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DEPENDENCY ON FOREST RESOURCE OF THE PEOPLE RESIDING IN KANGKRACHAN NATIONAL PARK

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ABSTRACT

Objectives of the study were to determine the dependency on forest resource and investigate factors relating to the dependency on forest resource of the villagers residing in Kangkrachan National Park. The designed questionnaires were employed for interviewing 323 respondents. The statistical software package was hired for the data analyses. Correlation analysis was employed for analyzing the relationship between each independent variable and the dependency on each kind of the collected forest product, and with the given significance level of .05

Results of the study indicated that the gender of the most respondents were male (50.2%) and their educational level were at primary school (47.1%). The main occupation of the majority was trading (37.8%). The average size of land holding was 6.35 rais. The average number of household member and labor were 4.37 and 2.62 persons, respectively. The average annual household income was 252,411.10 baht. The most respondents were used to received the information about forest resource conservation (85.1%) and never attended any training course about forest resource conservation (74.9%). The average score of the knowledge about forest resource was 17.16 from the full score of 20. The dependency on forest resource was determined on each kind of 9 kinds of the studied forest products, namely, medicinal plant, wild fruit, bamboo, bamboo shoot, mushroom, edible plant, edible insect, wildlife and firewood. The total value of the collected forest products was 3,740,062.26 baht per annum. Based on the hypothesis test indicated that the main occupation was positively related to the dependency on almost all kinds of the mentioned forest products except firewood. While annual household income was negatively related to the dependency on such kinds of forest products that related to the main occupation. In addition, educational

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level was negatively related to the dependency on wild fruit, bamboo, bamboo shoot and mushroom. Moreover, the receiving information about forest resource conservation was positively related to the dependency on wild fruit. Finally, number of household number and score of the knowledge about forest resource conservation were negatively related to the dependency on firewood.

INTRODUCTION

Forest is the most significance natural resource for living things not only human but also others. It is a source of 4 essential factors for human living, namely, food, clothes, house construction material and herbs. Moreover, forest provided the various intangible values, namely, maintaining the equilibrium of ecological system, plant and animal genetic conservation etc. In case of the heavy deforestation will cause the impact on the other relevant environments such as plant, wildlife, soil, water and weather etc. The top soil with abundant useful minerals of the degraded forest will be easily eroded by rain because water could not be completely absorbed by a rather small number of the existing trees, this will cause the flood occur especially in the rainy season. On the other hand, in the dry season, soil moisture in watershed area is low, causing the water level in the streams and rivers become shallow or completely dry which cause direct and indirect negative impacts on socio-economic system of the country. Forest protection by offender arrest couldn't success. Thus, forest protection by various proper means will be needed, because human is the main cause of deforestation. There were many ways of doing for reducing people dependency on forest resource namely guiding them to produce food and wood for their own use, encourage them being awareness of forest resource conservation, as well as to conduct the public relation program toward the targeted group in order to let them to know that how the forest resource conservation could provide benefits to them as well as to all of the people in the Thai society.

The buffer zone in the conservation area is a fruitful forest management pattern because the project area is zoned into restricted utilization zone (core area) and buffer zone. The buffer zone is the outer area surrounding the core area, the various types of land use were partially unprohibited in this area namely, forest plantation, agricultural land, homestead and some of natural forest will be conserved for supporting the natural regeneration of plants and animals as well as to be the route for wildlife migration. Moreover timber cut and collection of non-timber forest products were permitted but only in the limited amount or just only for

home use.

Kangkrachan National Park is located in Petchaburi and Prachuap Khiri Khan Province. It is the mountainous areas of Ta Nao Sri Mountain with a high slope and a very long ridge of almost 1,000 km which continuously lay from Thailand to Myanmar. Thus, the numerous species of plant and animal were found in this national park. Moreover, it is a watershed areas of Petchaburi and Pran Buri River which were head water of Kangkrachan and Pran Buri Dam. The both dams not only supply water for crop cultivation but also for drinking and casual use of the people residing in Hoa Hin and Cha Um District which are the important recreational areas of the country. The announcement of the national park cause the impact on people residing in and around such recreational areas because they necessitated to live on the forest resources for a very long time ago this leading to lack participation in forest resource conservation and continuity deforestation (Division of National Park, 1992). Hence, results from the study on socio-economic condition, knowledge and understanding on forest resource conservation affecting the dependency on forest resource in Kangkrachan National Park are the very useful information to be applied for formulating the appropriate management plan for sustaining the national park as well as to be used as a optimal guideline for managing the other national parks in the near future.

Objectives

1. To determine the dependency on forest resources of the people residing in Kangkrachan National Park

2. To determine factors affecting the dependency on forest resources of the people residing in Kangkrachan National Park.

Limitation of the Study

The study emphasized the dependency on forest resource of the people residing in Kangkrachan National Park. The scope was limited to 9 kinds of forest products, namely, herbs, wild fruit, bamboo, bamboo shoot, mushroom, edible plant, edible insect, wildlife and firewood and factors affecting the depending on such kinds of forest products. The using data was collected from the respondents who residing in and around the national park which not over than 3 km. apart from the demarcation. The studied areas were composed of 43 villages which located in Kangkrachan, Song Pu Nong, Mae Pricng and Pa Teng Sub-district, Kangkrachan District; yang Nam Klud Nia, Yang and Nam Klud Tai Sub-district Nong Ya Plong District; and Khao Kra Puk and Klud Luang Sub-district, Ta Yang District, Petchaburi Province; and Nong Plub, Huai Sut Yai, and Bueng Nakhon Sub-district, Hua Hin District, Prachuap Khiri Khan Province.

Word Definition

Forest resource mean wood and non-

wood forest products found in Kangkrachan National Park including herbs, wild fruit, bamboo, bamboo shoot, edible plant, edible insect, wildlife and firewood.

Dependency on forest resources mean activities of forest utilization including forest product collection and wildlife hunting for home use and sale excluding forest land utilization.

Knowledge of forest resource conservation mean the knowledge about forest protection, rehabilitation and maintenance which undertaken by household heads or the household representatives in order to sustain the forest resource.

Research Conceptual framework

1. Independent variables include educational level, main occupation, total annual household income, information receipt, size of land holding, training course attendance, number of household member, number of household labor and knowledge of forest resource conservation.

2. Dependent variable is the dependency on the 9 kinds of forest products, namely, herbs, wild fruit, bamboo, bamboo shoot, mushroom, edible plant, edible insect, wildlife and firewood.

Research Hypothesis

The dependency on each kind of the 9 forest products, namely, herbs, wild fruit, bamboo, bamboo shoot, mushroom, edible plant, edible insect, wildlife and firewood correlate to each of the following independent variables namely educational level, main occupation, total annual household income, information receipt, size of land holding, training course attendance, number of household number, number of household labor and knowledge on forest resource conservation.

MATERIALS AND METHODS

Material

1. The designed questionnaire using for collecting data which correspond with the setting objectives.

2. Kangkrachan National Park Map.

3. Camera, vehicles, office supplies, and computer.

Pre-survey

The field surveying especially in the studied communities as well as Kangkrachan National Park were carried out in order to collected the general information about physical and biological characteristic as well as the other environmental conditions which were needed for formulating the research plan. In addition, searching documents and consulting with the related agencies as well as determining the location and boundary of the targeted communities from topography map were conducted.

Questionnaire Design

Questionnaire could be designed by employing the information about the dependency on forest resource which were obtained from searching the related documents and research works, in the next step the obtained questionnaire should be approved by the 3 experts first, after that the pre-test with 30 sampled household heads or the household representatives who residing in the other communities which located adjacent to the studied area could be conducted. The obtained data from the pre-test was tested for it's reliability by Cronbrach's alpha coefficient method. The value of such coefficient was 0.74. Finally, the questionnaire should be improved again before employing for the real study.

Sampling Scheme

The studied area was firstly divided into 2 zones namely, inside and outside zone of the national park area. The boundary of the outside zone is 3 km apart from the national park demarcation. The distribution of the sampled villages located in inside and outside zone around the national park were 2 and 41 villages which respectively. The total household number of 43 studied villages was 14,688 households. The optimal sample size or household number could be obtained by using the Yamane formula for computation (Yamane, 1973) and with the given sampling biased level of .1 was 99. However, the 323 sampled households which much over than such obtained optimal sample size were employed for the study. The number of sampled households by village could be computed by using the proportional distribution formula (Jameekorn, 1983). In addition, the accidental sampling method was employed for the field survey.

Data Analysis

1. Descriptive analysis. The general information about socio-economic, dependency on forest resource, and comprehension of forest resource conservation of the people residing in and around Kangkrachan National Park were analyzed and were presented in the various statistical terms namely percentage, frequency, mean, maximum, minimum and standard deviation.

2. Relationship analysis. The hypothesis test was carried out by employing the correlation analysis method.

RESULTS AND DISCUSSION

General Basic Information

Results of the study indicated that most respondents were male (50.2%) and the rest were female (49.8%). Primary school was the educational level of the most (47.1%), the nexts were pre-university, secondary school, vocational school, bachelor degree and illiterate with the percentage of 27.9, 10.5, 7.7, 3.4 and 3.4 respectively. The main

Table 1. Independent and dependent variable using for the study

Independent variable	Symbol	Dependent variable	Symbol
1. Educational level (year)	X_1	1. Dependency on herbs (kg)	Y_1
2. Main occupation (agriculture or casual labour in agriculture = 1, others = 0)	X_2	2. Dependency on wild fruit (kg)	Y_2
3. Total annual household income (baht)	X_3	3. Dependency on bamboo (culm)	Y_3
4. Information receipt (do = 1, nil = 0)	X_4	4. Dependency on mushroom (kg)	Y_4
5. Size of land holding (rai)	X_5	5. Dependency on bamboo shoot (kg)	Y_5
6. Training course attendance (do = 1, nil = 0)	X_6	6. Dependency on edible plant (kg)	Y_6
7. Number of household member (person)	X_7	7. Dependency on edible insect (kg)	Y_7
8. Number of household labor (person)	X_8	8. Dependency on wildlife (kg)	Y_8
9. Comprehension of forest resource conservation	X_9	9. Dependency on firewood (m^3)	Y_9

occupation was trading (37.8%), the nexts were government officials, casual agriculture, fishing, and others (barber, contract, and livestock raising) with the percentage of 27.6, 14.2, 7.4, 3.1 and 6.9 respectively. Size of land holding of the majority were less than 1 rai (47.4%)(6.25 rais = 1 ha), nexts were 1-5 rai, 6-10 rai, > 15 rai and 11-15 rai with the percentage of 24.5, 13.6, 10.2 and 4.3 respectively, and with the minimum, maximum and mean of 0.13, 100.50 and 6.35 rai respectively. The number of household member of the majority was ranging from 4 to 6 persons (55.4%), the nexts were 1-3 and 7-9 persons and with the percentage of 29.7 and 14.9 respectively, and the minimum, maximum and mean were 1, 9 and 4.37 persons respectively. The number of household labor of the majority was 2 persons (39.0%), the nexts were 1,3,4 and over than 5 persons and with percentage of 19.2, 18.6, 11.8 and 11.4 respectively, the minimum, maximum and mean were 1, 6 and 2.62 persons. The total annual household income of the most were ranging from 100,001-150,000 baht (22.9%), the nexts were lower than 100,000, 150,001-

200,000, > 300,000, 200,001-250,000 and 250,001-300,000 baht with the percentage of 22.6, 20.8, 17.6, 9.9 and 6.2 respectively, and the minimum, maximum and mean were 36,000, 1,460,000 and 252,411.1 baht respectively. The most respondents used to receive the information (85.1%). In addition, the most respondents never attended any training course in forest resource conservation (74.9%). Moreover the comprehension of forest resource of the respondents was tested by using 20 questions with the full score of 20. Results from the testing of forest resource knowledge test indicated that all of the respondents could respond correct answers for the following questions (statements): being recreational area and source of knowledge are the advantage of forest, fire line preparation assist to reduce a fire hazard and damaging forest area, reforesting in the degraded forest will develop to itís former status, while there was a question which the respondents of 39.9 percent could not respond the correct answer, it was forest product collection is not a deforestation activity, the minimum, maximum, mean, and standard deviation of the score were 12, 20, 17.16 and 2.16 respectively.

Dependency on Forest Resource

Determination of the dependency on forest resources of 323 sampled households indicated that forest product collectors was only 36.8 percent of the total respondents. Bamboo was utilized most, the average collected amount per household per annum was 3.81 culms, and with the total amount which being collected by all of the targeted communities was 56,151.78 culms per annum. The second rank of the utilizable forest product was mushroom, its average collected amount per household per annum was 2.26 kg and the total amount was utilized by all communities was 33,307.88 kg per annum. While the edible insects is the forest product type which was used with the smallest amount, it's average amount of utilization per household per annum was 0.24 kg and the total amount of using by all of the targeted communities was 3,537.12 kg per annum. Based on the valuation of each kind of the collected forest products indicated that mushroom was wildly use and with maximum use value of 1,702,239 baht, while the firewood shared with the minimum use value of 64,847.20 baht. Moreover, the total collected amount of the 9 kinds of forest products per annum was 3,740, 062.26 baht. Detailed are shown in Table 2.

Factors Relating to the Dependency of Forest Product

The analysis of the relationship between each independent variable and the dependency on each kind of forest product was carried out by employing the correlation analysis method and with the statistical significant level of .05. The results were presented in Table 3.

Table 2. Quantity of forest products collecting by respondents for utilization

Forest product type	No. of sampled household	Quantity of collection per annum[1/]	Quantity of home use per annum[2/]	Quantity of sale per annum[3/]	Average of annual collection quantity per household	Total annual collection quantity[4/]	Total annual value (baht)
Herbs (kg)	25	308	305	3	0.95	14,001.10	206,479.38
Wild fruit (kg)	52	516	503	13	1.59	23,433.42	212,153.51
Bamboo (culm)	109	1,232	1,232	0	3.81	56,151.78	485,174.96
Bamboo shoot (kg)	114	822	793	29	2.54	37,434.52	280,758.90
Mushroom (kg)	119	729	184	545	2.26	33,307.88	1,702,239.00
Edible plant (kg)	75	263	212	51	0.81	11,937.78	425,117.61
Edible insect (kg)	24	79	79	0	0.24	3,537.12	218.122.40
Wildlife[5/] (kg)	53	95	95	0	0.29	4,274.02	145,169.30
Firewood (m^3)	10	72	72	0	0.22	3,242.36	64,847.20

Remark : 1/ Quantity of each kind of forest product was collected by 323 sampled households
2/ Quantity of each kind of forest product was utilized by 323 sampled households
3/ Quantity of selling forest product by forest product type of 323 sampled households
4/ Total quantity of each kind of forest product was collected by total 14,738 households which located in all of the studied communities.
5/ Estimated weight.

Based on the relationship between each independent variable and the dependency on each kind of forest product of the people residing in and around Kangkrachan National Park indicated that educational level had negative correlation with the dependency on wild fruit, bamboo, bamboo shoot, and mushroom. This could be interpreted that the respondents who have less education have to depend on such forest products much more than the ones who have higher education, this mainly due to the higher educator have more comprehension of forest resource than the lower educator. Moreover, the high educators having awareness of forest resource conservation this will cause the declining in their dependency on such forest products, this corresponded

Table 3. Results of the analysis of the correlation between the dependency on each kind of forest product and each independent variable

Dependency on forest products	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
Y_1	-0.097	0.232*	-0.150*	-0.043	0.003	0.086	-0.040	-0.075	0.005
Y_2	-0.112*	0.188*	-0.229*	-0.110*	-0.026	-0.023	-0.020	-0.013	0.071
Y_3	-0.122*	0.305*	-0.352*	-0.007	-0.006	0.025	-0.053	-0.031	0.001
Y_4	-0.112*	0.252*	-0.398*	-0.047	0.003	-0.056	-0.054	-0.065	0.007
Y_5	-0.119*	0.248*	-0.375*	-0.032	-0.011	-0.066	-0.049	-0.099	-0.091
Y_6	-0.100	0.268*	-0.274*	-0.003	-0.056	0.051	-0.070	-0.058	-0.078
Y_7	-0.026	0.203*	-0.143*	-0.025	-0.006	0.032	-0.013	-0.023	-0.037
Y_8	-0.095	0.126*	-0.194*	-0.031	-0.049	-0.038	-0.028	-0.023	-0.047
Y_9	-0.046	0.018	-0.101	-0.046	0.096	-0.003	-0.124*	-0.069	-0.170*

Remark : *significant at .05 level

to the studies of Shamethong (2000) and Wongchai (2004) represented that the educational level correlated with the dependency on forest resource. Main occupation positively correlated with the dependency on herbs, wild fruit, bamboo, bamboo shoot, mushroom, edible plant, edible insect, and wildlife, this could be interpreted that the respondents who engaged in agriculture or casual labor in farm will depend much more on forest products this due to the cultivated land usually located adjacent to the forest area, so the forest products could be collected easily. Moreover, such occupations seasonally generated income to the cultivators, hence, their income was not sufficient to meet the household expenditure, this will lead them to collect forest products more for their home use and sale for making the additional household income, this corresponded to the study of Khunsan (2001) which represented that household occupation related to the utilization of almost all of the forest products except charcoal and herbs. Moreover, based on the study of Kutrisukhon (2002) indicated that main occupation affected the dependency on forest products.

Total household income negatively correlated with the dependency on herbs, wildlife, bamboo, bamboo shoot, mushroom, edible insect, and wildlife, this could be interpreted that the higher income households decrease their dependency on forest resource, this mainly due to the household income is

sufficient for household expenditure, so the forest product collection is no longer necessary occupation for them. Moreover, the dependency on wildlife decreased this because of the decreasing in wildlife population and more restricted forest protection which corresponded to the studies of Puwavimol (2002) and Sripaew (2003) represented that annual household income affecting the dependency on forest resource.

Information receipt positively correlated with the dependency on wild fruit this could be interpreted that the households which never received any information about forest resource conservation collected more amount of wild fruit than the ones which used to received the information. Hence, the foresters should arrange the public relation program about the optimal season and duration for forest products collection as well as to instruct the impact caused from the over harvesting, and advice an appropriate technical collection method, this will lead the targeted group to understand more about the significance of forest resource conservation, and reducing in their dependency on forest resource, this corresponded to the study of Wongchai (2004) represented that the information receipt affecting the dependency on forest products.

In addition, the number of the household member and the score of comprehension about forest resource conservation negatively correlated with the dependency on firewood, this could be interpreted that the households with more members and having the high score of the understanding in forest resource conservation consumed less firewood, this mainly depended on their understanding and recognition of the significance of the forest resource conservation. This corresponded to the study of Kvansombut (2005) represented that the number of household member related to the dependency on forest resource. Moreover, the study of Wongchai (2004) represented that the number of household member and the knowledge of national forest reserves affecting the dependency on forest resource. Thus, in order to sustain the conservation forest in Kangkrachan National Park, the performing of the public relation program for transferring knowledge about forest resource conservation should be carried out

CONCLUSIONS

General Basic Information

The study indicated that most respondents were male (50.2%) and their educational level were at primary school (47.1%). Trading was their main occupation (37.8%). The average size of land holding was 6.35 rais. The average number of household members and labors were 4.37 and 2.62 persons respectively. The average total annual household income was 252,411.1 baht. Most of them received information about forest resource conservation (85.1%) and never attended any training courses in forest resource

conservation (74.9%). In addition, their knowledge about forest resource was rather good, and with the average score of 17.16 which came from the full score of 20.

Dependency on Forest Resource

The households which depended on forest resources were only 36.8 percent of the total respondents. Bamboo was the main forest product in use, it's average annual collected amount per household was 3.81 culms and the total amount was collected by all of the targeted communities per annum was 56,151.78 culms. While, edible insect was consumed in the minimum amount, it's average annual collected amount per household was 0.24 kg and with the total annual collected amount of all targeted communities of 3,537.12 kg, mushroom shared with the maximum use value of 1,702,239 baht/annum, while fire wood shared with the minimum use value of 64,847.20 baht/annum. The total use value of the 9 kinds of the forest products was 3,740,062.26 baht/annum.

Factors Relating to the Dependency of Forest Product

There were 2 factors significantly correlated with the dependency on herbs namely main occupation and total annual household income, and their correlation types were in positive and negative direction respectively and with the significant level of .05.

Dependency on wild fruit positively correlated with the main occupation and receiving information about forest resource conservation; and negatively correlated with educational level and total annual household income, and with the significant level of .05.

Dependency on bamboo positively correlated with the main occupation, but negatively correlated with educational level and total annual household income, and with the significant level of .05.

Dependency on bamboo shoot positively correlated with the main occupation but negatively correlated with educational level and total annual household income, and with the significant level of .05.

Dependency on mushroom positively correlated with the main occupation, but negatively correlated with educational level and total annual household income, and with the significant level of .05.

Dependency on edible plant positively correlated with the main occupation but negatively correlated with total annual household income, and with the significant level of .05.

Dependency on edible insect positively correlated with main occupation but negatively correlated with total annual household income, and with the significant level of .05.

Dependency on wildlife positively correlated with main occupation, but negatively correlated with total annual household

income, and with the significant level of .05.

Dependency on firewood negatively correlated with number of household member, and the score of knowledge about forest resource conservation, and with the significant level of .05.

RECCOMMENDATIONS

The public relation program should be implemented in order to guide the local people to have more comprehension and awareness of the significance of forest resource conservation. In addition, the restriction of the collected amount of forest products is needed for balance between the harvested amount and the yield. Moreover, the growing of multi-purpose plants such as herbs, bamboo and wild fruit in the living area and marginal farm land for own use are also needed in order to reduce the dependency on the natural forest.

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