Ying Wua Hill)
6. Vegetation: Moist tropical forest
7. Landform: Flat
8. Land use: Community forest
9. Topography:
    a. Site position: (X) 471543
       (Y) 937394
    ii. Elevation: 300 m
    iii. Slope pattern: 10-15%
10. Soil depth level:
    a. 0-15 cm (A1)
    b. 15-30 cm (A2)



Appendix 2.3 Soil profile at 200-300 m altitude

Appendix 3 Above-ground biomass study of bamboo



Appendix 3.1 The culms samples of *Dendrocalamus asper* (Roem. & Schult.) Backer ex Heyne for biomass study

Appendix 3.2 The branches samples of *Dendrocalamus asper* (Roem. & Schult.) Backer ex Heyne for biomass study

Appendix 3.3 The leaves samples of *Dendrocalamus asper* (Roem. & Schult.) Backer ex Heyne of bamboo leaves for biomass study

Appendix 4 Bamboo species in Ban Thung Soong

Appendix 4.1 The culms of *Bambusa bambos*

Appendix 4.4 The culms of *Cephaostachyum pergracile*

Appendix 4.2 The culms of *Dendrocalamus asper*

Appendix 4.5 The clums of *Bambusa tulda*

ppendix 4.3 The culms of *Melocanna humilis*

Appendix 4.6 The culms of *Bambusa blumeana*

Appendix 5 Questionnaires

There are three phases of collecting questionnaires, first phase covered general and specific information.

1. General information.
   - Section 1: Personal information.
2. Specific information.
   - Section 2: Village information
   - Section 3: Wood uses and livelihood of the people.
   - Section 4: Minor Forest Products.

Section 1: Personal information

- Name of respondents
- Gender
- Age
- Place of birth
- Origin
- Migration background
- Marital status
- Educational levels
- Jobs
- Net Income summary
- External income
- Family members
- Houses or land ownership

Section 2: Village information

1. Information of village satisfaction
2. Problem in the village
3. Satisfaction of village committee
4. Participation with forest conservation
5. Facilities and infrastructure information
6. Selling products in markets
7. Land area
8. Crop for subsistence
9. Livestock

Section 3: Wood uses and livelihood of the people

1. Information of house construction material
2. Wood collection
3. Trees species
4. Fuelwood
5. Charcoal

Section 4: Minor Forest Products

1. Knowledge about Minor Forest Products
2. MFPs collection
3. Description of MFPs uses
4. MFPs resources in forest
5. Limitation factor of MFPs
6. Method to sustain and develop MFPs
7. Participation on sustainable MFPs
8. Planting activities
9. Training need
10. Participation with parataxonomist
11. Hunting activities
12. Learning programmes about MFPs
13. Satisfaction of Ban Thung Soong Community Forestry programme