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TITLE: Potential for Collaborative Management of Doi Suthep-Pui National Park

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THESIS

POTENTIAL FOR COLLABORATIVE MANAGEMENT OF DOI SUTHEP-PUI NATIONAL PARK

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A Thesis Submitted in Partial Fulfillment of
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The study aimed at analyzing socio-demographic and economic characteristics of local people associated with Doi Suthep-Pui national park to identify the problems of current management practices and key issues for collaborative management, and to determine the potential for collaborative management of Doi Suthep-Pui national park. The investigator used household as unit of analysis. The representatives of households were interviewed during April-May, and November-December, 2005. One hundred eighty households were selected from ten villages as a sample. Descriptive statistics and Multiple Regression Analysis were used to analyze the survey data.

Potential in collaborative management of national park in this study indicated by 7 variables: income status, benefit gained from national park, attitude towards national park management, land holding status, forest resources utilization, knowledge about national park regulations, and conflicts between local communities and national park agency while collaborative management of national park was measured by the degree of agreement to participate in collaborative management.

The study found that all the above mentioned variables significantly influence the degree of agreement to participate in collaborative management for Doi Suthep-Pui national park ($F= 2.875$; Sig. = .007; Multiple $R= .324$; $R^2= .068$) and accounted for seven percent of variance in the degree of agreement. However, only two variables including income status (Beta = .193; t = 2.238; Sig. = .027), and attitude towards national park management (Beta = .171; t = 2.190; Sig. = .030) significantly influence the degree of agreement to participate in collaborative management.

Student's signature

Thesis Advisor's signature

9 / April / 2006

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Md. Tohidul Islam

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INTRODUCTION

Thailand is a tropical country which extends from $5^{O}45^{'}$ to $20^{O}30^{'}$ north latitude and $97^{O}30^{'}$ to $105^{O}45^{'}$ east longitude. Thailand has an area of 513,517 sq. km and a population of approximately 65.4 million (CIA-The World Fact Book, 2005). Thailand has a tropical monsoon climate which follows a three- season pattern: a rainy season beginning in June that lasts until October; a relatively cool winter from November to February; and an extremely hot and humid summer from late March until June (Amget, 1998). In Thailand, forested areas covered about 60% of the total land area in 1953, 26% in 1993 and 33.09% in 2000(RFD, 2002). With the biologically rich and highly diversified ecosystems, there are 916 species of birds, 282 species of mammals, approximately 405 species of reptiles and amphibians, some 650-800 species of freshwater fish and as many as 15,000-20,000 species of vascular plants (Amget, 1998).

Protected areas in Thailand are vast reservoirs of the natural cultural resources. In the present time, protected areas carry immense value of the conservation and management of biodiversity. Like many other countries, conflict between the resident and/or local villagers and the protected area personnels are becoming routine in protected area management. A centralize, bureaucracy-dominated top-down approaches to manage protected areas have often ignored the fact that local villagers depend largely on the resources to be conserved; these policies have also trend to ignore traditional beliefs and knowledge, many of which have enormous significance for conservation.

The majority of the protected areas in Thailand are managed by the government, while recently a few are managed in partnership with local villagers. Existing policies, legislation and practices of conservation for protected areas cannot

be sustained if local villagers are constantly in conflict with protected area officials. So, it is essential to develop sustainable management program for protected areas of country. This is why, I select to study on potential for collaborative management of Doi Suthep-Pui national park, in Chiang Mai Province.

This study has both theoretical and practical significance. First, theoretically, the assessment would be a contribution to the body of knowledge on collaborative management of national park. Results of this study can provide some grounds for a construction of paradigm or perspective for better understanding of collaborative management of national park with different stakeholders. Second, the results of this study are envision to provide in depth understanding and information to the planners of national park management plan especially collaborative management plan development of Doi Suthep-Pui national park, which will help in future plan development.

Objectives of the Study

1. To study about socio-demographic and economic characteristics of the local people associated with Doi Suthep-Pui national park.
2. To identify the problems of current management practices and key issues for collaborative management of Doi Suthep-Pui national park.
3. To determine the potential for collaborative management of Doi Suthep-Pui national park.

Scope of the Study

The study was conducted in only villages situated inside the Doi Suthep-Pui national park and in the proximity of 5 km from the boundary. Sustainability is dependent upon stakeholders, their culture, norms, values, and park agency which may vary from place to place. Other park authority and/or researchers are encouraged to consider, discuss and amend these concepts to parallel the individual parks

situations as the park face similar pressure to manage national park and want to adopt collaborative management system to manage national park.

The targeted population of the study was villagers living in villages inside national park and surrounding national park within 5 km. These villagers were only one stakeholder in collaborative management of the national park. Although its' success depends on other stakeholders in the same management system though other stakeholders were not studied.

Definition of Terms

National Park- refers to Doi Suthep-Pui national park situated in north-west of Chiang Mai, northern Thailand.

Collaborative management of national park- refers to (also referred to as co-management, participatory management, joint management, shared-management, multi-stakeholder management or round-table agreement) a situation in which some or all of the relevant stakeholders in Doi Suthep-Pui national park are involved in a substantial way in management activities.

Stakeholder-refers to local villagers living in villages inside national park and surrounding national park within 5 km whose possesses a stake (or interest) in the management of the Doi Suthep-Pui national park.

Current management of national park- refers to management of national park solely by the government park agency.

Participation- refers to the involvement of target people (people in communities of inside and in the proximity of 5 km from the boundary of Doi Suthep-Pui national park) in the park management activities.

Local community –refers to the people living inside 15 villages of Doi Suthep-Pui national park and surrounded 18 villages situated in the proximity of 5 km from the boundary of the national park whose may be the stakeholder in collaborative management of national park.

LITERATURE REVIEW

For the supplementary purpose of fulfilling the study's objectives, available literatures which will explicit and implicit couple with the study are categorized into following topics: Thailand's Protected Area System, Doi Suthep-Pui National Park and Collaborative Management of Protected Areas.

1. Thailand's Protected Area System

Thailand's protected area system was established in 1961 when Khao Yai was designated as the country's first national park (Chettamart, 1985). Since then the system has expanded to include protected areas of various descriptions. There are different categories of protected areas in Thailand and each serves various functions according to its respective enabling legislation and operating objectives. Since the first national park, Khao Yai National Park, was established in 1961, the number and areas of national park in Thailand had been slowly expanded during the first 20 years. Due to nature conservation alert in the country and the change of the National Forest Policy, the number of the protected area was dramatically increased in the last decade. To date, there have been 319 units in the system, covering 108,064 sq. km or over 21% of the country's land surface. The system comprises 145 national parks (119 are terrestrial national parks and 26 are marine national parks), 53 wildlife sanctuaries, 52 non-hunting areas and 69 forest parks (Table 1) (Department of National Parks, Wildlife and Plant Conservation, 2003). These do not include the vast areas of watershed protection forest as they often overlap with the aforementioned protected areas and are not possible to be segregated as individual units. The current protected area system also excludes a number of small protected areas of high conservation values as they are smaller than IUCN's minimum size of 10 sq. km.

Though the number of protected areas as well as the total size of the system is quite impressive, most areas are smaller than 1,000 sq. km and over half of the system consists of areas smaller than 400 sq. km (Thaiparks.com, 2003).

Table 1 Thailand's protected area categories, number of units, and size of coverage

Protected area category	Number of units	Size of coverage (Sq. km)	% of country land area
National Parks (IUCN Category II)	145	68,928	13.46
- Terrestrial	119	-	12.05
- Marine	26	-	1.45
Wildlife Sanctuaries (IUCN Categories Ia)	53	34,848	6.81
Non-hunting Areas (IUCN Category VI)	52	3,408	0.67
Forest Parks (IUCN Category III)	69	880	0.17

Note: The table does not include Class I Watershed Protection Forest (IUCN Category Ib), Mangrove Forest Reserves (IUCN Category VI) and other small protected areas

Source: Department of National Parks, Wildlife and Plant Conservation (2003)

There is protected area system and protected areas are categorized into different categories. These have been managed in accordance with the legal provision prescribed in its respective legislation. Chettamart (2003) has developed protected area categories to match each of those 1994 IUCN categories as shown in Table 1 for the purpose of his teaching. It is based upon comparative examination of the management objectives of each classification-one by one. It can be summarized that protected areas of Thailand can be assigned into 4 different IUCN categories-Ia, Ib, II, III and VI as shown in Table 2.

Table 2 Management objectives of Thailand's protected area categories as referenced to IUCN matrix of protected area categories and objectives, 1994

Management objectives	Ia Wildlife Sanctuary	Ib Watershed Class I	II National Park	III Forest Park	VI Non-hunting, Mangrove Conservation Areas
Scientific research	1	3	2	2	3
Wilderness protection	2	1	2	3	2
Preservation of species and genetic diversity	1	2	1	1	1
Maintenance of environmental services	1	1	1	-	1
Protection of specific natural/ cultural features	-	-	2	1	3
Tourism and recreation	-	2	1	1	3
Education	-	-	2	2	3
Sustainable use of resources from natural ecosystems	-	3	3	-	1
Maintenance of cultural/ traditional attributes	-	-	-	-	2

Note: 1 Primary objective

2 Secondary objective

3 Potential applicable objective

- Not applicable

Source: Emphandhu and Chettamart (2003)

Thailand's protected area system is being administered and managed by the new Ministry of Natural Resources and Environment Management's Department of National Parks, Wildlife and Plant Conservation since 2002. Its management and operation chiefly rest on three existing laws, namely National Parks Act of 1961, Wild Animals Preservation and Protection Act of 1992 and National Reserved Forest Act of 1964. They are reinforced by several prescriptive regulations issued by the

Ministry (Emphandhu and Chettamart, 2003). The map of Thailand's forest covers with protected areas is showed in Figure 1.

According to the above-mentioned legislations all exploitive uses of protected areas are prohibited, including logging, timber cutting, hunting, fishing and commercial collection of non-timber forest products (NTFPs). Traditional Use of NTFPs by local communities is found in most protected areas with close management oversight. In fact, various scales of illegal tree cutting and wildlife poaching are still found in many protected areas around the country as there are few remaining natural forests left unprotected (Emphandhu, 2003). Neither protected area system plan nor management policies have been formulated for the protected area system. Protection and management are based on a number of cross-cutting policies and plans.

Thai government saw a real need to reform the public organization structure and their roles. The reformation process was put into operation to achieve new and more appropriate government structures to improve the effectiveness of natural resource and biodiversity management, with more emphasis on local communities and public involvements under the government decentralization process. The good governance is also an essential issue to accommodate natural resource and environmental conservation in Thailand. The Ministry of Natural Resources and Environmental Management was created in 2002 to act in response of the new Government Policy. All protected area categories are managed under this new Ministry (Emphandhu and Chettamart, 2003).

The Former National park, Wildlife Conservation, Watershed Management, and Forest Fire Management and Control Divisions along with Regional Forest Offices have been pulled out from Royal Forest Department and setting up as Department of National Parks, Wildlife and Plant Conservation (DNPWPC) under the Ministry of Natural Resources and Environmental Management in 2002.

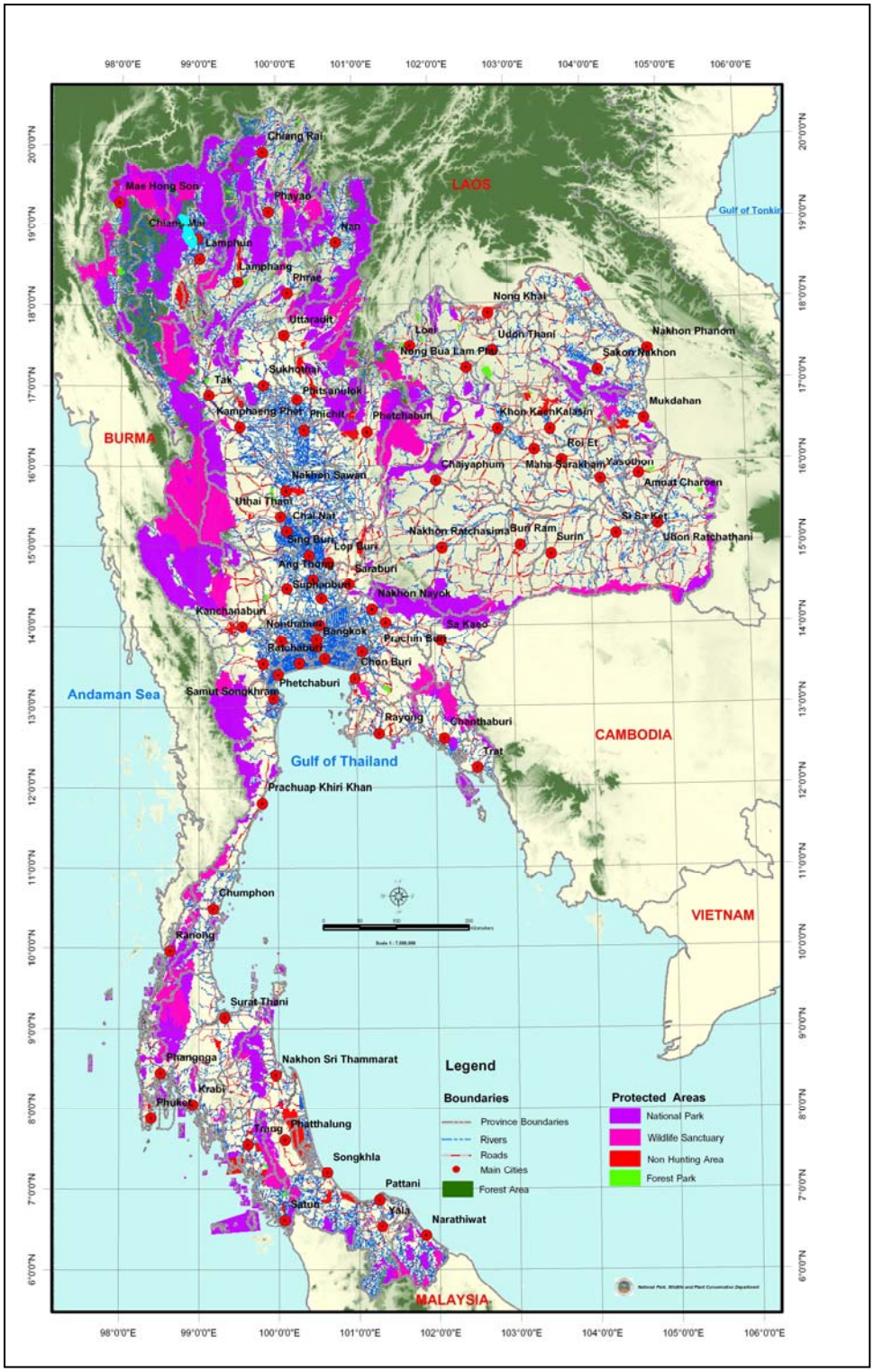

Figure 1 The map of Thailand's forest covers with protected areas

Source: Department of National Park, Wildlife and Plant Conservation Office (2006)

DNPWPC is the key department of the protected area management. The key offices for protected area management in the department are: Office of National Parks (protected area category II & III), Office of Wildlife Conservation (protected area category Ia & VI—non-hunting areas), and Office of Watershed Management and Conservation (protected area category Ib) (Emphandhu and Chettamart, 2003).

2. Doi Suthep-Pui National Park

2.1. General Information

Doi Suthep-Pui national park is situated in north-west of Chiang Mai, northern Thailand ($18^{o}51^{'}$ north latitude and $98^{o}54^{'}$ east latitude). This national park has a historical and archeological significance concerning the establishment of the city of Chiang Mai. The name of "Suthep" is taken from hermit "Washuthep" who, according to the legend, was the father of Queen Chammathewi of Hariphunchai. It is one of the Thailand's premier national parks. The twin-peaked park dominates the northern city of Chiang Mai, its slopes harboring a dramatically scenic Buddhist temple, and a Royal Palace.

On Doi Suthep there is Wat Phra Boromathat Doi Suthep Worawihan, a temple that houses the Buddha's relics. It is, therefore, a sacred place for Thai people in general and for the people of Chiang Mai in particular (Tanakanjana, 1996).

Originally, Doi Suthep was a national reserved forest. In 1981, by a royal decree, it was designated as a national park, the twenty-fourth national park of Thailand, covering the area of 16,106 hectares. In 1982, the National Park expanded to include more districts, waterfalls and streams, with the total area of 26,105.93 hectares (262.50 sq. km) (Tourism Authority of Thailand, 2002).

The National Park is part of the Thanon Thongchai Mountain Range. Owing to its mountainous and forest features, Doi Suthep-Pui National Park contains the headwatershed of many rivers and steams, e.g. Mae Hang, Mae Rim, Mae Ram and Mae Sa. These waterways flow to the east of the National Park into the Ping River,

Mae Rim district. The Suthep basin provides water for use and consumption for Chiang Mai (especially before the irrigation canals were put in place). It is made up of several other small basins and streams which support agricultural, industrial and domestic uses of people in the north and the central parts of the county. The water of the Tha Chang basin on the east side of the National Park is vital to the livelihood of the people and agriculture of Hang Dong district before it flows into the Ping River (Tourism Authority of Thailand, 2002).

2.2. Topographic Characteristics

Altitude of the national park ranges from 330 meters to 1,685 meters from above sea level. The National Park is located in a part of the Thanon Thongchai Mountain Range. It is characterized with complex features and high cliffs. Its highest peak is Doi Pui, rises 1,685 meters above sea level. Other peaks are: Doi Suthep (1,601 meters), Doi Mae La Noi (1,549 meters), Doi Khom Rong (1,459 meters) and Doi Buak Ha (1,400 meters). Other remarkable peaks include Doi Mae Luat, Doi Pang hang Luang and Doi Pha Klong. The terrain in the Mok Fa waterfall area is mostly at 400-980 meter above sea level (Tourism Authority of Thailand, 2002).

2.3. Climatic Characteristics

The climatic condition is a monsoon climate with pronounced dry and rainy seasons. Because of the high altitude, the weather on the upper slopes of the mountains is cool and pleasant all over the year even in summer season average temperature is about 20-23^{O}C. The average annual temperature, recorded near Phuphing Palace, is 20^{O}C, with maximum and minimum average temperatures of 24^{O}C and 17^{O}C, respectively. In the winter season, the air is cool and clear. Temperature can drop as low as 6^{O}C in February. The dry season comes between November and March. On an average some there were 2,000 millimeters of rainfalls in the park each year, mostly from May to October. August and September are the wettest months with rain falling daily (Gray, Piprell and Graham, 1994).

Table 3 Average temperature, rainfall and relative humidity at different elevation of Doi Suthep- Pui national park (1966-1985)

Climatic characteristics & elevation	Months												Mean Average/ Total
	Jan	Feb	Mar	Apr	Ma	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Temperature (in ^{0}C)													
330 m	18.5	19.6	23.8	26.1	26.1	25.8	25.0	24.9	25.0	24.1	21.5	17.7	23.2
800 m	18.0	19.6	23.3	24.9	23.9	24.1	24.0	24.6	24.8	24.2	21.1	17.8	22.5
1,275 m	16.5	17.7	21.0	22.7	22.0	21.6	21.2	20.8	20.8	20.0	17.7	15.3	19.8
1,500 m	17.2	20.0	22.7	23.3	21.8	20.6	20.3	20.0	20.1	19.8	18.2	16.5	20.0
Rainfalls (in mm)													
330 m	0.2	2.8	21.4	36.4	190.0	154.5	298.0	393.8	237.1	138.0	51.6	15.6	1,539.9
800 m	0.0	2.5	11.5	56.7	185.4	137.0	291.9	305.0	215.4	96.8	43.2	8.6	1,354.0
1,275 m	1.8	2.2	21.5	93.7	352.8	304.5	450.6	497.0	436.7	233.4	82.0	19.2	2,495.5
1,500 m	19.0	2.8	26.0	66.7	260.7	241.0	296.9	360.4	384.7	217.3	96.0	34.5	2,006.0
Relative Humidity (in %)													
330 m	68.3	58.6	55.5	56.5	69.4	75.0	78.5	81.9	80.5	76.4	73.4	69.5	70.3
800 m	72.3	74.5	72.5	74.9	79.5	84.8	86.3	88.1	87.9	86.5	84.2	81.6	81.1
1,275 m	69.4	62.6	60.0	63.8	74.7	78.9	85.0	85.4	84.6	83.5	77.5	73.3	74.9
1,500 m	72.7	60.2	56.7	66.2	82.2	87.8	85.3	88.9	89.3	86.2	83.9	80.5	78.3

Source: Personal communication, Doi Suthep-Pui National Park Office (2005)

The average temperature, rainfall and relative humidity at different elevation of Doi Suthep-Pui national park in 1966-1985 is shown in Table 3.

2.4. Vegetation

Doi Suthep (elevation 1,601 meters) and Doi Pui (1,685 meters) are part of a geologically ridge forming the western boundary of the Ping River Valley. The bedrock of the park is almost entirely granitic. The park's deciduous and evergreen forests shelter what may be the most profuse plant life in Thailand despite the loss of some species. Plan surveys conducted since 1904 have revealed that there are at least 2,092 species of 193 families (17% of the total flora in Thailand) and new species are still being discovered. (Gray, Piprell and Graham, 1994).

The major forest types represented in the national park include the deciduous forest associations of the lowlands (deciduous dipterocarp-oak, bamboo deciduous forest and mixed deciduous forest) and evergreen forest of uplands (Maxwell and Elliot, 2001). The plant community consists of different forest types in Doi Suthep-Pui national park. In short these are:

Mixed deciduous forests are occurred on the plains at the foot hill at a lower altitude than dry deciduous dipterocarp forests. Recent studies indicate the park's deciduous forests may contain more tree species than any other tropical deciduous forest so far studied on earth. Common tree species include *Tectona grandis*, *Xylia xylocarpa* var. kerrii, *Pterocarpus macrocarpus*, *Terminalia alata*, *T. chebula*, *Schlechera oleosa*, *Vitex peduncularis*, *Cratoxylum cochinchinnense*, *Canarium subulatum*, *Morinda coresa*, and some species of Fagaceae family. On canopy there are varieties of orchids, e.g. those genus of the Denbrobium, Rhynchostylis, Aerides, etc.

Dry deciduous dipterocarp forests are found at an altitude lower than 800 meters. The tree species are *Dipterocarpus obtusifolius*, *D. tuberculata*, *Shorea obtusa*, *S. siamensis* and *Wendlandia tinctoria*. There are also several species of the

Fagaceae e.g. *Shorea roxburghii*, *Quercus kerrii*, *Lithocarpus lindleyanus* and *Lithocarpus sootepensis*.

Dry evergreen forest is occurred at the higher altitudes, over 600 meters above sea level, usually near creeks and streams with high humidity. Trees are taller than 35 meters. Tree species are usually of the Fagaceae family, such as, *Castanopsis diversifolia*, *C. acuminatissima*, *Lithocarpus elegans* and *Lithocarpus lindleyanus*. Some large trees are *Dipterocarpus costatus*, *Michelia baillonii*, *Manglietia garrettii*, *Schima wallichii*. Some trees of streams and creeks, e.g. *Actinodaphne henryi*. Some of the rare species are also found here, e.g. *Styrax bensoides*, *Cinnamomum spp*. The ground is covered with *Cynatheaceae chinensis* and a variety of ferns.

Hill evergreen forest is covered most of the areas of the Doi Suthep-Pui national park. Structurally, they are similar to the dry evergreen forests but are found over 1,000 meters above sea level. Trees species are mostly mosses and ferns cover intense at the forest ground layer. Trees are of the Fagaceae species, such as, *Catanopsis diversifoliia*, *C. acuminatissima*, *C. calathiformis*, *Quercus kingiana*, *Lithocarpus lindleyanus*, *Lithocarpus lindleyanus*, *Schima wallichii*, *Styrax benzoides*, *Cinnamomum* spp., *Betula alnoides*, *Wendlandia tinctoria*, *Symplocos macrophylla*, *Adinandra integerrima* and *Phyllanthus emblica*. The ground cover plants are *Rubus* spp., *Smilax* spp., *Viburnum* spp. and some other terrestrial ferns.

Tropical pine forest is relatively sparse in higher elevations. Tropical pine forests are mixed with some trees of the oak family and *Dipterocarp* spp. The typical trees dominant are *Pinus merkusii* and *P. kesiya.* The other oaks could be easy colonize as: *Quercus* spp., *Castanopsis acuminatissima, C. diversifolia, Lithocarpus annamensis,* etc. as well as *Styrax benzoides, Morinda coreia, Syzygium* spp*., Ochna integerrima.* Shrubs are included *Fagraea ceilanica, Embelia subcoriacea.* The undergrowth is composed of *Cyperus trialatus, Eragrostis interrupta, Saccharum fuscum, Vetiveria zizanioides.* Wild orchids are found epiphytic orchids such as, *Dendrobium cariniferum, D. dixanthum, D. draconis, D. sulcatum, Aerides*

crassifolia, A. flabellate, Ascocentrum miniatum, A. ampullaceum, Vanda lilacina, V. coerulea, etc.

2.5. Wildlife

At present, there is no report of large animals in Doi Suthep-Pui national park. However, there are 31 species of small mammals such as, *Muntiacus muntjak, Cannomys badius, Callosciurus* spp., etc. (Gray, Piprell and Graham, 1994).

According to The Conservation Data Centre, Department of Biology, Mahidoul University, Bangkok (1995), there are over 330 species of birds, including some rare birds. Some common bird species are *Phaenicophaeus tristis, Centropus sinensis, Glaucidium brodiei, Merops* spp., *Megalaima autralis, Hirundo* spp., *Dicrurus* spp., etc. Some uncommon bird species are *Aviceda leuphotes, Pemis ptilorhyncus, Treron* spp., *Chrysococcyx maculates, Cetropus bengalensis, Apus* spp., *Parus major*, etc. Some rare bird species are *Ictinaetus malayensis, Gallus gallus, Macropygia unchall, Sasia ochracea, Pitta oatesi*, etc.

Reptiles are found, for instance, *Platysternon megacephalum*, *Manouria impressa*, *Tropidophorus berdmori*, *Rana nigorittta, R. limnocharis*, *Ichthyophorus youngorum*, etc. Insects found are in great number, especially butterflies. It is reported that there are over 500 species of day butterflies such as, *Samia canningii, Attacus alatas, Argina argus, Palpita macrops, Metapercnia ductaria,* etc.

2.6. Local Villages and Socio-Economic Characteristics

Doi Suthep-Pui national park covers 4 districts and 11 Tambons of Chiang Mai Province (Muang District-3 Tumbons, Hang Dong District- 2 Tumbons, Mae Rim District- 3 Tumbons and Mae Tang District- 3 Tumbon). National park contains many local villages inside the park, on the park boundary, and within 5 km. of the park boundary. According to Doi Suthep-Pui national park office in 2004, there were 15 villages namely Doi Pui, Doi Suthep, Phu Phing, Khun Cahng Khian, Huai Kaew,

Chang Khim, Mae Lord Tai, Lisaw Tha Pha, Pha Nok Kok, Mae Sa Noi, Pong Hai, Huay Rai, Machia Noi, Pha Tack located inside the park boundaries (1,541 households; population of 10,492), 18 villages located on the edge of the park boundary (1,455 households; population of 7,235), and 25 villages located within 5 km. of the park boundary where most villagers have used park lands for agriculture (2,016 households; population of 8,032). About 10% of the area is inhabited by the hilltribe community and farmers who grown leeches, cabbages and upland rice. Conflict over agricultural land uses and park management is an important issue for Doi Suthep-Pui. Because of a dramatic increase in tourism, many resorts have been developed near the park. Many of the local people sold their lands to resort owners and have then encroached on park land for agriculture. Illegal logging by local people is another problem in the management of Doi Suthep-Pui national park (National Park Office, 2005).

The west side of the park has been either virtually destroyed or severely disturbed in part because the preserve has been allowed to accommodate tourist resorts, government agencies, agricultural research stations, television relay towers and at least 500 hilltribe families. Half-hearted efforts over the years have been made to relocate the tribe people who have contributed to forest eradication through their slash- and burn farming methods. Animal poaching and collection of rare wild plants continues while some lower slopes were denuded in 1991 to install a water reservoir to service a recreation complex which includes a shooting range (Gray, Piprell and Graham, 1994).

2.7. Points of Interest

Wat Phra That Doi Suthep It is the holy place of Buddhist and *Lan Na* history. It is located on Doi Suthep, Mueang District, near park Head Quarters within park area. According to legend, holy relics discovered during reign of King Kuena (1355-1385) were placed in a howdah on the back of a white elephant, which carried them to Wat Phrathat, then if dropped dead due to fatigue from long journey. The present dates from the 16th century and was expanded and restore several times later.

A flight of 306 steps, bordered by a NAGA balustrade, leads up from the parking area to the temple, which has beautifully decorated buildings and a Lanna-style chedi covered with engraved gold plates, flanked by four ornamental umbrellas.

The Phuphing palace It is located on Doi Buak Ha, Mueang District, Chiang Mai Province inside national park. It is the royal winter residence in Chiang Mai where the royal family stays during seasonal visits to the people in the northern part of the country. The palace is also the royal guesthouse for prominent State visitors from abroad. The palace was built in 1961. Phra Tamnak Phuphing Rajanives was built in northern Thai architechtural style called “Reun Mu” (Group of Houses). The palace has Ruen peek Mai (Log cabin), Ruen Rab Rong (Royal Guesthouse), Pha Mon Pavilion and Fern Garden Originally, Water Reservoir, Phra Tamnak Siri Song Phuphing, Phra Tamnak Payak Sathit, Phra Tamnak Sri Nagarindra, Suan Suwaree 9Rose Garden) and Hor Phra. There grows many kinds of beautiful seasonal flowers and roses in the palace’s botanical garden. The palace is opened everyday for visitors from 8.30 a.m. to 4.30 p.m. But it is closed for visitors' when the Royal Family is in residence, normally January to early March.

Doi Pui Research Station Doi Pui Research Station, located in Doi Suthep-Pui National Park in Chiang Mai, is part of the Agro-Ecological system Research and Development Institute (AERDI). It is a site designed for research and development for the conservation and revival of natural resources and the high-land environment. Providing technical service through, for example, workshops and training to introduce novel agricultural technology, it has the aims of improving the quality of life of farmers, hill-tribe communities and achieving sustainable local development following the guidance of His Majesty the King’s Royal Projects.

The station’s research places principle emphasis on plants of temperate environments including fruit crops such as persimmon, pear, lychee and strawberry, plus various ornamental flowers and different species of mushroom. Doi Pui Research Station has all the staff, buildings and equipment necessary to facilitate both laboratory research and field experiments.

A Memorial statue to Chruba Siwichai It is situated at the base of the mountain welcomes pilgrims and travelers alike. Chruba Siwichai was a teacher and a forest monk. He was a very wise man and the spiritual leader of the local people. People still come to this site to pay homage to Chruba Siwichai before they ascend the mountain to make merit at Wat Phra That Doi Suthep, which is the spiritual center of Chiang Mai.

Huai Kaew waterfall It is located near the Chruba Siwichai Memorial, not far from the main road. There is Wang Bua Ban, a beautiful pool at the base of the waterfall.

Mae Sa waterfall This waterfall is a lovely set of ten falls that a good flow of water all year long. A distance of 100 to 500 meters separates all the falls. It is one of the popular falls in Chiang Mai, which surrounded by moisten plants at evergreen forest and the weather is fine all the year. It is located ion Mae Rim-Sa Moeng Road in Mae Rim District (Road number 1096).

Monthathan waterfall This is a beautiful, nine-tiered waterfall that flows over a cliff. The name “Monthathan Falls” is resulted by the trees (Montha) which has white and red flowers, big green leaves. It is about 3 kilometers from Huai Kaew waterfall.

Tat Mok-Hang waterfall It is far from Mae Rim District about 12 kilometers on Mae Rim-Sa Moeng Raod. It’s a quiet and moist forest especially in hot season.

Mok Fa waterfall It is one of the nice waterfalls in Mae Tang District. It’s location is traveling on Chiang Mai-Fang (Road number 107) and keep to the left on Mae Malai-Pai (Road number 1095) about 58 kilometers. Moreover there are Mok Fa Cave and Nature Trail near the fall.

Si Sang Wan waterfall This small fall is located on Hang Dong-Sa Moeng Road in Hang Dong District (Road number 1269).

Moreover there are many attractions such as Doi Pui Summit, Hill Tribe Villages, Pha Lat Cliff, Wang Bua Ban Cliff, Pha Dam Cliff and Many others offer spectacular vistas of the park and the city below.

2.8. Facilities and Services in the Park

There are some facilities and services provided by Doi Suthep-Pui national park authority for the tourists, visitors and researchers. Facilities and services available are located in important different places within national park. Main facilities and services can be summarized as below:

There are total 15 guest houses in the national park among those 9 are located in the Park Headquarters, 2 in Monthathan Falls and 4 in Mok Fa Falls. All guest houses are equipped with beds and guilt. Tourists, visitors and researchers can afforded this facility with rental fees. There are 30 public toilets, 5 public telephone booths, 395 souvenir shops, 33 restaurants, 202 garbage bins, 6 camp grounds, 8 car parking areas, many big chairs, tents and interpretive signs located different places of point of interests (National Park Office, 2005).

2.9. Number of Tourists Visited Doi Suthep-Pui National Park

The tourists visited Doi-Suthep-Pui national park is increasing. Number of tourists in the national park from1998 to 2003 is summarized in Table 4 below. It shows that number of tourists gradually increased.

Table 4 Number of tourists visited Doi Suthep-Pui national park in 1998-2003

Month	1998	1999	2000	2001	2002	2003
January	137,265	132,958	225,325	388,238	312,223	255,793
February	142,951	151,249	298,219	271,834	326,681	275,017
March	175,592	167,004	369,657	311,249	500,331	317,949
April	218,361	352,493	332570	324,596	290,829	292,503
May	156,333	168,875	327,523	348,210	325,801	282,544
June	166,429	238,362	346,614	106,383	434,724	254,744
July	193,299	322,986	421,748	523,578	534,086	559,025
August	230,395	211,080	360,248	458,499	298,408	450,740
September	155,029	257,365	314,922	422,848	438,559	429,072
October	103,352	200,106	249,562	331,283	213,485	148,748
November	157,714	281,826	240,69.3	295,843	199,179	279,916
December	269,264	187,122	252,909	175,281	266,265	384,373
Total	2,105,984	2,671,696	3,739,990	3,957,842	4,140,571	3,930,424

Source: Personal communication, Doi Suthep-Pui National Park Office (2005)

2.10. Activities to be followed by the visitors

According to brochure printed by Recreation and Interpretation Division of DNPWPC (2003), to maintain natural integrities of the park, in an appropriate manner that can eternally serve public education and recreational needs, everyone, as a park visitor, can assist the park authority by following the activities mention below:

1. Do not harm or bring out park's flora and fauna vital parts though they are in forms of leaves, flowers, fruits or any forms of forest products.
2. Do not commercially operate human activities within the park area.
3. Do not bring along weapons or hunting gears into the park area.
4. Do not scratch or post anything in the area of the park.

5. Do not generate loud noises, which may disturb other visitors or other park's natural organisms.

6. Do not leave garbage, wastes and fuel maters they may cause fire outside provided containers.

7. Drive your vehicle carefully and obey park's traffic regulations or signs and also park your vehicles properly only on provided parking grounds.

8. Keep your visit in a manner confirmable with good Thai tradition and culture

9. Do not bring foam ware into the park.

10. Strictly follow park regulations and orders made by park law-enforcement personnel.

According to information provided by Doi Suthep-Pui National Park Office (personal communication, 2005) rental park regulations are:

1. Don't bring any form of illegal drugs into the park.

2. Don't remove any items from guesthouse.

3. Don't use any electrical appliances in guesthouse other than those already provided.

4. Users are responsible to pay, in full, for any damage to the guesthouse and its contents.

5. Be considerate of others and don't make excessive noise.

6. Don't perform any form of gambling in the park.

2.11. Administrative Units in Doi Suthep-Pui National Park

According to National Park Office (personal communication, 2005) in Thai government's administration there is the Ministry of Natural Resources and Environment Management under which Department of National Parks, Wildlife and Plant Conservation is responsible for administration and management of all protected areas. Department of National Parks, Wildlife and Plant Conservation has it's 21 Regional Offices one of which is a Chiang Mai Regional Office under which Doi

Suthep-Pui national park is administered and managed. The head/or in charge of the national park is designated as Superintendent of national park. He is mainly responsible for management and development of national park. Under his direct control and administration there are 7 Ranger Station Units (Protection Units) which are as follows:

1. Ranger Station Unit-1 (Pha Dam)
2. Ranger Station Unit-2 (Sri Sang Van Waterfall)
3. Ranger Station Unit-3 (Mae Sa Waterfall)
4. Ranger Station Unit-4 (Mae Hia)
5. Ranger Station Unit-5 (Mok Fa Waterfall)
6. Ranger Station Unit-6 Tat Mok-Wang Hang Waterfall) and
7. Ranger Station Unit-7 (Chang Khian)

There are four Check Points in Doi Suthep-Pui National Park which are as follows:

1. Doi Pui Cheek Point
2. Huai Kaew Cheek Point
3. San Pa Yang Cheek Piont and
4. Huay Terng Thow Cheek Point

3. Collaborative Management of Protected Area

3.1. General Information

Collaborative management implies that there are two or more separate parties (the concept of stakeholders is useful) involved. A stakeholder can be defined as any individual, social group or institution whose possesses a stake (or interest) in the management of the natural resource concerned (Borrini-Feyerabend, 1996). The interest may arise for a variety of reasons, such as being dependent on the resource for subsistence or commercial survival, having cultural or historical ties to it, living

nearby, or holding delegated responsibilities for its welfare. Stakeholders can be thought of as those parties who are affected directly or indirectly by management decisions, in a positive or negative way. It includes those who can influence such decisions, as well as those who would like to influence decisions. So, collaborative management is something that is done by multiple stakeholders. This feature alone represents a major difference in relation to more conventional forms of management, where one party retains sole responsibility for decision-making and other stakeholders remain at the periphery. Collaborative management implies that government and resource users agree about tenure, thus providing a foundation of confidence and legitimacy for management. If disagreements arise, collaboration implies that there will be willingness to resolve difference and an effort to negotiate an acceptable tenure arrangement. Whether it is active or passive, the hand of government is usually present in some way in collaborative management systems, even if it is restricted to approving the allocation of rights and privileges for using and managing the resource (Ingles, Musch and Hoffmann, 1999).

Collaborative management is not a new approach. Partnerships for resources management exist in various forms in many countries and many professionals involved in protected area (PA) management are aware of their potential and limitations. PAs should be managed with the active involvement of local authorities, non-government organizations (NGOs) and economic operators, in addition to that of local communities, scientists and conservation professionals (Borrini-Feyerabend, 1996).

Overview focuses on the process and practical aspects of promoting and supporting collaborative management of natural resources in the ways that are acceptable to government and resource users. Collaborative management of natural resources refers to:

- The arrangements for management that are negotiated by multiple stakeholders and are based on a set of rights and privileges (tenure) recognized by the government and widely accepted by resource users; and

● The process for sharing power among stakeholders to make decisions and exercise control over resource use (Ingles, Musch and Hoffmann,1999).

Collaborative management is not an approach applicable and effective in all cases. For instance, in situations that require rapid decisions and actions, e.g. to block the fast ecological deterioration of an area, it is better to act than to wait for a general consensus on what to do about to devastated territory. On the other hand, practical experience has shown that it is advisable to pursue a partnership when the active commitment and collaboration of stakeholders are essential for the management of the PA and when the access to the natural resources included in the PA are essential for the local livelihood, security and cultural survival. (Borrini-Feyerabend, 1996).

For most protected areas, management planning and activities implemented by one agency (usually a state agency) in charge and has full authority to decide other agency should be involved and/or not as stakeholders in management. According to this perception, the government protected area agency may consider legal, political, social, economical, and cultural situations and the may:

● ignore the interests and capacities of indigenous peoples and local and mobile communities and repress all unlawful relationships with the protected area (the pure exclusive model);

● inform them about relevant issues and decisions;

● actively consult with them about such issues and decisions;

● seek their consensus on issues and decisions, also through sharing with them some economic and other benefits of conservation;

● negotiate with them on an open basis (thus effectively involving them in the decision-making process) and develop specific collaborative management agreements;

● share with them authority and responsibilities in formal way (e.g., by asking them to join a Management Board) thus creating a collaborative management organization; or

- recognize their existing management authority and responsibility or restitute/devolve such authority and responsibility to them (e.g., as a consequence of a legal claim, restitution process or reform in the country's protected area system).

Similar graduated options could also be identified from the perspective of indigenous and local communities with regard to outside interference with Community Conserved Areas. Communities may be more or less keen to involve the government agencies and other parties in decision-making regarding the territories and natural resources of their concern.

Participation in protected area management- a continuum can be show in Figure 2. Along the continuum of Figure 2, a portion of the continuum between 'actively consulting' and 'transferring authority and responsibility' is identified such as 'seeking consensus', 'negotiating (involving in decision-making) and developing specific agreements', and 'sharing authority and responsibility in a formal way', where actively consulted with other stakeholders but not given a share of authority in management on the other hand fully transferred the authority and responsibility to other stakeholders is not a collaborative management. According to Renard, 1996 a 'mild' version of collaborative management-i.e., the consultation and the seeking of consensus of stakeholders in PA management –is essential in all cases. The 'strong' version of collaborative management-i.e., the inclusion of stakeholders in a management board or outright devolution of specific authority and responsibility-may or may not be appropriate according to the specific conditions.

According to Borrini-Feyerabend, 2003 there are very many types of collaborative management of protected areas and it is thus difficult to identify some characteristics common to all protected areas.

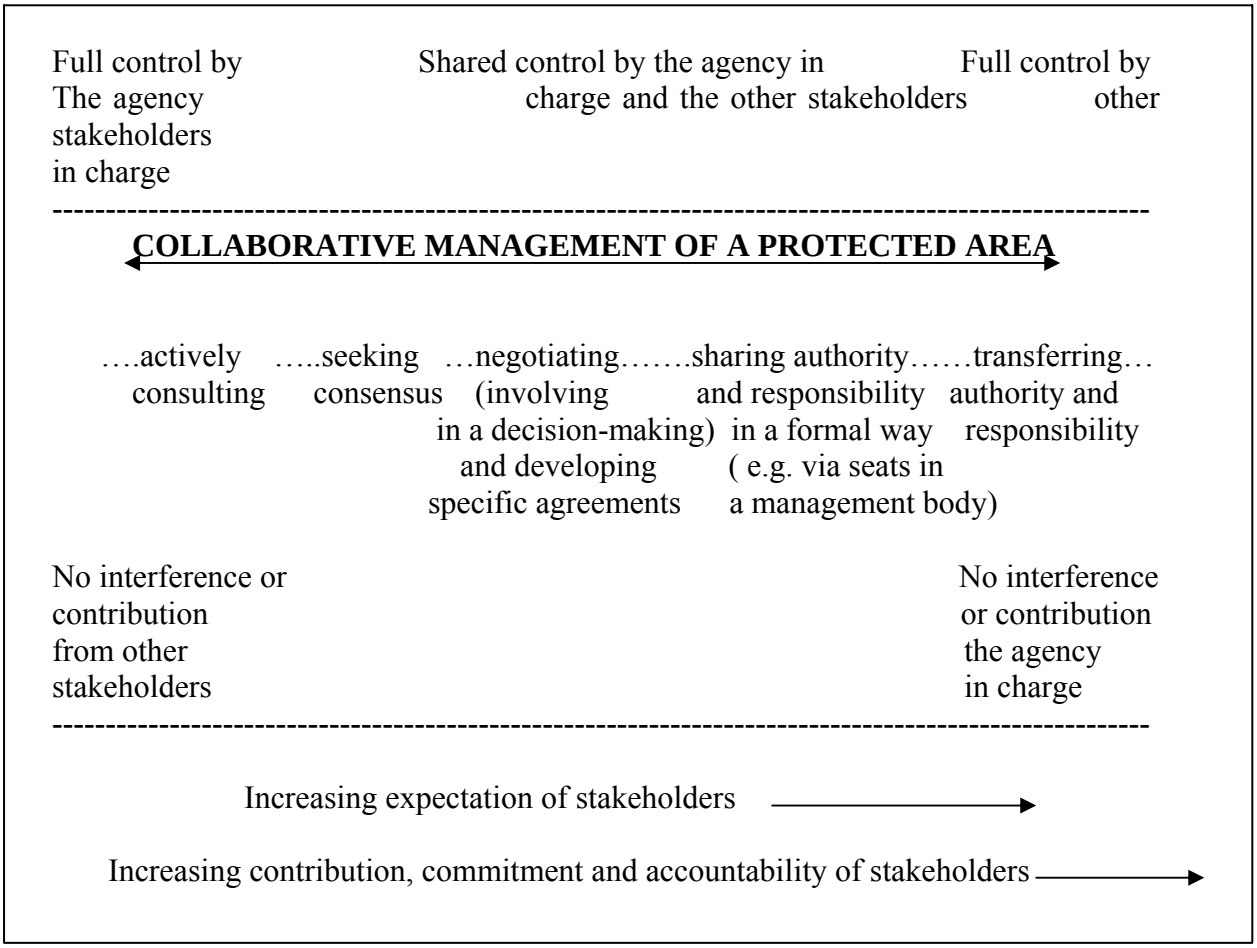

Figure 2 Participation in protected area management- a continuum

Source: Borrini-Feyerabend, G. (1996)

3.2. Characteristics of Government-Managed and Collaboratively Managed Protected Areas.

According to Borrini-Feyerabend, Kothari and Oviedo (2004), collaborative management in protected areas can be analyzed in various ways. Apart from the objectives of management (reflected in the IUCN management category) and governance arrangements, key distinguishing features are:

● Historical origins of the protected area (Was the protected area imposed over the will of indigenous and local communities or were the communities in agreement with the establishment of the protected area and its key management objectives? Were communities involved in asking for the protected area? Was any resettlement involved? Was there a negotiated compensation for any communities leaving their territories?)

● Length of time the governance model has been in place (Has the Collaboratively managed Protected Area been in place for more or less than a decade? Has it been able to "adjust" its governance structure and procedures to the context?)

● Permission accorded or not for people to inhabit the protected area or a designated buffer zone around it, and/or permission accorded or not accorded for people to carry out activities within the protected area or buffer zone.

● Extent of community interest in and engagement with the protected area (Are community members aware of the existence of the protected area? Is the protected area valued as a component of community identity, culture and livelihoods? Has the community demonstrated the will to participate in its management?)

● Extent of government interest in and engagement with the protected area (Is the area considered a major element in the national protected area system- a "jewel in the crown"? Is it endowed with sufficient human and financial resources?)

● Flexibility of the system (Is the institutional setting prescribed by legislation, for instance regarding who should be the members of the management board, or is there room for adjustment and experimentation, responding to the specific characteristics of the context? Is adaptive management the overall approach?)

● Ecological performance (Is the protected area effective in protecting biodiversity and critical ecological service? According to what indicators and whose monitoring results?)

● Social, cultural and economic performance (Is the protected area meeting the needs of local communities?)

In the case of collaboratively managed protected areas additional important characteristics, which are often difficult to assess, include:

● Fairness of process (Is protected area governance support by independent bodies or experts, capable of promoting and "watching over" the fairness of negotiations? In particular, is such support available to facilitate the development of specific agreements, multi-stakeholder management bodies, and /or good relationships between government agencies and communities? Are there specific forms of support to facilitate participation of under-privileged sectors of the community?)

● Adequacy of capacities and means (Are the collaborative management structure and processes legally recognized and "secured" from the perspective of all it's parties? Are the human and financial resources adequate to sustain the governance option, especially in its transaction-intensive initial phase? Is the income stream sufficient to sustain recurrent costs of social communication, negotiated decision-making, collective operations and monitoring?)

● Extent of power sharing and effective collaboration among the involved parties e.g. government agencies, indigenous and local communities and other stakeholders.

The above list of characteristics does not describe all features of a protected area or even of its relationship with local people. But it can be used to distinguish between "strong" and "weak" collaborative management models.

3.3. Some Common Features of Collaborative Management in Protected Areas

According to Borrini-Feyerabend, Kothari and Oviedo (2004), some of the key features that are common to all collaborative management agreements are:

● Collaborative management is an arena of social engagement, encounter and experimentation. Many protected area collaborative management agreements are relatively new and even those that have had one or several decades of experimentation are still exploring structures and options. As such, they are interesting arenas for learning and change. It is often sensible to adopt a flexible and adaptive approach while the various players adjust themselves to the new arrangements.

● Collaborative management capitalizes on multiplicity and diversity. Collaborative management is usually a multi-party but also a multi-level and multi-disciplinary endeavor. Different social actors possess different capacities and contribute different strengths to management. A partnership stresses and builds upon these complementary roles. Different social actors, however, may also possess contrasting interests and concerns. The challenge is to create a situation in which they pay-offs for everyone are greater when collaboration occurs rather than competition.

● Collaborative management is based upon a negotiated, joint decision-making approach and some degree of power-sharing, sharing of responsibilities and distribution of benefits among all institutional actors. While the type and extent of power-sharing and benefit distribution vary from situation to situation, all actors acquire *some* voice and receive *some* benefits from their involvement. This fact alone may help to empower the least powerful stakeholders, thus redressing societal imbalances and fostering social justice.

● Collaborative management is more of flexible process than a stable and definitive end point. It requires on0going review and improvement rather than the strict application of a set of rules. It’s most important result is not a management plan

but a management partnership, capable of responding to varying circumstances and needs. And collaborative management agreements and organizations have a healthy tendency to evolve. This allows them to strive towards ever more effective and equitable arrangements and maintain the liveliness and flexibility to respond to change.

3.4. Options for Action and Advice in Collaborative Management of Protected Areas

According to IUCN publication on "Indigenous and Local Communities and Protected Areas' (2004) agencies managing or co-managing protected areas have a number of options for action that they can take to enhance effectiveness and equity. Basic to all these options is the recognition that, where protected areas affect the livelihoods and interest of the local communities, it is important to gain their support if protected areas are to achieve their conservation aims. Further more, it is increasingly recognized that it is unacceptable for protected areas to disempowered or impoverish their resident communities.

The process of engaging communities as management partners should ideally begin at the stage of planning and design, encourage the effective participation of all interested parties at every stage and provide meaningful responses to their concerns. The key options for action for collaborative management can actually be seen as steps in this process, as one often depends on fair accomplishment of other. By adopting a positive approach to the involvement of local communities, a national protected area agency and/or local protected area administration can develop strong and/or weak collaborative management models. Each model, however, should be tailored to the unique circumstances of the relevant country and communities. The key options for action for collaborative management are as follows:

3.4.1. Sharing Information, Advice and Conservation Benefits with the Concerned Communities

The sharing of information, advice and benefits is the first and essential step to be taken in any collaborative management setting. It can be considered as the “foundation” for collaborative management. For this, essential activities are mention bellow:

● Consult with relevant communities regarding the need for, objectives and management priorities of any new protected area.

● Consult with relevant communities on the technical decisions about protected areas

● Share protected area information promptly and fully through social communication events that allow open discussion and mutual learning.

● Share protected area benefits with relevant communities through ways and means proposed by protected area agencies.

3.4.2. Empowered Indigenous Peoples and Local and Mobile Communities to Participate in Protected Area Management

A second step toward collaborative management is the strengthening of communities through a process of analyzing the relevant issues, leading to self-organizing and capacity building according to their needs. Indigenous and local communities and their organizations may require new capacities and resources to be able to relate effectively to government agencies and conservation NGOs in formal settings and to assume new roles and responsibilities.

● Engage communities in assessing the biological and social situation of the protected area at stake and developing a joint vision of its desired future.

● Support communities to organize and built their capacities, as they see fit.

3.4.3. Engage the Concerned Communities in Negotiation Processes and Management Institutions

This third step signals a significant change: moving from a situation in which protected area agencies are “in charge”, to which authority and responsibilities are effectively shared.

- Integrate local/traditional and national/modern practices and knowledge.
- Negotiate collaborative management plans and complementary agreements with communities and other parties.
- Develop and support collaborative management institution capable of responding through time to the changing needs of protected area and its relevant management partners.
- As appropriate, negotiate the restitution of land resources to the rightful indigenous peoples and local and mobile communities or devolve management authority and responsibility to them.

3.4.4. Promote Learning at Various Levels

On-going is the necessary fourth step and crucial component of adaptive management, vital in protected areas which include some of the most precious and valuable environments and resources.

- Enhance awareness and relevant technical capacities of protected areas' staffs.
- Promote “learning by doing” by all stakeholders in each protected area and mutual learning and sharing of experiences among protected areas in similar circumstances
- Facilitate participatory evaluation processes and protected area certification by international bodies.

3.5. New Paradigm for Protected Areas

There were some 60,000 protected areas in the world (Phillips, 2003). The United States is the pioneer in established and managed protected areas on government-owned areas government- managed for perception of their heritage for all time and also for enjoyment of elites. Until mid 1960s, around the world protected areas were setup and managed solely through government agencies favored top-down view without too much concern for the impact on indigenous and/or local peoples. Rights and opinion of indigenous and/or local peoples living inside and proximity of protected areas who are associated with protected areas were or little concern of any government before 1970. The thinking about protected areas as well as indigenous and/or local peoples living inside and proximity of protected areas changed gradually since mid 1960s.

Since 1962, World Congress on Parks and Protected Areas held in every 10 years intervals and adopted a number of recommendations gradually prioritizing opinion and rights of indigenous and/or local peoples associated with protected areas. Summary of the recommendations from the first to the fifth World Congress on Parks and Protected Areas showed a number of new themes in every congress.

In 1960s, protected areas were established and managed considering wilderness perceptions of nature; diagnosis of environmental problem were overpopulations, and carrying capacity of land; peoples were treating as threat for protected areas; key influence for protected areas were colonial conservation and elitist interests; and solution was considered exclusionary protected areas.

In 1980s, protected areas were established and managed considering perceptions of natural ecosystem, biodiversity, and ecoregions; diagnosis of environmental problems were poverty, overpopulations, and carrying capacity of land; considering that peoples cannot ignored, peoples were treating as resource for protected areas; key influence for protected areas were sustainable development debate, and growing concern for livelihoods; and solution were considered

establishing buffer zones, integrated conservation and development programs, and community-based conservation.

After 1990, protected areas were established and managed considering perceptions of nature as culture in nature and nature in culture; diagnosis of environmental problems were power relations, and North-South inequalities; considering align with rural people, alliance with grass-roots who are associated with protected areas; key influence for protected areas were democracy/human right movement, participatory development, post-modern influences on natural and social sciences; and solution were considered establishing alternative protected areas, participatory natural resources management and human rights.

Main elements of modern paradigm for protected areas in twenty-first century, which contrasts in almost every respect with those of which prevailed 30 to 40 years ago are as follows (adapted and expanded from Phillips, 2003):

● Run with, for, and in some cases by local people- that is local people are no longer seen as passive recipients of protected areas policy but as active partners, even initiators and leaders in some cases.

● Run by many partners, thus different tiers of government, local communities, indigenous groups, the private sectors, NGOs and others all are engaged in protected areas management- a function of decentralization and devolution which is occurring in many countries.

● Run also with social and economic objectives, as well as conservation and recreation ones.

● Paid for through a variety of means to supplement-or replace-government subsidy.

● Managed by people with a range of skills, especially people-related skills.

● Managed to help meet the needs of local people, who are increasingly seen as essential beneficiaries of protected area policy, economically and culturally.

● Planned as a part of national, regional and international systems, with protected areas developed as a part of family of sites. The Convention on Biological Diversity (CBD) makes the development of national protected area systems a requirement (Article 8a).

● Developed as ‘networks’, that is with strictly protected areas, which are buffered and linked by green corridors, integrated into land around that is managed sustainably by communities.

● Often set up for scientific, economic and cultural reasons-the rationale for establishing protected areas therefore becoming much more sophisticated.

● Managed so that the needs of local people are considered alongside those of visitors.

● Managed adoptively in long term perspective, with management being learning process.

● About restoration and rehabilitation as well as protection, so that lost or eroded values can be recovered.

● Viewed as a community asset, balancing idea of national heritage.

● Viewed as an international concern, and the management of such areas guided by international responsibilities and duties as well as national and local concerns.

● Selection, Planning and Management viewed as essentially a political exercise, requiring sensitivity, consultations and astute judgment.

The modern paradigm for protected areas in twenty-first century, which contrasts in almost every respect with those of which prevailed 30 to 40 years ago are shown in Table 5.

Table 5 A paradigm shift in protected area management

The conventional understanding of protected areas	**The emerging understanding of protected areas**
Planned and managed against people	Run with, for, and some cases by local people
Run by central government	Run with, for, and some cases by local people
Set aside for conservation	Run with social and economic objectives
Paid for by taxpayer	Paid for many sources
Managed by scientists and natural resource experts	Managed by multi-skilled individuals
Managed without regard to local community	Managed to help meet needs of local people
Developed separately	Planned as part of national, regional and international systems
Managed as 'islands'	Developed as 'networks'(strictly protected areas, buffered and linked by green corridors)
Established mainly for scenic protection	Often set up for scientific, economic and cultural reasons
Managed actively within short timescale	Managed adaptively in long term perspective
About protection	Also about restoration and rehabilitation
Viewed primarily as a national asset	Viewed also as a community asset
Viewed only as a national concern	Viewed also as an international concern
Managed in a technocratic way	Managed with political considerations

Source: Phillips (2003)

CONCEPTUAL FRAMEWORK AND HYPOTHESIS

Local villager's participation in collaborative management is a necessary component of development of collaborative management program for Doi Suthep-Pui national park. Therefore, in this study, degree of agreement to participate in collaborative management has an impact on potential for management of the national park.

The major variable in this study is degree of agreement to participate in collaborative management. The review of related literature and theoretical framework revealed that the degree of agreement to participate in collaborative management related to the selected variables. Degree of agreement may be different such as strongly agree, agree, somewhat agree, disagree, and strongly disagree. In this study, it is hypothesized that income status, benefit gained from national park, attitude towards national park management, land holding status, forest resources utilization, knowledge about national park regulations, and conflicts between local communities and national park agency influence the degree of agreement to participate in collaborative management for Doi Suthep-Pui national park. The conceptual framework of the study is shown in Figure 3.

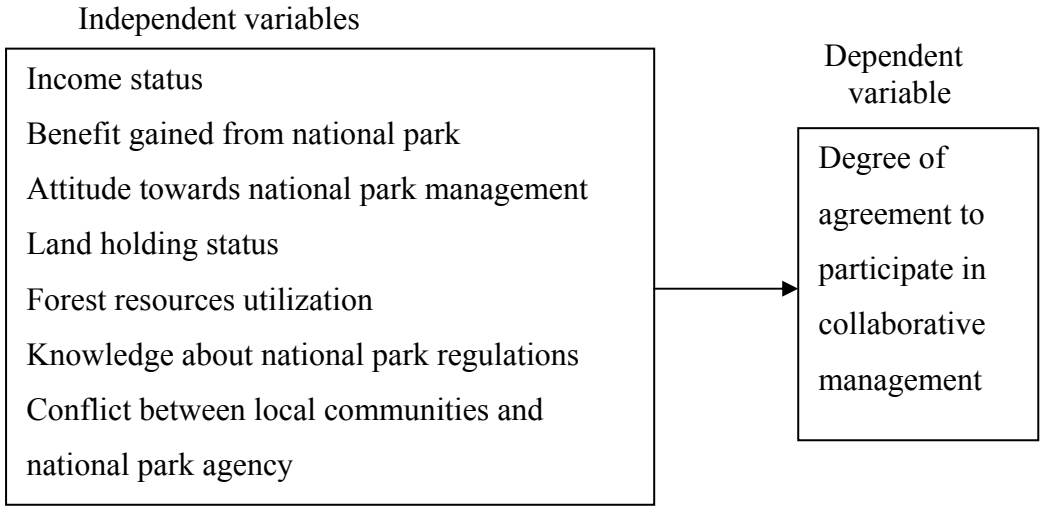

Figure 3 Conceptual framework of the study.

METERIALS AND METHODS

Materials

The materials of the research were only interview schedule which was divided into 4 parts indicating as:

Part 1: Socio- demographic characteristics This part includes respondents' status in household, gender, age, religion, marital status, demographic structure of the household members, level of education of household members, birth place, and race.

Part 2: Economic characteristics This parts includes respondents' major and minor occupations, household income per year from major and minor occupation, and total, comparison of household income and expenses, and need for change of major occupation or not.

Part 3: Natural resource utilization This parts includes respondents' land holding (owned land, rented land, borrowed land, other), they grow tree for household use or not (if grow, number of tree species and number of trees), utilize forest resources or not (if use the type of resources such as wild plants, wild animals, wood, fuelwood, and pattern of uses such as for household use only, sell some of them, and sell all).

Part 4: Knowledge about national park, expectation and attitudes toward national park management This parts includes respondents' know or not Doi Suthep-Pui is a national park, know or not the differences between national park and other forest areas, know or not national park regulations or the activities prohibited in national park, what are the main problems of traditional management of national park according to their opinion, choose between traditional management or collaborative management as a villager living inside and/or nearby the national park, top five priorities as management measures required for national park as local people (they were asked to choose 1^{st} to 5^{th} priority from given 12 management measures or others

if any they think required), degree of agree to participate in collaborative management of national park, attitudes towards national park management, get or not any benefit from the national park since the national park first established, opinion about conflict between their community and the national park agency, if there were conflicts what are level of conflicts (measured for seven pre-prepared causes of conflicts), suggestions for conflict resolution, and the most respected person in their community.

Methods

1. Research Design

The design of this research is quantitative design. The flow chart of the research methodology is shown in Figure 4.

2. Population and Sampling Techniques

Population of the study was the local villagers of the villages inside and in the proximity of 5 km from the boundaries of the Doi Suthep-Pui national park, Chiang Mai province, Thailand. The unit of the analysis was household (HH) of the villages and samples were selected from the representative of the household.

Multi stage sampling technique was used. The respondent was randomly selected from the above mentioned villages. The stages of sampling were as follows:

1. In this stage samples were selected randomly from populations of the villages situated inside the national park and in the proximity of 5 km from the boundaries of the national park. In the study area, there were 15 villages inside national park and 18 villages located on the edge of the park boundary, totaling of 33 villages were populations in this stage. Map of Doi Suthep-Pui national park indicating villages inside surrounding the park is given (Figure 5). Five sample villages from 15 villages inside the national park and 5 villages from 18 villages located on the edge of the park boundary, totaling 10 villages were selected as samples in the stage.

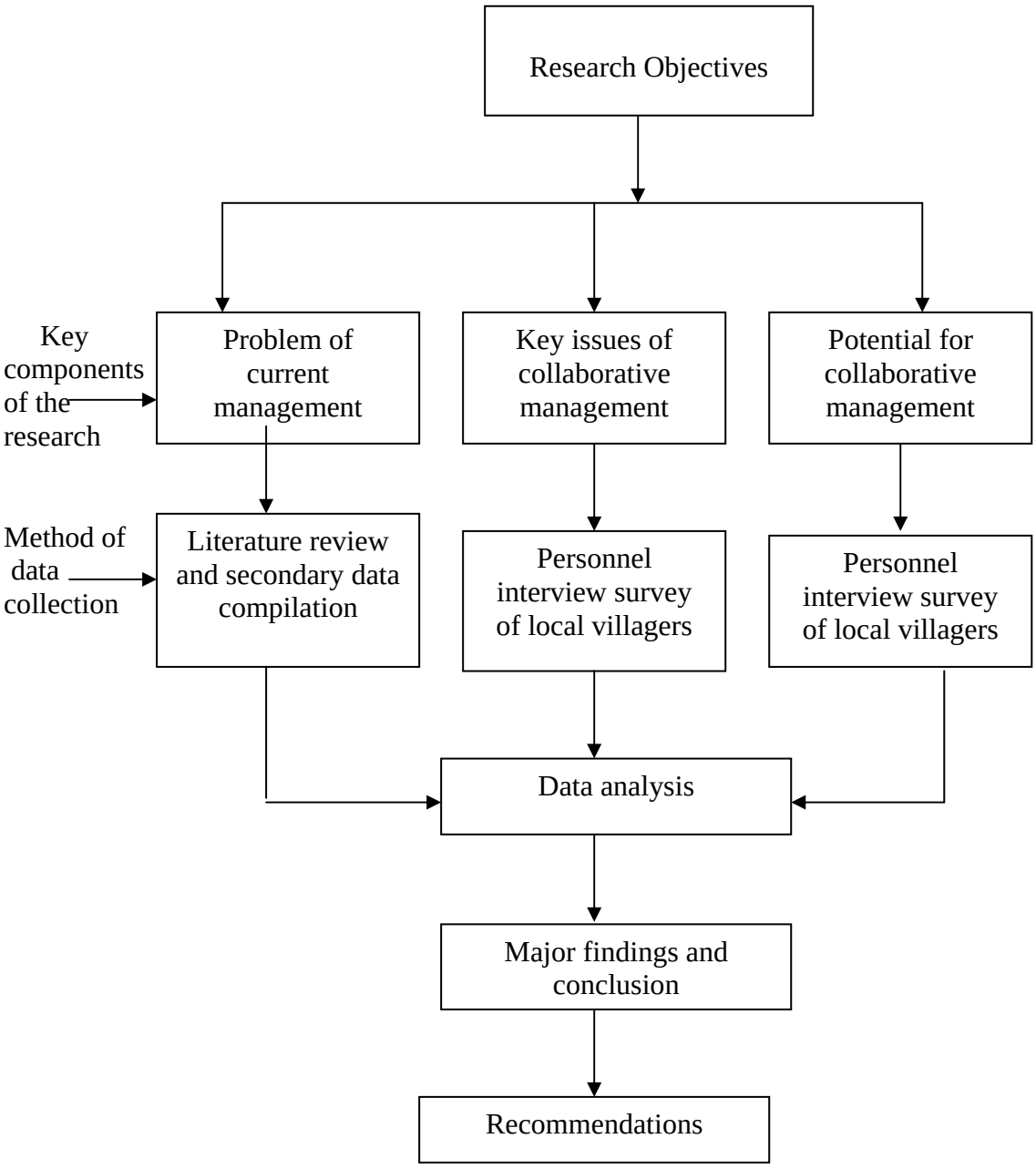

Figure 4 Flow chart of the research methodology

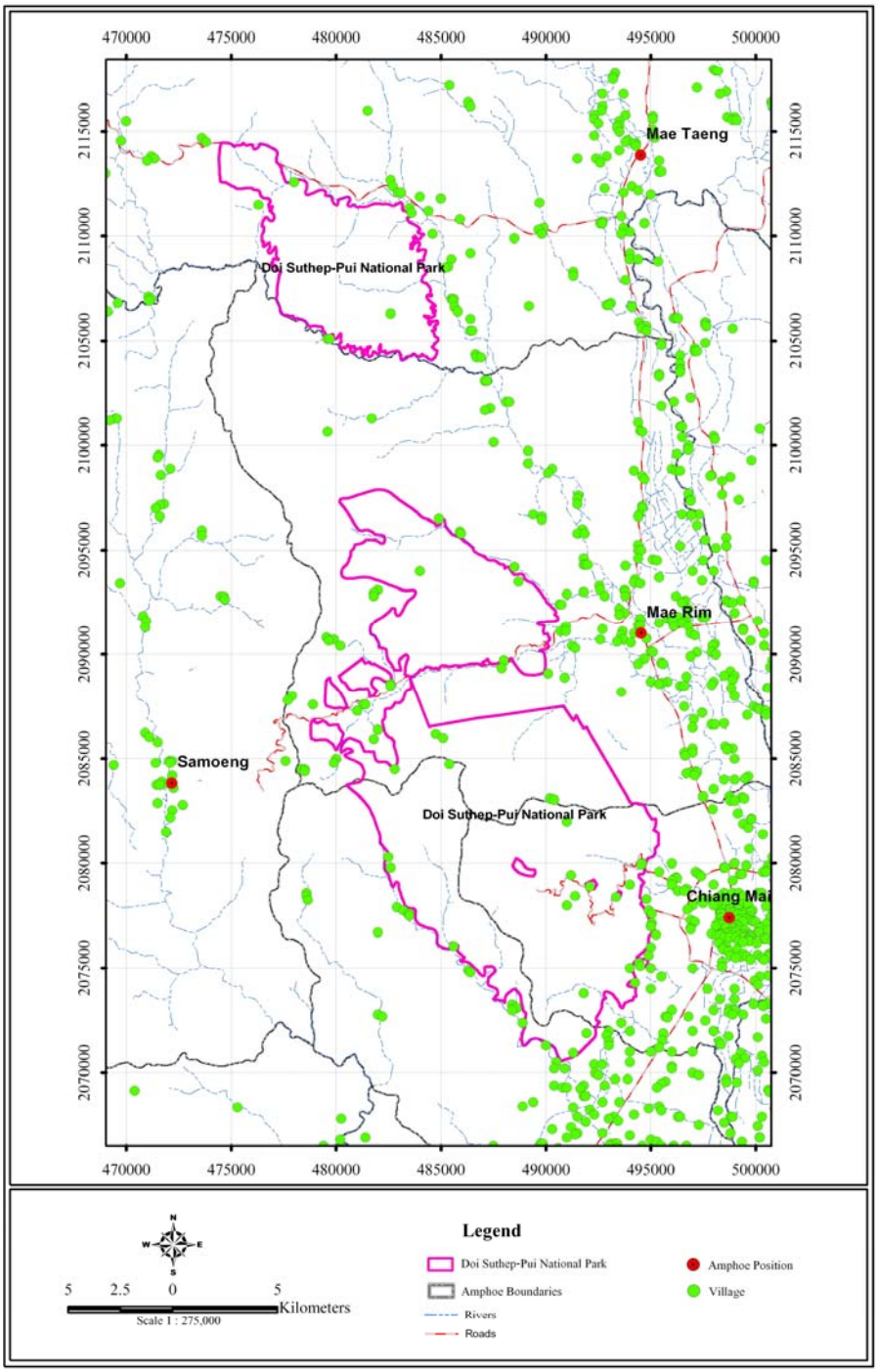

Figure 5 Map of Doi Suthep-Pui national park indicating villages inside and surrounding the park

Source: Department of National Park, Wildlife and Plant Conservation Office (2006)

2. In this stage, samples were selected randomly from the selected 10 sample villages. The household was unit of analysis. Ten percent of the total households from abovementioned villages were randomly selected proportionately from each sample selected village as samples. Total 180 households were selected as samples. The representative from the selected households (samples) was considered for interview as interviewee.

3. Data Collection Procedure

The research was involved assessment of the problems in existing traditional management of national park and potential of collaborative management of national park. The data collection procedures were divided into two types of data, which were primary data collection and secondary data compilation.

3.1. Primary Data Collection Procedure

Primary data was collected through personal interviewed of representative from selected sample households (HHs). The interview schedule was used to collect primary data on the various related issues on problems of traditional management and potential of collaborative management of Doi Suthep-Pui national park. The criteria for choosing the personal interview method as the data collection method was the appropriateness, validity, time, and expense. The personal interview survey was conducted during April-May, and November-December, 2005.

The respondents were personally interviewed by the interviewers. Interviewers were hired fourth year and/or master students of Forestry Faculty of Kasetsart University, Bangkok, Thailand. They were selected based on their ability to speak and understand very well both in English and Thai and local/Northern dialect. The interviewers were trained on how to carry out an interview and were briefed on the purpose and importance of the study.

Each interviewer was allocated certain number of respondents to be interviewed to meet the timetable. The completed interview schedule was edited at the end of each day to identify any missing item(s) for re-interviewed whenever needed.

3.2. Secondary Data Compilation

Secondary data was collect from different documents, reports and records of different departments like DNPWPC, office of Doi Suthep-Pui national park, Royal Forest Department, etc. Specially Doi Suthep-Pui national park office, database, GIS map and Master Plan for Doi Suthep-Pui national park were main source of secondary data in this research. The annual and/or monthly reports, proceedings and meetings and other published documents of Doi Suthep-Pui national park helps lot in this case. Published research findings on national park and The National Park Act of 1961 of Thailand and others literatures were also sources of secondary data of the research.

4. Data Analysis

Data collected were quantitative data which measured and analyzed as follows:

4.1 Measurement of Data

Respondents status in household- head of household, spouse, parents, son/daughter and/or other.

Village name- the name of the village (one of the sample 10 villages) where respondents were living.

Gender- male or female.

Age- the number of years passed after birth.

Religion- Bhuddism or other.

Birth place- this village i.e. present residing village or other village.

Race- Thai or other.

Marital status- married, single, and divorced/separated.

Household structure (number and age classes HH members)- age classes of household members were categorized into five classes such as 0-5 years, 6-17 years, 18-44 years, 45-64 years, and 65 years and above.

Level of education of household members- numbers of years of formal schooling completed by the members of household. Education level of household members were categorized into six classes such as none, primary (1^{st} -6^{th} yr.), secondary (7^{th} -9^{th} yr.), high-school (10^{th} -12^{th} yr.), college/university, and vocational/other training.

Major occupation- the primary source of money earnings of the household. It was categorized into agriculture and /farming related and other.

Minor occupation- the secondary source of money earnings of the household. It was categorized into agriculture and /farming related and other.

Household income- the amount of money (in Baht) that the respondents and his/her household members earns per annum (number from the past year) from their major and minor occupation. It was categorized into agriculture and /farming related, other, and total.

Comparison of household income and expenses- the amount of money (in Baht) that the respondents and his/her household members' earns and expenses per

annum (number from the past year). It was categorized into sufficient with some saving, sufficient but no saving, and do not sufficient.

Need for change of major occupation- respondents and/or his/her household members want to change their major occupation. It was categorized into need and do not need.

Land holding (farm size)- the area in *rai* (1 hectare= 6.25 *rais*) of the farm the respondents household were operating. It was categorized into owned, rented, borrowed, others, and total. The mean was obtained from the total number of *rais* the respondents' household holding.

Grow tree for household use- grow and do not grow. In case grow number of tree species and total number of tree grow was calculated.

Utilization of forest resources- for this purpose forest resources were classified into wild plants, wild animals, wood, fuelwood, wood for making charcoal, wood for construction, wood for making furniture, wood for craft, and other. Utilization was categorized into use and do not use. In case of use the type of used was categorized into for household use only, sell some, and sell all.

Know or not that Doi Suthep-Pui is a national park-know or do not know.

Know or not about differences between national park and other forests-know or do not know.

Knowledge about national park regulations- know about regulation, do not know about regulation.

Opinion about problems in current management of national park – the respondent's view/or opinion about problems in traditional management of national park. Problems described by the respondents were summarized and analyzed.

Choice for national park management- the respondents choose between current management and collaborative management of national park. It was categorized into current management, collaborative management, and either approach.

Top five choice for national park management- the respondents were asked among 12 pre-prepared management tools and other if any they think are important for national park management to prioritized from 1^{st} -5^{th}.

Degree of agreement in collaborative management of national park- whether or not the respondents were agree to participate in collaborative management of national park. The degrees were ranking 1, 2, 3, 4, and 5 for strongly disagree, disagree, some what agree, agree, and strongly agree respectively.

Attitude towards the national park management- the respondents were asked 9 pre-prepared statements for their degree of agree. The degrees were ranking 1, 2, 3, 4, and 5 for strongly disagree, disagree, some what agree, agree, and strongly agree respectively.

Get any benefit from the national park- the respondents get or do not get any benefits from the national park since the park established.

Opinion about inflicts between community and national park agency- the respondents gave opinion that there were conflicts or no conflicts between community and national park agency. Percentage of respondents was calculated from those opinions.

Opinion about degree of conflicts between community and national park agency- the respondents those who think that there was conflicts between community and national park agency were asked 7 pre-prepared statements /causes of conflicts between community and national park agency for their degree of agree. The degrees were ranking 1, 2, 3, 4, and 5 for very slightly, slightly, moderate, strong, and very strong respectively.

Suggestions for conflict resolution in national park management – the respondents were asked to give suggestions for conflict resolution in national park management. Suggestion gave by the respondents were summarized and analyzed.

Most respected person in the community- the respondents' opinion about most respected person in their community. It was categorized into community leader, local government officer, local politician, local NGO official, and other.

4.3 Uses of Statistics

Quantitative data were analyzed in this study. Descriptive statistics frequencies distribution, percentage, standard deviation, mean, median, range, maximum, minimum were used to explain all variables. To study the relationship between two types of variables, independent variables and dependent variable I had tested effect of independent variables on dependent variable. Multiple Regression analysis was employed to test hypothesis where involved more than two independent variables and one dependent variable in which the relationship between variables was linear**.**

RESULTS AND DISCUSSION

The results and discussion is divided into four parts based on objectives of the study which are socio-demographic and economic characteristics, problems of current park management and key issues on collaborative management, potential factors for collaborative management of Doi Suthep-Pui national park, and hypothesis testing result.

Part 1: Socio-Demographic and Economic Characteristics

1. Socio-Demographic Characteristics

The socio-demographic characteristics of the respondents can be described by status in household, gender, age, religion, marital status, household size and demographic structure of the household, birth place and races. The socio-demographic characteristics of the respondents are summarized in Table 6.

Status in household The most of the respondents was head of household. Among total 180 respondents, 58.9% was head of household. Whereas 16.7%, 7.8%, 16.1%, and 0.6% respondents were spouse, parent, son/daughter, and others respectively. This was happen because for questionnaire survey household representatives were selected as respondents.

Gender The most of the respondents 68.3% were male and rest 31.7% respondents were female. Where the total number of household members was 880 of which 49.5% were male and 50.5% were female.

Religion Majority of the respondent 86.7% was Buddhist. Whereas, 13.3% respondents were from other religion

Table 6 Socio-Demographic characteristics of the respondents

(n = 180)

Characteristics	Number	Percent
Status in household		
- Head of household	106	58.9
- Spouse	30	16.7
- Parents	14	7.8
- Son/daughter	29	16.1
- Other	1	0.6
Gender		
- Male	123	68.3
- Female	57	31.7
Age class (in years)		
- 14-20	14	7.8
- 21-30	36	20.0
- 31-40	50	27.8
- 41-50	55	30.6
- 51-60	18	10.0
- 61-84	7	3.9
Mean = 38.48		
Standard deviation = 12.54		
Household size (head)		
- 2	14	7.8
- 3-4	86	47.7
- 5-6	50	27.8
- 7-8	16	8.9
- 9-10	7	3.9
- >10	7	3.9
Mean = 4.89		
Standard deviation = 2.26		

Table 6 (cont'd)

n = 180

Characteristics	Number	Percent
Male members = 436(49.5%)		
Female members= 444(50.5%)		
Religion		
- Bhuddism	156	86.7
- Others	24	13.3
Education level of household members		
- None	216	26.5
- Primary (1^{st} -6^{th} yr.)	237	29.1
- Secondary (7^{th}-9^{th} yr.)	131	16.1
- High school (10^{th} -12^{th} yr.)	139	17.0
- College/University	51	6.3
- Vocational/other training	41	5.0
Marital status		
- Married	153	85.0
- Single	22	12.2
- Divorced/separated	5	2.8
Birth place		
- This village	114	63.3
- Other	66	36.7
Race		
- Thai	179	99.4
- Others	1	0.6

Age The age of the respondents ranged from 14 to 84 years old with a mean of 38.5 years, standard deviation12.54. Majority of the respondents 30.6% was aged between 41-50 years old. Where 7.8%, 20.0%, 27.8%, 10.0%, and 3.9% respondents were aged between 14-20 years, 21-30 years, 31-40 years, 51-60 years and over 60 years old respectively.

Marital status Majority of the respondents 85% was married. Whereas 12.2% was single and rest 2.8% was divorced/separated. The respondents were selected from sample households as representative of the households. This may be cause for most of the respondents were married and responsible person in the household.

Birth place Majority of the respondent's 63.3% birth place was in their present living place/own villages. Whereas rest 36.7% respondents birth place is other village.

Race Almost all the respondent's 99.4% were Thai. Only 0.6% respondents were non-Thai.

Household size and demographic structure of household The average of household size of the respondents was 5 with the range of 2 to 15. The national average household size in 2000 was 4.1 (NSO; Demographic Characteristics Projection for Thailand 1990-2015). The respondents' average household size was higher than national average. Even though the meanings of the household differs from nuclear family but most of the households of villages inside national park and surrounded by national park consisted to nuclear family members. The one who have married must separate house and other belongings from their parents according to the social culture of Hmong even other groups of local peoples. Most of the respondent household size range from 3-4 member 47.7%. The age classes of the household members of respondents are 5 years and below old 10.9%, 6-17 years old 21.3%, 18-44 years old 46.2%, 45-64 years old 17.5% and 65 years and above old 4.1% which represents that majority of the members of respondents' households is young generation. Total 49.5% members of the respondents' households were male and rest 50.5% was female. That means male was less than female. Respondent household size (head) and household age classes are summarized in Table 6 and Table 7 respectively.

Education level of household members Majority of the respondent household members 29.1% level of education is within primary school (studying / or complete). Whereas 26.5% member's level of education is below primary i.e. none

educated. Other members level of education are 16.1% secondary level, 17% high school level, 6.3% college/or university level, 5% attained vocational/or other training. Though there were 880 household members in 180 sample households, 65 members are so young that they are now not going to school. It could be understood that the poverty and lack of belongings still circled around inhabitants of villages inside and surrounding national park. Though national park is situated very close to Chiang Mai city level of education of respondents household members are not satisfactory to researcher. Since the National Education Act of 1999 prescribes the duration of compulsory education for nine years, as a result, children should be at school until the age of 15 years. The law is also moving towards the extension of basic education opportunity in the schooling system to 12 years. This not only affected to the Thai in the low land and / or urban area, but also the tribal in deciding their children education. But the law is not strictly enforced in the study area. The level of education of the respondents household members are summarized in Table 6**.**

Table 7 Demographic structure (age class) of sample household members

(n = 880)

Age class (in years)	Numbers	Percent
0-5	96	10.9
6-17	187	21.3
18-44	407	46.2
45- 64	154	17.5
65 and above	36	4.1

2. Economic Characteristics of the Respondents

Major and minor occupation Majority of the respondents 55% recognized that their major occupation agriculture and /or farming related. Whereas other respondents 45% major occupation is selling souvenir, food shops and other non-farming related. On the other hand 25.6% respondents recognized that their minor occupation is agriculture and/or farming related and other 74.4% respondents recognized that their minor occupation is other than agriculture and/or non-farming

related. From the finding it could be understood that 25.6% respondents minor occupation is agriculture and /or farming related though 45% of the respondents major occupation is agriculture and/or non-farming related i.e. most of the respondents (80.6%) choose agriculture and/or farming related activities as their occupation. Respondents' major and minor occupations are summarized in Table 8.

Farm size The average farm sizes of the respondents were 8.13 *rai*s. The majority of the respondents 37.2% farm size were1-5 *rai*s. 15% respondents had no farm land. Other respondents 23.9%, 12.8%, 3.3%, 2.8%, 2.8%, and 2.2% farm size rage were between 6- 10, 11-15, 16-20, 21-25, 26-30, and 31-100 *rai*s respectively. There were big gap of farm size (range) which 0-100 *rai*s. Most of the respondents living inside national park villages had no own land for farming because the owner of the land is government park agency.

Gross annual household income The mean gross annual household income of the respondents is 81261.67 Baht with the range minimum 3,000 Baht to maximum 500,000 Baht. Gross annual household income range (in Baht) of the respondents households are 10,000 and below, 10,001 - 40,000, 40,001 – 72,000, 72,001 – 120,000, 120,001- 250,000, and 250,001 -500,000 Bahts respectively 5.6%, 31.1%, 30.1%, 22.2%, 7.8%, and 2.2%. Majority of the respondents 36.7% gross annual income is 40,000 Bahts and below. Finding shows that most of the respondents household 89.5% gross annual income is 120,000 Bahts and below. The national gross annual household income is 146,220 Bahts (National Statistics Office, 2002). That means about 90% of the respondents households gross annual income were below national average. Average poverty line in Thailand in 2003/2004 was 1,363 Bahts per month. The poverty line is obtained by specifying a consumption bundle considered adequate for basic consumption needs and then by estimating the costs of these basic needs. In the other words, the poverty line is conceptualized as a minimum standard required by an individual to fulfill his or her basic food and no-food needs (World Bank, 2004). Therefore, the inhabitants of villages inside and surrounded Doi Suthep-Pui are generally still poor.

Table 8 Economic characteristics of respondents

(n =180)

Characteristics	Number	Percentage
Major occupation		
- Agriculture and/or farming related	99	55.0
- Others	81	45.0
Minor occupation		
- Agriculture and /farming related	46	25.6
- Others	134	74.4
Farm size (total land holding) in *rai***		
- 0	27	15.0
- 1-5	67	37.2
- 6-10	43	23.9
- 11-15	23	12.8
- 16-20	6	3.3
- 21-25	5	2.8
- 26-30	5	2.8
- 31-100	4	2.2
Mean = 8.13		
Standard deviation = 10.54		
Gross annual household income (in Baht*)		
- 10,000 and below	10	5.6
- 10,001- 40,000	56	31.1
- 40,001- 72,000	55	30.6
- 72,001- 120,000	40	22.2
- 120,001- 250,000	14	7.8
- 250,001- 500,000	4	2.2
Mean = 81, 261.67		
Standard deviation = 159,347.60		

Table 8 (cont'd)

(n =180)

Characteristics	Number	Percentage
Comparison of household income and expenses		
- Sufficient with some saving	85	47.2
- Sufficient but no saving	40	22.2
- Do not sufficient	55	30.6
Need to change /or not the respondents major occupation		
- Need to change	70	38.9
- Do not need to change	110	61.1

Note: * 1 US Dollar equal to 40 Baht

** 6.25 *rai* equal to 1 hectare

Comparison of household income and expenses The majority of the respondents 47.2% recognized that their household annual income is sufficient with some savings. Whereas 30.6% and 22.2% recognized do not sufficient and sufficient but no saving respectively. Findings show that majority recognized their household income sufficient with some savings though average household income of respondent is far below the national average household income. The national gross annual household expenses were 120,300 Bahts (National Statistics Office, 2002). That means the respondents average household gross annual income and gross annual expenses both are below the national level.

Need to change and/or not the respondents major occupation The majority of the respondents 61.1% do not want to change their present major occupation. Other respondents 38.9% think that if there is any better chance they want to change their present major occupation. Result show that most of the respondents do not want to change their present major occupation though they had not sufficient income from major occupation to expenses their life and to save some for future.

Table 9 Land holding of the respondents

(n =180)

Types of lands	Number	Percent
Owned land (*rai*s)		
- 0	79	43.9
- 1– 5	57	31.7
- 6 – 10	24	13.3
- 11 – 15	9	5.0
- 16 – 20	8	4.4
- >20	3	1.7
Mean = 4.32		
Standard deviation = 9.03		
Rented land (*rai*s)		
- 0	160	88.8
- 1– 5	16	8.9
- 6 – 10	3	1.7
- 11 – 15	1	0.6
Mean = 0.48		
Standard deviation = 1.79		
Borrowed land (*rai*s)		
- 0	157	87.2
- 1– 5	22	12.2
- 6 – 10	1	0.6
Mean = 0.38		
Standard deviation = 1.14		
Other land (*rai*s)		
- 0	122	67.7
- 1– 5	24	13.3
- 6 – 10	20	11.1
- >10	7	3.9

Table 9 (cont'd)

(n =180)

Types of lands	Number	Percent
Mean = 2.95		
Standard deviation = 6.09		
Total land holding(*rai*s)		
- 0	27	15.0
- 1 – 5	67	37.2
- 6 – 10	43	23.9
- 11 – 15	23	12.8
- 16 – 20	6	3.3
- >20	14	6.8
Mean = 8.13		
Standard déviation = 10.54		

Note: 1 *rai* =0.16 hectare

Land holding In the study land holding of the respondents household were classified into owned land, rented land, borrowed land, other land and total land holdings and unit of the land were in *rai*s (1 *rai* = 0.16 hectare). The findings of the study are summarized in Table 9.

Owned land The majority of the respondents household 43.9% had no owned land for farming. Most of the respondents living inside national park villages had no owned land for farming because the owner of the land is government park agency. This is why majority of the respondent households had no owned farm land. Whereas 31.7% respondent households had their owned land range from 1-5 *rai*s where the mean owned land holding of the respondents households were 4.32 *rais* and highest owned land holder household had 100 *rai*s land. Other respondent households 13.3%, 5.0%, 4.4%, and 1.7% had 6-10, 11-15, 16-20, and more than 20 *rai*s owned land respectively.

Rented land The majority of the respondents household 88.8% had no rented land for farming activities. On the other hand 8.9% respondent households had rented land range from 1-5 *rais* where mean rented land holding was 0.48 *rai* and highest rented land holder had 13 *rai*s respectively. Other respondents household 1.7%, and 0.6% had respectively 6-10, and 11-15, *rai*s rented land.

Borrowed land The majority of the respondent households 87.2% had no borrowed land. On the other hand 12.2% respondent households had borrowed land range from 1-5 *rais* where mean borrowed and highest land holding of respondents households were 0.38 *rais* and 8 *rais* respectively. There were only one respondent household hold more than 5 *rais* of borrowed land which was 8 *rais.*

Other land The majority of the respondents households 67.7% had no other (except owned, rented and borrowed) land. On the other hand 13.3% respondent household had other land range from 1-5 *rais* where mean other land holding was 2.95 *rais* and highest other land holding was 35 *rai*s. Other respondent households 11.1%, and 3.9% had other land respectively 6-10 *rai*s, and more than10 *rai*s.

Total land holding The majority of the respondent households 37.2% had total land holding 5 *rais* and below where mean total land holding was 8.13 *rais* and highest total land holding was 100 *rais* respectively. On the other hand 15% respondent households had no land. Other respondent households 23.9%, 12.8%, 3.3%, and 6.8% had respectively 6-10, 11-15, 16-20, and more than 20 *rai*s total land.

Forest resources utilization Forest resources were classified into wild plants, wild animals, wood, fuelwood, wood used for making charcoal, wood used for construction, wood used for making furniture, wood used for craft, and other. Utilization were categorized into use and do not use. In case of use the type of used was categorized into used for household use only, sell some, and sell all. The findings of the study are summarized in Table 10.

Wild plants The majority of the respondents 56.7% do not use wild plants. Whereas 36.7% used wild plants for household consumption only, 6.6% used for sell some also. Among those who used wild plants most of them 27.2% used 1-5 species of wild plants and rest 6.6% used 6-10 wild plants species. That recognized that most of the respondents and their household members were not defendant on wild plants for their livelihood.

Wild animals The majority of the respondents 83.3% do not use wild animals. Whereas 12.2% used wild animals for household consumption only, 4.5% used for sell some also. Among those who used wild animals most of them 12.7% used 1-5 species of wild animals and rest 4% used 6-10 wild animal species. This also recognized that most of the respondents and their household members were not defendant on wild animals for their livelihood.

Wood The majority of the respondents 95% do not use wood. Other 5% used wood for household consumption only. Actually almost all respondents and/or their household members have used wood for their own household purposes. But in interview survey it was estimated from last year. This is why study recognized that most of the respondents and/or their household do not use wood.

Fuelwood The majority of the respondents 81.1% used fuelwood for household use only. Other 18.9% do not used fuelwood. The reality is that almost all respondent have used fuelwood for their household consumption though the study show that 18.9% do not used fuewood. Only minor portion of respondent and/or their household members may used electricity /or gas as fuel for cooking purposes.

Wood for making charcoal The majority of the respondents 97.2% do not use wood for making charcoal. Other 2.8% used wood for making charcoal for household consumption only. That means there were no commercial charcoal producers found in the study area who and/or their household members were defendant on charcoal production i.e. on forest resources for their livelihood.

Table 10 Forest resources utilization

(n = 180)

Types of forest resources	Number	Percent
Wild plants		
- Do not use	102	56.7
- Use for household only	66	36.7
- Use for sell some	12	6.6
If use, number of species		
- 1-5	49	27.2
- 6-10	29	16.1
Wild animals		
- Do not use	150	83.3
- Use for household only	22	12.2
- Use for sell some	8	4.5
If use, number of species		
- 1-5	23	12.7
- 6-10	7	4.0
Wood		
- Do not use	171	95.0
- Use for household only	9	5.0
Fuelwood		
- Do not use	34	18.9
- Use for household only	146	81.1
Wood used for making charcoal		
- Do not use	175	97.2
- Use for household only	5	2.8
Wood used for construction		
- Do not use	96	53.3
- Use for household only	84	46.7

Table 10 (cont'd)

(n = 180)

Types of forest resources	Number	Percent
Wood used for making furniture		
- Do not use	154	85.6
- Use for household only	26	14.4
Wood used for craft		
- Do not use	180	100.0
Wood used for other purposes		
- Do not use	170	94.4
- Use for household only	9	5.0
- Use for sell some	1	0.6

Note: The compute value of forest resources utilization summarized as

Maximum = 24.00; Minimum = .00; $\overline{X}$ = 5.356; and SD = 2.000

Wood for construction The majority of the respondents 53.3% do not use wood for construction. Other 46.7% used wood for household use only. Actually almost all respondents and/or their household members have used wood for construction in their own household purposes at least some in their lives. But in interview survey it was estimated from last year. This is why study recognized that most of the respondents and/or their household do not use wood for construction.

Wood for making furniture The majority of the respondents 85.6% do not use wood for making furniture. Other 14.4% used wood for making furniture for household use only. Actually most of the respondents and/or their household members have used wood for making furniture at least their own household purposes. But in interview survey it was estimated from last year. This is why study recognized that most of the respondents and/or their household do not use wood for making furniture.

Wood for craft All the respondents 100% do not use wood for craft.

Other uses of wood The majority of the respondents 94.4% do not use wood in other purposes. Whereas 5% have use of wood in other purposes for household use only and rest 0.6% used wood in other purposes for sell some also. That means respondents and/or their household members were not defendant on forest resources especially on wood for their livelihood.

The findings of the study show that most of the respondents and /or their household members used very few amount of forest resources other than fuelwood. Those who used forest resources like wild plants and animals they used for their household used / consumption only. Very few respondents used forest resources to household use and /or also sell some. There were no one found who sell full forest resources for his/her household members livelihood maintained. That means there were no ones who fully depended on forest resources for his/her and their household members' livelihood.

Compute values of forest resources utilization Forest resources utilization was considered one independent variable in the study hypothesis. So computed values of forest resources utilization were used for the testing of the study hypothesis. To determine the values of forest resources utilization, the value level used were do not use equal to zero (0), use for household use only equal to one (1), use for sell some equal to two (2), and use for sell all equal to three 93). The computed values of forest resources utilization were maximum = 24.00; minimum = .00; $\overline{X}$ = 5.356; and SD = 2.000.

Part 2: Problems of Current Park Management and Key Issues for Collaborative Management of Doi Suthep-Pui National Park

1. Problems of Current Management of Doi Suthep-Pui National Park

The review of related literature and field study revealed that there were some problems in current management of Doi Suthep-Pui national park such as:

Main problems of current management of national park Recreation, education, and research are the only three types of activity allowed within national parks. In consistency with the objectives of goal of national park management specified by IUCN, the management goals of Thailand's national park are to *preserve natural ecosystem, to provide access, and to facilitate recreation, education, and research activities.* National parks are intended to decelerate biological resource destruction within the country. All the consumptive uses, i.e. logging, hunting, collecting, etc. are prohibited by law. Findings of the study shows that the main problems of traditional management of national park are illegal tree cutting 75.6%, land encroachment for settlement and commercial uses 45.6%, expansion of agricultural lands within national park 42.2%, wildlife hunting and poaching 25.6%, livestock grazing 12.8%, fuelwood collection 11.1%, unclear boundary demarcation 10.6%, inadequate staffs for protection 10.6%, setting fires 8.9%, non timber forest products collection 5%, and lack of good governance 4.4%. In the forest resources utilization parts, the study shown that there were not a single respondents and/or household found who was fully defendant on forest resources for their livelihood. But here show that illegal tree cutting is main problem in the national park management which is contradictory. Encroaching and poaching pressures on national parks and other protected areas in Thailand have occurred since the protected area system was first established (Kasetsart University, 1987). Governance involves the interactions among structures, processes and traditions that determine how power is exercised, how decisions are taken and how citizens and other stakeholders have their say. It is a concept that applies at all levels in the field of protected areas- site, national, regional

and global (Institute of Governance, 2002).Good governance of protected areas has to recognize such social and economic movement together with the keeping balance of maintaining benefit to the society-at-large and to future generations. Study findings about main problems of current management are summarized in Table 11.

Emphandhu and Chettamart (2003) recognized some major management issues and problems in Thailand's protected areas in their jointly presented paper on "Thailand Experience in Protected Area Management" at Vth IUCN World Park Congress, Durban, South Africa, 8-17 September, 2003. These major management issues and problems are:

Poaching issue: The size and number of Thailand protected areas system has increased rapidly. However maintaining the ecosystem in good health is still a serious issue. Though, agricultural area expansion into protected area seems lessened than in the past, the threat from poaching is still a serious issue today. Illegal logging, commercial forest product collecting such as *Aquiraria crasna* (Agar wood), illegal wildlife hunting and fishing can be found in most of the protected areas.

Tourism issue: Because of the government policy and tourism demand is substantial increased in national parks and some wildlife sanctuaries, more infrastructures to accommodate tourists needs have been greatly developed and sometime in conflict with prime objectives of maintaining ecological integrity in protected areas. Wildlife sanctuaries which are classified as IUCN category Ia are now allowed for tourism use despite main objective of wildlife and habitat preservation. The uncontrolled tourism development may cause impacts to protected areas in long terms.

Conflict issue: Human right movement for the grass-root population is relatively strong at present. Some social scientists and NGOs called for the parliament to pass a bill "Community Forest" in order to allow local inhabitants to own and manage forest nearby for their needs including forest in protected areas. However, the conservation NGOs and natural scientists are opposed to this idea since they see that

protected area management must be not only for local communities benefit but for the society at large. Conflict in protected area level between government officials, local people and other government agencies still exists due to several problems such as unclear protected area boundary, illegal utilization of forest products in protected areas, conflicting plans and policies among agencies, for instances.

No legal backup for management plan implementation: Current management plan are not legally backup. Therefore, most often left unimplemented. Rather, protected area management is likely to operate upon ad hoc decisions of protected area managers or higher administrators.

Table 11 Main problems in current management of Doi Suthep-Pui national park according to respondents' opinion

(n=180)

Problems	Numbers	Percent
Illegal tree cutting	136	75.6
Land encroachment for settlement and commercial uses	82	45.6
Expansion of agricultural lands within national park	76	42.2
Wildlife hunting and poaching	46	25.6
Livestock grazing	23	12.8
Fuelwood collection	20	11.1
Unclear boundary demarcation	19	10.6
Inadequate staffs for protection	19	10.6
Setting fires	16	8.9
Non timber forest products collection	9	5.0

Conflict between community and national park agency The study found that the majority of the respondents 121 think that there is conflict between community and national park agency in national park management. Whereas 59 think that there is no conflict between community and national park agency in national park management. That means majority of the respondents do not conform to present park regulations and management activities followed by park agency. To improve

situations, during collaborative management program development and implementation provision for motivation of local people through training programs should be included.

Causes of conflicts The respondents who said there is conflicts between community and national park agency were asked on pre-pared statement/causes of conflicts for their opinion and degree of conflicts (very slightly, slightly, moderate, strong, and very strong). Different respondents reply differently for different statements/ or causes which are summarized in Table 12. The results are 31.6%, 24.6%, 20.2%, 14.9%, and 8.7% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on illegal tree cutting. 46.4%, 25.0%, 21.4%, 3.6%, and 3.6% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on fuelwood collection. 55%, 24.8%, 13.8%, 1.8%, and 4.6% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on non-timber forests products collection. 22.1%, 14.2%, 14.2%, 31.0%, and 18.5% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on land encroachment. 48.2%, 26.4%, 14.5%, 604%, and 4.5% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on wildlife hunting. 41.7%, 32.4%, 18.5%, 2.8%, and 4.6% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on livestock grazing. 19.3%, 14.9%, 20.2%, 27.2%, and 18.4% respectively said that there were very slightly, slightly, moderate, strong, and very strong conflicts between national park agency and community in national park management on expansion of agricultural land within national park.

The park is situated in boundary of the Thailand's second largest city Chiang Mai. So the value of land near and/or surrounded the city is very high for commercial used like building resorts for tourists, established industries, etc. and other non-commercial use like settlement and/or residential use. Land encroachment for agricultural and/or farming related activities as well as for commercial and/or residential or other uses is very high in Doi Suthep-Pui national park. Whereas land encroachment is happen for agricultural and/or farming related activities and/or settlement purposes in most of the other remote protected areas and/or national parks of the nation.

Most of the national parks of Thailand have faced challenges in protecting the country's remaining forests and biodiversity due to the presence of villages inside park boundaries or in surrounding areas. The majority of these villagers consume natural resources within the parks. Earlier studies found that more than 70% of local people living inside and near six national parks use biological resources in the national parks as an income source. Patterns of resource utilization of those local people ranges from encroaching on park land for agriculture, grazing, hunting, commercial fishing, and cutting wood, to collecting wild plants and plant products (Kasetsart University 1990a,1990b, 1991a, 1991b, 1991c, 1992). These patterns of resource utilization do not conform to the requirements of the National Park Act (RFD 1961). They also reflect an undesirable relationship between national parks and local communities.

Human right movement for the grass-root population is relatively strong at present. Some social scientists and NGOs called for the parliament to pass a bill "Community Forest" in order to allow local inhabitants to own and manage forest nearby for their needs including forest in protected areas. However, the conservation NGOs and natural scientists are opposed to this idea since they see that protected area management must be not only for local communities benefit but for the society at large. Conflict in protected area level between government officials, local people and other government agencies still exists due to several problems such as unclear protected area boundary, illegal utilization of forest products in protected areas, conflicting plans and policies among agencies, for instances.

Table 12 Percentage distribution of respondents classified by their opinion about level of conflicts between community and national park agency in Doi Suthep-Pui national park management

(n=180)

Causes of conflicts	Percent (number)				
	VS	Slgt.	M	Str.	VStr.
Illegal tree cutting	31.6	24.6	20.2	14.9	8.7
(Valid n=114 & not apply 66)	(36)	(28)	(23)	(17)	(10)
Fuelwood collection	46.4	25.0	21.4	3.6	3.6
(Valid n=112 & not apply 68)	(52)	(28)	(24)	(4)	(4)
Non-timber forests products	55.0	24.8	13.8	1.8	4.6
collection	(60)	(27)	(15)	(2)	(5)
(Valid n=109 & not apply 71)					
Land encroachment for settlement	22.1	14.2	14.2	31.0	18.5
and commercial uses	(25)	(16)	(16)	(35)	(21)
(Valid n=113 & not apply 67)					
Wildlife hunting and poaching	48.2	26.4	14.5	6.4	4.5
(Valid n=110 & not apply 70)	(53)	(29)	(16)	(7)	(5)
Livestock grazing	41.7	32.4	18.5	2.8	4.6
(Valid n=108 & not apply 72)	(45)	(35)	(20)	(3)	(5)
Expansion of agricultural land	19.3	14.9	20.2	27.2	18.4
within national park	(22)	(17)	(23)	(31)	(21)
(Valid n=114 & not apply 66)					

Note: VS = Very Slightly
Slgt. = Slightly
M = Moderate
Str. = Strong
VStr. = Very Strong

2. Key Issues for Collaborative Management of the Doi Suthep-Pui National park

The review of related literature and theoretical framework revealed that there were some factors which should be potential for collaborative management of Doi Suthep-Pui national park. These are as follows:

Table 13 Key issues for collaborative management of Doi Suthe-Pui national park

(n=180)

Issues for collaborative management	Number	Percent
Conflicts between community and park agency		
- Yes, has some conflict	121	67.2
- No conflict	59	32.8
Know and/or not Doi Suthep-Pui is a national park		
- Know Doi Suthe-Pui is a national park	173	96.1
- Do not know Doi Suthe-Pui is a national park	7	3.9
Know and/or not the difference between national park and other forests		
- Yes, know the difference	60	33.3
- No, do not know the difference	120	66.7
Know and/or not national park regulations		
- Yes, know national park regulations	98	54.4
- No, do not know national park regulations	82	45.6
Get and/or not benefit from national park since established as local people		
- Yes, get some benefit	93	51.7
- No, do not get any benefit	87	48.3
Grow and/or not trees for household use		
- Yes, grow tree for household use	81	45.0
- No, do not grow tree for household use	99	55.0
If grow, how many species		
- 1-10 species	77	42.8
- 11-20 species	4	2.2

Respondents know and/or not Doi Suthep-Pui is a national park The study found that the majority of the respondents 96.1% know that Doi Suthep-Pui is a national park. Other 3.9% do not know Doi Suthep-Pui is a national park. It is positive for develop a collaborative management practices for the park because local people already know that Doi Suthep-Pui is a national park.

Respondents know and/or not the difference between national park and other forests Findings show that **t**he majority of the respondents 66.7% do not know difference the between national park and other forests. Other 33.3% know the difference between national park and other forests. If any training and/or awareness raising program for local people launch under collaborative management program will be helpful to raising awareness and/or knowledge of local people on difference between national park and other forests.

Respondents know and/or not national park regulation Study result shows that the majority of the respondents 54.4% know national park regulations. Other 45.6% do not know the national park regulations. In this case also if any training and/or awareness raising program for the local people launch under collaborative management program will be helpful to raising awareness and/or knowledge of local people on national park regulations.

Benefit from national park to local peoples Finding show that the majority of the respondents 51.7% get some benefit from national park since established. Other 48.3% do not get any benefit from national park since established. The respondents were gave answer thinking direct economic benefit like logging, direct employment, etc. form national park. Most of the respondents were getting indirect benefit like selling souvenirs, foods to tourists, employ as tourist guide, etc. If the national park agency or other stakeholder able to play their rule to make understand the local people about the benefits of the national park, it will be helpful for future development of collaborative management program of the national park.

Grow trees for household use The study found that the majority of the respondents 55% do not grow trees for their household use. Other respondents 45% grow trees for their household use. Among 45% those who grow trees maximum respondents 42.8% grow 1-10 tree species and rest 2.2% respondents grow 11-20 tree species. Overall the respondents are not habituated in tree growing in their household for their household use. If there were any motivation and incentive providing programs for tree grown for household use the situation may changed and improved.

Part 3: Potential Factors for Collaborative Management of Doi Suthep-Pui National Park

Choosing management systems The study found that the majority of the respondents 62.8% choose collaborative management system for national park management as an inhabitant of villages inside national park and/or nearby surrounded people. Whereas 27.8% choose either's collaborative or current management system for national park management and 9.4% choose current management system for national park management. The findings are summarized in Table 14.

Degree of agreement to participate in collaborative management Participation means the involvement stakeholders in sharing responsibilities, duties, and benefits. There were five degree of agree among those every respondents may choose any one of them. These were strongly agree, agree, some what agree, disagree and /or strongly disagree to participate in collaborative management of national park. The study finding show that most of the respondents 45.6% agree to participate in collaborative management of national park. Whereas 29.4% strongly agree, 21.6% some what agree, 1.7% disagrees, and 1.7% strongly disagrees to participate in collaborative management of national park. For successful collaborative management program active participation is essential from every stakeholder. In Doi Suthep-Pui national park collaborative management system respondents i.e. villagers living inside national park and surrounding national park will be the main stakeholder. Without any

motivation most of the respondents were agreed and/or strongly agreed to participate in collaborative management of the park. The findings are summarized in Table 14.

Table 14 Factors affecting collaborative management of Doi Suthep-Pui national park (n = 180)

Factors affecting on collaborative management	Number	Percent
Choice of national park management system		
- Current management	17	9.4
- Collaborative management	113	62.8
- Either approach	50	27.8
Degree of agreement to participate in collaborative management		
- Strongly disagree	3	1.7
- Disagree	3	1.7
- Some what agree	39	21.6
- Agree	82	45.6
- Strongly agree	53	29.4
Most respected person in the community		
- Community leader	136	75.6
- Local government officer	29	16.1
- Local politician	7	3.9
- Local NGO official	1	0.6
- Other	7	3.9

Most respected person in the community The study found that more than two-third of the respondents 75.6% most respected person in their society is community leader. Whereas 16.1%, 3.9%, 0.6%, and 3.9% respectively recognized local government officers, local politicians, local NGO officials, and others as most respected person in their society. In Doi Suthep-Pui national park collaborative management system respondents i.e. villagers living inside national park and surrounding national park will be the main stakeholder. Their most respected person in their society is their community leader. The findings are summarized in Table 14.

Table 15 Required management measures suggested by local people towards Doi Suthep-Pui national park management

(n=180)

Management tools	Percent (number)				
	1st	2nd	3rd	4th	5th
Providing knowledge about park regulations to local people	18.3 (33)	6.7 (12)	11.7 (21)	2.2 (4)	6.7 (12)
Being friendly with local people	11.7 (21)	21.7 (39)	10.6 (19)	9.4 (17)	10.0 (18)
Enhancing public relations about national park management	5.0 (9)	7.2 (13)	8.9 (16)	9.4 (17)	8.9 (16)
Strictly enforce regulations to prevent encroaching and wildlife poaching	1.1 (2)	2.8 (5)	2.8 (5)	7.2 (13)	7.2 (13)
Demarcating national park boundaries	8.3 (15)	7.2 (13)	12.8 (23)	6.7 (12)	6.7 (12)
In equity with all local people	6.7 (12)	7.8 (14)	12.8 (23)	11.1 (20)	10.0 (18)
Providing new piece of land for agriculture	23.3 (42)	7.8 (14)	8.9 (16)	7.2 (13)	5.6 (10)
Allowing local people to establish community forest	5.6 (10)	13.9 (25)	5.0 (9)	12.2 (22)	4.4 (8)
Promoting tourism and the participation of local people in tourism management	11.1 (20)	7.8 (14)	7.2 (13)	11.1 (20)	10.0 (18)
Promoting local economy through other income generating activities	5.6 (10)	6.1 (11)	10.0 (18)	12.2 (22)	12.8 (23)
Providing support for infrastructure development in local communities	0.6 (1)	5.6 (10)	3.3 (6)	5.0 (9)	6.7 (12)
Supporting local communities development programs	2.8 (5)	5.6 (10)	6.1 (11)	6.1 (11)	11.1 (20)

Note: 1st, 2nd, 3rd, 4th, and 5th refers to choice of respondents.

Management measures required suggested by local people towards national park management The respondents are asked to choose top five priorities for national park management practices that they expected/that are important to them among 12 pre-prepared management tools/or others if any according to them. Study findings are presented in Table 15. The study found that different respondents reply differently for their chosen priority. The most of the respondents 23.3% choose providing new piece of land for agriculture is important for national park management as 1st priority. Whereas 7.8%, 8.9%, 7.2%, and 5.6% choose it as 2nd, 3rd, 4th , and 5th priorities respectively. 18.3%, 6.7%, 11.2%, 2.2%, and 6.7% choose providing knowledge about park regulation to local people as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 11.7%, 21.7%, 10.6%, 9.4%, and 10.0% choose being friendly with local people as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 5.0%, 7.2%, 8.9%, 9.4%, and 8.9% choose enhancing public relations about national park management as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 1.1%, 2.8%, 2.8%, 7.2%, and 7.2%choose strictly enforce regulations to prevent encroaching and wildlife poaching as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 8.3%, 7.2%, 12.8%, 6.7%, and 6.7% choose demarcating national park boundaries as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 6.7%, 7.8%, 12.8%, 11.1%, and 10.0% choose in equity with all local people as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 5.6%, 13.9%, 5.0%, 12.2%, and 4.4% choose allowing local people to establish community forest as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 11.1%, 7.8%, 7.2%, 11.1%, and 10.0% choose promoting tourism and the participation of local people in tourism management as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 5.6%, 6.1%, 10.0%, 12.2%, and 12.8% choose promoting local economy through other income generating activities as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 0.6%, 5.6%, 3.3%, 5.0%, and 6.7% choose providing support for infrastructure development in local communities as 1st, 2nd, 3rd, 4th, and 5th priorities respectively for national park management. 2.8%, 5.6%, 6.1%, 6.1%, and 11.1% choose supporting local communities' development programs as 1st, 2nd, 3rd, 4th, and 5th priorities respectively

for national park management. That means respondents were aware about national park management practice. This awareness is a potential factor which may be very much helpful in collaborative management of Doi Suthep-Pui national park.

Local peoples' attitudes towards national park management activities The respondents are asked about their perception for 9 pre-prepared national park and /or biodiversity conservation related statements. There were five degree of agree among those every respondents may and/or may not choose any one of them. These were strongly agree, agree, some what agree, disagree and /or strongly disagree to participate in collaborative management of national park. Study findings are presented in Table 16. Study found that different respondents reply differently for different statements. 35.6%, 55.0%, 6.7%, 1.7%, and 1.1% respondents were respectively strongly agree, agree, neither agree nor disagree, disagree and strongly disagree that the designation of national park help protecting forest encroaching and hunting. 40%, 55.0%, 3.8%, 0.6%, and 0.6% respondents were respectively strongly agree, agree, neither agree nor disagree, disagree and strongly disagree that forest area should be protected for recreation and nature study purposes. 42.2%, 50%, 7.2%, and 0.6% respondents were respectively strongly agree, agree, neither agree nor disagree, and strongly disagree that forest area should be protected in order to protect biodiversity for next generation. 27.8%, 51.7%, 12.7%, 6.7%, and 1.1% respondents were respectively strongly agree, agree, neither agree nor disagree, disagree and strongly disagree that controlling expansion of agricultural lands within national park. 38.9%, 47.2%, 8.9%, 2.2, and 2.8% respondents were respectively strongly agree, agree, neither agree nor disagree, disagree and strongly disagree that allowing long-term residents who lived here before the national park was designated to collaborative management. 13.3%, 51.1%, 21.2%, 12.2%, and 2.2% respondents were respectively strongly agree, agree, neither agree nor disagree, disagree and strongly disagree that enhancing the enforcement of national park regulations.17.8%, 50.6%, 20.5%, 6.1%, and 5% respondents were respectively strongly agree, agree, neither agree nor disagree, disagree and strongly disagree that local people gain benefit from the designation of the national park.

Table 16 Local peoples' attitudes towards Doi Suthep-Pui national park management activities

(n=180)

Statements	Percent (number)					$\overline{X}$	SD
	SA	A	NA	D	SDa		
The designation of national park helps protecting forest encroaching and hunting	35.6 (64)	55.0 (99)	6.7 (12)	1.7 (3)	1.1 (2)	4.22	.74
Forest area should be protected for recreation and nature study purposes	40.0 (72)	55.0 (99)	3.8 (7)	0.6 (1)	0.6 (1)	4.33	.63
Forest area should be protected in order to protect biodiversity for next generation	42.2 (76)	50.0 (90)	7.2 (13)	-	0.6 (1)	4.33	.66
Controlling expansion of agricultural lands within national park	27.8 (50)	51.7 (93)	12.7 (23)	6.7 (12)	1.1 (2)	3.98	.88
Allowing long-term residents who lived here before the national park was designated to collaborative management	40.0 (72)	50.6 (91)	6.7 (12)	2.2 (4)	0.6 (1)	4.27	.73
Controlling grazing within the national park to decrease disturbance of national park ecosystem	12.2 (22)	50.0 (90)	21.7 (39)	13.3 (24)	2.8 (5)	3.56	.96
Allowing local people to use minor forest product from national park for their subsistence	38.9 (70)	47.2 (85)	8.9 (16)	2.2 (4)	2.8 (5)	4.17	.89
Enhancing the enforcement of national park regulations	13.3 (24)	51.1 (92)	21.2 (38)	12.2 (22)	2.2 (4)	3.61	.94

Table 16 (cont'd)

(n=180)

Statements	Percent (number)					$\overline{X}$	SD
	SA	A	NA	D	SDa		
Local people gain benefit from the designation of the national park	17.8 (32)	50.6 (91)	20.5 (37)	6.1 (11)	5.0 (9)	3.70	.99

Note: SA = Strongly Agree; A = Agree; NA = Neither agree nor disagree; D = Disagree; SDa = Strongly disagree; $\overline{X}$ = Grand mean; SD = Standard deviation. Computed Grand total = 6,513; Grand mean = 4.020

Compute value of the local people's attitude towards the national park management Attitudes of the local peoples towards Doi Suthep-Pui national park management was considered one independent variable in the study hypothesis. The compute values of local peoples attitudes towards the national park management were used for the testing of the study hypothesis. To determine the values of the local peoples attitudes towards the national park management activities the value level used were strongly agree the statement equal to five (5), agree the statement equal to four (4), neither agree nor disagree the statement equal to three, disagree the statement equal to two (2), and strongly disagree the statement equal to one (1). The findings of computed values of local peoples attitudes towards the national park management found shown that the grand total of values was 6,513 and mean value 4.020.

The findings also shown that forest area should be protected for recreation and nature study purposes and forest area should be protected in order to protect biodiversity for next generation jointly highest grand mean (4.33) of local peoples attitudes toward the national park management. Whereas, allowing long-term residents who lived here before the national park was designated to collaborative management (4.27) and controlling grazing within the national park to decrease disturbance of national park ecosystem (3.56) were second highest and lowest values respectively.

Main suggestions in conflicts resolution in management of national park

The Study found that according to respondents' opinion the main suggestions in conflicts resolution in national park management were as presented in Table 17. The main suggestions were to provide alternative income generation programs for local people 68.9%, clear and permanent boundary demarcation 52.2%, park management with local peoples participation 48.9%, awareness raising and motivational programs 37.2%, appropriate park regulations 20.0%, and good governance 6.7%. That means respondents are aware about conflicts, causes of conflicts, conflict resolution in national park.

Table 17 Main suggestions for conflicts resolution in Doi Suthep-Pui national park management according to respondents' opinion

(n =180)

Suggestions	Number	Percent
Provide alternative income generation programs for local people	124	68.9
Clear and permanent boundary demarcation	94	52.2
Awareness raising and motivational programs	67	37.2
Park management with local peoples' participation	88	48.9
Appropriate park regulations	36	20.0
Good governance	12	6.7

In the early 1990s there was a major reform of the Thai constitution. The new constitution was completed and passed as the highest law of the land in September 1997 (Phongpaichit, 2001). Chapter V of the 1997 constitution of the Kingdom of Thailand declares that "The state shall promote and encourage public participation in the preservation, maintenance and balanced exploitation of natural resources and biological diversity and in the promotion, maintenance 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." So the constitution creates an opportunity and potential for collaborative management of national park.

Part 4: Hypothesis Testing Results

In this study, hypothesis was that income status, benefit gained from national park, attitude towards national park management, land holding status, forest resources utilization, knowledge about national park regulations, and conflicts between local communities and national park agency influence the degree of agreement to participate in collaborative management for Doi Suthep-Pui national park. The results from multiple regression analysis are summarized in Table 18. The results found income status, benefit gained from national park, attitude towards national park management, land holding status, forest resources utilization, knowledge about national park regulations, and conflicts between local communities and national park agency altogether significantly influence the degree of agreement to participate in collaborative management for Doi Suthep-Pui national park (F= 2.875;Sig.= .007; Multiple R= .324) and they accounted for 6.8% (R^2 = .068) variance in degree of agreement to participate in collaborative management of the national park. However, when looking at relationship between each independent variables and dependent variable it was found that only two variables namely income status (Beta = .193; t = 2.238; Sig. = .027), and attitude towards national park management (Beta = .171; t = 2.190; Sig. = .030) significantly influenced the degree of agreement to participate in collaborative management. Among these two variables income status is more influential variable than attitude towards national park management.

The relationships between each other independent variables and dependent variable found were benefit gained from national park (Beta = .109; t = 1.406; Sig. = .161), land holding status (Beta = -.041; t = -.459; Sig. = .647), forest resources utilization (Beta = -.015; t = -.198; Sig. = .843), knowledge about national park regulations (Beta = .114; t = 1.506; Sig. = .134), and conflicts between local communities and national park agency (Beta = -.018; t = -.240; Sig. = .810). That means those were not significantly influenced the degree of agreement to participate in collaborative management.

Table 18 Results from Multiple Regression Analysis in testing hypothesis

Independent variables	$\overline{X}$	SD	Beta	t	Sig.
Constant				4.101	.000
Income status	71,261.667	69,300.116	.193	2.238	.027
Benefit gained from national park	.517	.501	.109	1.406	.161
Attitude towards national park management	4.020	.4605	.171	2.190	.030
Land holding status	8.128	10.540	-.041	-.459	.647
Forest resources utilization	5.356	5.552	-.015	-.198	.843
Knowledge about national park regulations	.544	.499	.114	1.506	.134
Conflicts between local communities and national park agency	.672	.471	-.018	-.240	.810

Note: F = 2.875; Sig. = .007; Multiple R = .324; R^2 = .068

The theoretical framework revealed may be missed some factors which might be better predictions for potential significant influenced to the degree of agreement to participate in collaborative management of Doi Suthep-Pui national park.

CONCLUSION

Development of collaborative management program in Thailand's national park was the focus in this study and principal objective of this study is to develop collaborative management program for Doi Suthep-Pui national park. For this purpose study considers on socio-demographic and socio-economic characteristics of the local villagers living inside national park and in the proximity of 5 km from the boundaries of the national park, identify problems existing in traditional management, key issues and potential for collaborative management of the national park.

Doi Suthep-Pui national park authority as well as local villagers has recognized the importance of an effective collaborative management of the park in present situation and for the sustainable development of the area as a whole, including local communities and for future generation also. The development of collaborative management programs for national park in Thailand is at the very beginning and it will be a long process. An important step in the long process of developing a collaborative management program is to have a realistic analysis of key strengths and weaknesses. There are no specific management agreements in place with clear rights and responsibilities for each of the stakeholders. The management plan for collaborative management of the national park is still not finalized and approved. Provisions from the 1997 Constitution of Thai which ensure "public involvement in local resource management" will form hopefully the basis of the future agreements with stakeholders on their specific role in collaborative management of the national park.

The study found that income status, benefit gained from national park, attitude towards national park management, land holding status, forest resources utilization, knowledge about national park regulations, and conflicts between local communities and national park agency significantly influence the degree of agree to participate in collaborative management for Doi Suthep-Pui national park (F= 2.875;Sig.= .007; Multiple R= .324; R^2= .068) and they are accounted for 10.5% variance in degree of agree to participate in collaborative management of the national park. The result also

found that only two variables namely income status (Beta = .193; t = 2.238; Sig. = .027), and attitude towards national park management (Beta = .171; t = 2.190; Sig. = .030) influence the degree of agree to participate in collaborative management of the national park. Among these two variables income status is more influential variable than attitude towards national park management.

RECOMMENDATIONS

Collaborative management programs for Doi Suthep-Pui national park and other must be based on a through understanding of local peoples, socio-demographic and socio-economic characteristics of local peoples and other stakeholders. In this way, national park agency and policy makers for national park management programs can consider local peoples socio-demographic, socio-economic characteristics for sustainable and effective collaborative management program. There are some recommendations addressed for collaborative management program development of Doi Suthep-Pui national park and also for future researches.

1. Recommendations for Collaborative Management Program Development of Doi Suthep-Pui National Park

The result brings up a few key issues relevant for the future of collaborative management program development and practices for Doi Suthep-Pui national park. The result found that income status of the local peoples associated with the national park management who will be the key stakeholder is significantly influence to degree of agreement to participate in collaborative management of the national park. So if the government agencies and /or non-government organizations take any programs for uplift income status of the local peoples, the degree of agreement to participate will be high. The study also found that attitude towards national park management is a quite promising factor which significantly influences the degree of agreement to participate in collaborative management of the national park. The recommendations be summarized as follows:

1. The park agency and/or non-government organizations should be taken and implement programs of income generating activities for local peoples associated with national park management which will help in uplift income level of them.

2. The park agency should control strictly the expansion of agricultural land within the national park.

3. During planning and implementing collaborative management program for the national park, it should be considered to allow live in the park area, those who are living in the park as long-term residents before starting collaborative management.

4. Local community leaders should be included during planning and implementation of collaborative management for the national park.

5. Park agency should put clear and permanent park boundary demarcation.

6. Community-based tourism activities should be included and implement in collaborative management of the national park program.

7. In collaborative management program of the national park, there should be a provision of infrastructure development activities of the local communities.

8. In collaborative management program of the national park, there should be a provision of providing knowledge park regulations to local peoples through motivation and training activities.

9. Park authority should behave friendly with local peoples.

10. The park authority should introduced and continue environmental education programs for children and community leader to change attitudes toward the national park management activites.

2. Recommendations for Future Research

This study focused on Doi Suthep-Pui national park collaborative management program development which could not be generalized to other national park. There should be many stakeholders in collaborative management of the national park. But study covers only one main stakeholder i.e. local peoples associated with national park. Further research will be better conducted in wide scope. There were several fields that this study did not cover but which need to be explored in order to develop multi-stakeholders approach in collaborative management of the national park. In order to know socio-demographic, socio-economic characteristics of local peoples associated with national park, to identify problems in existing traditional park management systems and key issues on collaborative management of national park, and potential for collaborative management of the national park similar study should be also conducted in other national parks of Thailand, by involving a team of

researchers from various fields such as economics, forestry, agronomy, health, education, together with sociology and anthropology.

Study about Thais' in general hill tribes in particular are very sensitive, especially when we touch their culture and tradition aspects. The researcher is foreigner who could not in-depth by participation observation and/or in-depth interview due to language and cultural barrier which was one of the most important problems conducting this type of research. Participation observation, combination with psycho-analytic approach would be also very useful as method.

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APPENDIX

Respondent ID Number…….

Interview Schedule

Socio-economic Characteristics of Local People in the Doi Suthep-Pui National Park, Chiang Mai, Thailand.

Conducted by

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M.S. student in Tropical Forestry
Faculty of Forestry, Kasetsart University
Bangkok, Thailand.

Name of Interviewee (optional)……..……

Status in household □ Head of household □ Spouse
□ Parents □ Son/daughter
□ Other

Address……
…….
Name of Village ……..……

Interviewer……...…….....

Date…….…..

Part 1: Socio- Demographic Characteristics.

1. Gender

    □ Male □ Female

2. Age ……years.

3. Religion

    □ Buddhism □Other, please specify ……

4. Marital status

    □ Married □ Single
    □ Divorced/Separated

5. Demographic structure of the household

Age group(years)	# of male	# of female	Total
0-5 yrs			
6-17 yrs			
18-44 yrs			
45-64 yrs			
65 yrs and over			

6. Level of education of household members

Level of education	# of member studying	# of member completed	Total
None			
Primary (1^{st}-6^{th} yr.)			
Secondary (7^{th} -9^{th} yr.)			
High school (10^{th}-12^{th} yr.)			
University			
Vocational/other training, please specify…….			

7. Where did you born?

□This village

□Other village, please specify…….

Year first live in this village ……

8. Race

□ Thai □Other, please specify……

Part 2: Economic Characteristics

9. What are your major and minor occupations?
   9.1. Major occupation
   □ Agriculture and/ farming related
   □ Other occupation…….
   Number of months working…… months.

   9.2. Minor occupation
   □ Agriculture and/ farming related
   □ Other occupation…….
   Number of month working……months.

10. Household income (approximately in bahts) per year, number from the past year

   10.1. From agriculture and or related farm
   ……..bahts.
   10.2. From other occupation
   ……bahts.

   10.3. Total income ……bahts.

11. Comparison of household income and expenses in the past year
   □ Sufficient with some saving
   □ Sufficient but no saving
   □ Do not sufficient, specify amount of debt……..baht

12. Need for change of major occupation

   □ Do not need
   □ Need

Part 3: Natural Resource Utilization

13. Land holding

16.1. Owned land ……..rai = …….ha

16.2. Rented land ……rai = …….ha

16.3. Borrowed land……..…….rai = …….ha

16.4. Other, please specify

……. …….. rai = ……..ha

Total land……rai = ……..ha

14. Did you grow tree for household use?

□ Yes, please specify number of tree species…….

Total number of tree …….

□ No

15. Forest resources utilization (estimated from the past year)

type of resources	do not use	use		
		for household use only	sell some of them	sell all
1. Wild Plants 1.1. 1.2. 1.3. 1.4. 1.5. 1.6.				

Forest resources utilization (cont'd)

type of resources	do not use	use		
		for household use only	Sell some of them	sell all
2. Wild Animals 2.1. 2.2. 2.3. 2.4. 2.5. 2.6.				
3. Wood 3.1. Fuel wood 3.2. Wood for making charcoal 3.3. Wood for construction 3.4. Wood for making furniture 3.5. Wood for craft 3.6. Other, please specify …….. ……..				

Part 4: Knowledge about national park, expectation and attitudes toward national park management.

16. Do you know Doi Suthep-Pui is a national park?

□ No

□ Yes

17. Do you know the differences between national park and other forest areas?

□ No

□ Yes

Please specify

……..……

……

18. Do you know national park regulations or the activities prohibited in national park?

□ No

□ Yes

Please specify

…….....

……..

19. According to your opinion what are the main problems of current management of national park?

1.

……..

…….

2.

…….

…….....

3.

…….

……..

4.

……..

……..

20. As a villager living nearby the national park, if you are asked to choose between current management or collaborative management which one you would choose?

    □ Current management
    □ Collaborative management
    □ Either approach is fine to me

21. What are the top five priorities you would choose for Doi Suthep-Pui national park management practices that you expected/that are important to you? (please specify 1, 2, 3, 4, 5 in □)
    □ Providing knowledge about park regulations to local people
    □ Being friendly with local people
    □ Enhancing public relations about national park management
    □ Strictly enforce regulations to prevent encroaching and wildlife poaching
    □ Demarcating national park boundaries
    □ In equity with all local people
    □ Providing new piece of land for agriculture
    □ Allowing local people to establish community forest
    □ Promoting tourism and the participation of local people in tourism management.
    □ Promoting local economy through other income generating activities
    □ Providing support for infrastructure development in local communities
    □ Supporting local communities development programs
    □ Other, please specify……..

22. Do you agree to participate in collaborative management of national park?
    □ Strongly agree
    □ Agree
    □ Somewhat agree
    □ Disagree
    □ Strongly disagree

23. How would you think about this statement?

Statement	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The designation of national park help protecting forest encroaching and hunting					
Forest area should be protected for recreation and nature study purposes					
Forest area should be protected in order to protect biodiversity for next generation					
Controlling expansion of agricultural lands within national park					
Allowing long-term residents who lived here before the national park was designated to collaborative management					
Controlling grazing within the national park to decrease disturbance of national park ecosystem					
Allowing local people to use minor forest product from national park for their subsistence					
Enhancing the enforcement of national park regulations					
Local people gain benefit from the designation of the national park					

24. Since the national park first established, have you ever gain any benefit from the national park?

□ No

□ Yes, please specify

……

……..…..

25. Do you think that your community has any conflict with the national park agency?

□ No, (skip question no.26)

□ Yes

26 What is the level of conflicts in each following activities
(Very slightly =1, slightly =2, moderate =3, strong =4 and very strong =5).

No	Statement	1	2	3	4	5
1.	Illegal tree cutting.					
2.	Fuelwood collection.					
3.	Non timber forest product collection.					
4.	Land encroachment.					
5.	Wildlife hunting					
6.	Livestock grazing.					
7.	Expansion of agricultural lands within national park.					

27. What are your suggestions for conflict resolution?

1.…..……

2.……...……

3.……...……

4.……...……

5.……...……

28. Who do you respect the most in your community?

□ Community leader

□ Local government officer

□ Local politician

□ Local NGO official

□ Other, please specify …….

Thank you for your kind cooperation.