Assessment of Human's Attitude Towards Natural Resource Conservation in Protected Area in Thailand

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Abstract: Attitude of residing people towards a protected forest area was evaluated for sustainable use of natural resources and forest conservation in the Phu Kao–PhuPhan Kham National Park in Thailand. Their economic and social conditions were assessed in three villages of Phukao, NongBua Lamphu Province. Data were collected from 348 households (66.5%) heads or the representatives in the villages with the questionnaire. The questionnaire consisted of three parts: (i) general economic and social information (ii) social grouping and participation and (iii) attitude toward participation in conserving natural resources and tourism management in this area. To evaluate their attitude, the collected data were divided into four categories: (i) level 4 equilibrium/nature (ii) level 3 warning (iii) level 2 risk (iv) level 1 crisis for forest conservation in the protected area. Overall, their attitude towards natural resource conservation, the social grouping and the community participation was very low. However, the attitude towards ecotourism is very high. We suggest that forest conservation will be maintained by more progress of ecotourism in this area.

Keywords: Human attitude, Natural resources, Sustainable management, National park, Conservation

Introduction

Increasing of urbanization and population growth are important factors in the increasing of food demands (Rosegrant & Cline, 2003). For this reason, agricultural activities have been wildly spread. Forest clearing for cultivation and changing in agricultural practices; such as intensification techniques, irrigation canal, grazing, residual management and drainage all affect the natural environment system. Additionally, the modernized agricultural techniques, such as mold broad plow, motorized tractors, hybrid cultivars, inorganic fertilizers and pesticides, can cause severe effects on biodiversity in forests(Mackenzie et al, 2012; Olupot et al, 2009). Besides, in tropical forests, even in protected area have been partially disturbed by the anthropogenic intrusion (Ellis et al, 2010; Fashing et al, 2004). Conservation policies tend to move the communities out by applying law enforcement. Nevertheless, many local people continue to harvest forest products from protected areas by boundary encroachment and poaching. The rapid expansion of existing community in protected-areas can cause anthropogenic forest fragmentation and forest resources harvesting for livelihood needs can also impacted forest structure and soil erosion (Pimentel et al, 1995). Even small human settlements in rural areas can exert an ecological impact on a much larger area, according to Andrew Hansen, Director of the Landscape Biodiversity Lab at Montana State University in Bozeman, USA (Hunter, 2007). "The effect of rural homes on native species population dynamics can be felt tens to hundreds of kilometers away".

To reduce the effect of environmental degradation is an important issue for natural forest conservation. However, Thailand government is not yet fully successful to conserve the protected forests in national parks. The local communities are still residing in the protected area in Phu kao – Phu PhanKham National park in Thailand. The people in the national park are highly dependent on forest ecosystem for its diverse and abundant natural, wildlife, land, food and water

resources. The importance of these resources has caused indigenous people to diverse way of managing them sustainably. Attitude of residing people in the national park towards forest conservation is critical for reducing the effect of forest degradation. Attitudes toward the staff of protected area and the perceptions of management practices also affect the attitude of residing people (Allendorf, 2007; Takon et al, 2013). For example, conflicts with park rangers due to resource extraction, too strict rules on forest resources use and rude behavior, such as harassment by park rangers, generate negative attitudes for local people toward the protected areas (Allendorf, 2007; Takon et al, 2013). We have examined the attitude towards forest conservation of the people residing within this protected area (Figure. 1).

Materials and Methods

A. Study Area

This study was carried out at the Phu Koa area (PK), a part of Phu Kao -Phu Phan Kham National Park located in its upper northeastern plateau. It is comprised of 318.36 square kilometer located between latitudes 16° 44' - 17° 2' N and longitudes 102° 25'- 102°43'E in the Nong Bua Lam Phu Province, lying between the south of UdonThani Province and the north of KhonKaen Province, Thailand. PK Mountain Range consists of two parallel lines of mountains. The outer line is steeper and higher ranging from 446.6 to 580.0 m above the sea level (asl), while the inner line is lower with 313.3 m to 380.00 m asl. There are nine peaks in this range, namely Phu Fang, Phu KhumPun, Phu Han, Phu KoMo, Phu Chan, Phu Phro, Phu Luak, Phu Wat and Phu Moei. Phu Moei (580 m asl) is the highest peak among them. In PK, three village communities have been established in its central plain of PK, DongBak, WangMon and ChaiMongkala villages. Three communities existence in the central of this protected area are spread more quickly within last 20 years.

These communities spread very quickly within the last 20 years causing the severe forest fragmentation and degradation over the plain (Figure. 2).

The Royal Thai Forestry Department (RFD) had tried to expel the village inhabitants from this protected forest. There had been several times of conflicts between the RFD and the village inhabitants. However, the RFD was not fully successful for expelling the inhabitants. After these disputes, the RFD had announced the boundary lines for these communities so that the forest beyond the boundaries is protected from human developments. To stop the severely degradation of this area, the protected forest was designated as the 50th national park of Thailand in September 20, 1985.

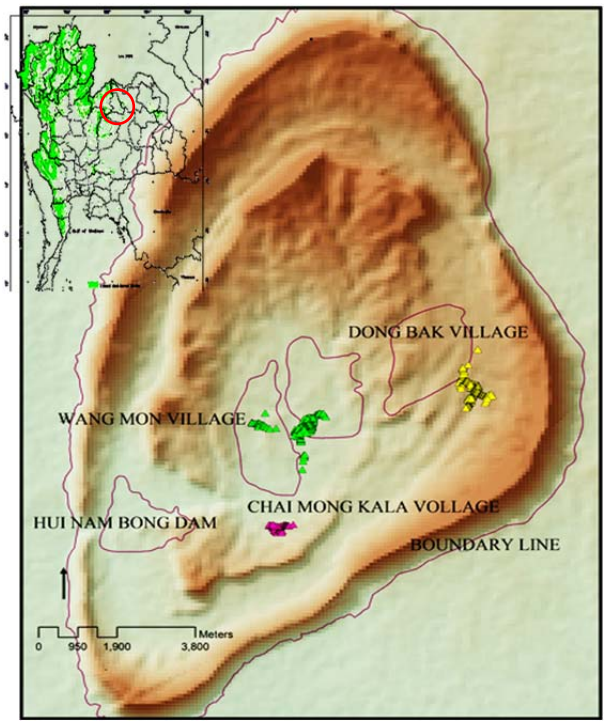

Figure 1. Study area and the boundary line between communities and forest area in PK. Green pink and yellow show the location of each household in three villages by GPS.
Source: The digital figure of land use in the study site is from the Land Development Department in Thailand, and the map of Thailand is from the Wildlife and Plant Conservation Department of the National Parks in Thailand, 2011.

(a)

(b)

Figure 2. The severe forest fragmentation and degradation of rubber (a) and cassava (b)

B. Data Collection and Analysis

The data were collected from communities, aerial photographs, documents provided by government offices and field survey. We organized community meetings (Figure 3). The aerial photographs were used to distinguish the agricultural and residential areas. The documents were provided by the Agriculture Office of NongBua LamPhu and KhokMuang Subdistrict Administration Organization, Non Sung District, NongBua LamPhu Province. A field survey was carried out to locate the geographical coordinates of every household with GPS Garmin 60Csx, Garmin, Olathe, KS, USA. From the GPS data, a map illustrated the locations was drawn with the help of Geographical Information System (ArcGIS 10.2.2, Environmental Systems Research Institute, Redlands, CA. USA) as shown in Figure 1.

(a)

(b)

Figure 3. Communities participation (a) and questionnaire survey (b) in August 2014

Three legally-settled villages in the PK were used in this study. The data were collected from 543 household heads or representatives of the three villages through meetings supported by the Office of Phu Kao-Phu PhanKham National Park and KhokMuang Subdistrict Administration Organization, NonSung District, NongBua LamPhu Province. However, only 348 household heads or 66.5% of the total could attend the meetings because some of them worked in another province or due to other reasons. During the meetings, a questionnaire was distributed for them to fill out.

The questionnaire had three parts (1) general economic and social information, (2) analysis of social grouping and participation and (3) analysis of attitude towards participation in conserving natural resources and tourism management in the area. The data were assessed according to the criteria shown in Table 1.

Table 1. Assessment criteria for attitudes towards participation in conserving natural resources and tourism management.

Index	Reason
Behavior of forest utilization	
	-Community reliance on forest reduces natural resources, affecting management of natural resources and watershed.
(1) little	***pass***
(2) much	***not pass***

(continue)

Index	Reason
Role in conserving natural resources in the area	
	- Cooperation between the government sector and communities can lead to sustainable management.
(1)community's responsibility	***pass***
(2) government's responsibilit	***not pass***
Participation in tourism management in the area	
	- Both the government sector' s insight into and agreement to the management reduce conflicts of management in the protected area.
(1) required	***pass***
(2) not required	***not pass***
Attitudes towards area management	
	- Community awareness that conservation is its responsibility enables the community to protect and manage natural resources in the area.
(1) good awareness	***pass***
(2) little awareness	***not pass***

The scores obtained from the criteria were totaled and compared with those in Table 2.

Table 2. Scores indicating states of area

State	Total score	State score
Balance/Nature	91-100	4
Warning	71- 91	3
Risk	51- 70	2
Crisis	<51	1

According to Table 2, the scores revealing the state were compared with the scores of the state of the environment systems divided into four levels:

(1) Nature – high diversity. Each component is abundant and functions normally.

(2) Warning –disturbance to component and/or function with fast recovery.

(3) Risk – disturbance on component and/or function with longer period recovery and/or displacement of some components.

(4) Crisis – disturbance to endangered and/or extinction species component also inactive or without function.

Results and Discussions

Economy and social aspects

Presently, there are 215 households with 901 residents in WangMon village, 85 households with 335 residents in Chai Mongkol village, and 223 households with 830 residents in DongBak village, with the total of 523 households with 2,066 residents. The aerial photographs show the land use for residential and agriculture classification as shown in Table 3.

Table 3. Data about economic and social aspects

The Basic data		%
Description		
Number of household	523	100.0
Number of respondents	348	66.5
Education	*Elementary*	83.1
Migration	*Other provinces*	55.1
	Congenital here	44.5
Resident period	*31 to 40 years*	85.7
Number of people in household	*1-5 people*	69.5
Occupation	*Farming*	74.7
Household income	*100,000-200,000 (Baht/year)*	86.5
Debt	*yes*	88.8
savings account	*no*	72.4

Source: The data from field survey, 2014.

The area of 10,000 rai (1,600 ha) in PK is set aside for residential and agriculture and 3,677 rai (588.3 ha) for the construction of Huay Nam Bong Reservoir, a royal initiative project. Of the agricultural area, cassava is grown most, covering an area of 3,720 rai (595.2 ha). The sampled total population in the 3 villages is 348 villagers. Among the household heads, male is 56.9% and female is 43.1%. Most of them (household heads) are 41-50 years old (26.7%), followed by those aged over 61 years old (23.0%) and 20-30 years old (7.2%). They practice Buddhism, and almost all of them (98.7%) do not want to relocate from the villages. For education, 83.1% of them (household heads) finished elementary school and 3.7% of them did not receive any formal education.

Most residents (74.7%) grow field crops, followed by those who raise garden crops (12.1%). Only a few of them are civil servants, merchants or unemployed. For their economic conditions, most of them (72.4%) do not have savings, 27.6% have savings and 88.8% have debt. According to the interview, most of them obtain vehicles

for rice field, chemical fertilizers and pesticides, while using loan.

Social grouping and community participation

Afforestation takes place regularly in this area, because of severe economic conditions.72.1% of them have participated in forestry, such as acceleration of tree growth, while 27.9% have not yet participated.

The residents reside in the protected area or the boundary area, while some of them are rangers in the park. The rangers engage in the protection of forests and wildlife as a government official or in other agencies. However, almost all farmers do not participate in such activity. 61.5% of all households have not yet participated in such training or meetings with government officials or private agencies, while 38.5% have participated in such training or meetings.

Lam Huay Bong is a major stream in PK, and they use water for drinking and for feeding the agricultural areas. 54.9% of all households have participated in the campaign to protect this stream, while 45.1% have not yet participated in such activity.

Attitudes towards Participation in Conserving Natural Resources and Tourism Management

The forests in PK are a major food source for the residents in NonSung District and its environs. Both local residents and outsiders have used and collected forest products. As a result of forest used for a long time, forest degradation continues and forest products runs out. The abundance of valuable trees, (*Dalbergia cochinchinensis*), the Thailand Rosewood, Siamese Rosewood or Tracwood, decreases, because of illegal logging. 74.7% of residents think that forest conservation is the rangers' responsibility while 62.4% of agree that the government does not have enough budget for forest management. However, 18.4% consider that the residents should furthermore participate in activities for conserving natural resources, and 12.9% believe that forest conservation is the responsibility of the residents.

The division between the national park and the community area will help to solve the issue of encroachment. More lectures will be presented to solve the conflict between rangers and residents and to encourage co-existence between forest nature and communities. Although 41.1% of residents agree with such division, 58.9% are not agree with the division.

PK has a high potential for eco-tourism, since many footprints of herbivore dinosaurs and a-million-year shellfish has been found. The Department of Geology, Ministry of Natural Resources and Environment make a plan to set up a museum in the community, displaying these exhibits. There are also natural sights for tourists. During the past two years, eco-tourism in this area has been flourished. 80.2% of residents agree with the statement that this area should be promoted as a tourist attraction, and 62.4% agree with the statement that a group should be set up to manage the tourism. 75.9% think the needs of guide training for local young adolescent.

The natural resources in PK forests have been dwindling, because of the rapid growth of the communities during the past 20 years. 42.8% of residents think that the shortage of land area for farming is the most important issue, and 84.9% think that its the lack of water. 89.7% feel that water for daily use is not enough especially during the dry season, and 61.8% feel that water source in this area is in run-down.

Forest fires usually break out in the drought-deciduous forest during the dry season. In the present, forest arson is common to collect forest products. 46.6 % of residents think that forest fire is a serious problem in this area.

Attitudes towards community participation in conserving natural resources

We summarize the attitude of local people in relation to conservation of natural forest resources from the four aspects, as follows.

1) Behavior of forest utilization: 82.8% (288 households) in the three villages take wood out of the protected forest area to make firewood and charcoal. Bamboo shoots, mushrooms, herbs, vegetables, and animals are also taken out. Only 17.2% of households do not collect forest products.
2) Role in conserving natural resources: 87.1% (303 households) think that the conservation of natural resources is the responsibility of government, while 12.3% think that it is the responsibility of the community.
3) Participation in tourism management: 62.4% (217 households) desire tourism management. This will be a social potential in this area.
4) Attitude towards area management: 205 households (58.9%) do not agree with the boundary dividing between the forest area and the residential area.

As a result, the criteria in attitude of local people are still low, except for 3) tourism management. Overall, the total score in their attitudes is 24.1, indicating that the attitude towards natural resource conservation, social grouping and community participation is still in the lowest level (crisis) in Table 3.

Conclusions

To conserve the natural forest and forest resources, the boundary lines between human areas and protected forests have been set in the national park. However, we are not yet successful in conserving the protected forests. Using a large amount of fertilizers and pesticides may induce irreversible disturbance to the natural habitats. Degradation of forest structure and function may cause soil erosion in this area. As agricultural land is degraded and abandon, more forests are cut and converted to newly agricultural land (Myers et al, 2000; Pimentel et al, 1995). Because the PK area is exposed to such great danger, the evaluation of the attitude of the resident is needed for forest conservation. Our results suggest that the importance of forest conservation need to be more instilled not only to adult generation but also the young generation, for sustainable use of forest resources and ecological service. Nevertheless, the attitude towards ecotourism is very high in the study area. Thus, we suggest that forest conservation must be potentially maintained and promote progress of eco-tourism in this area.

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