

Community's participation in Community Forest Management : A case study of Kaen Toa

Community Forest, Pa Ma Now Sub-district, Ban Fhang District, KhonKaen Province

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This study aims to survey community participation in community forest management (CFM) at Kaen Toa community forest, Pa Ma Now sub-district, Ban Fhang district, KhonKaen province. It is also to identify social-economic factors influencing community participation. The survey was conducted from July to October, 2006. Household representatives selected by an accidental sampling technique were asked to complete a semi-structured questionnaire. Data analysis is descriptive-based. F-test and Scheffe's test were used to examine factors influencing community participation. In total, 135 household representatives participated in this survey. The majority of participants have high expectation for benefits gained from community forest. They reported of participating in CFM activities but not on a regular basis. Key obstacles for effectiveCFM identified by the participants include lack of financial support, community perception on value of the community forest, and community understanding toward CFM. From statistical tests, social-economic factors with significant influence on community participation at least in oneactivity are number of family members, size of lands owned by a household, and expectation of benefits gained from the community forest at 0.05 significant level.

Key word : Community Forest

Diversity of rice species planted in saline soil areas: A case study at Ban Nafai, Wa Pee Pa Tum District, Mahasarakham Province.

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This study aims to list rice species planted in saline soil areas: a case study at Ban Nafai Wa Pee Pa Tum District, Mahasarakham Province. It is also to describe key characteristics of rice and rice field conditions suitable for planting rice. A village leader, community wise persons and villagers were interviewed about rice cultivation, especially rice species and their characteristics, using a semi-structured questionnaire. Farmer techniques for saline soil restoration were also asked. In total, 60 villagers participated in the survey. The study found 27 varieties of rice planted by Nafai's farmers, of which 16 are sticky rice and 11 varieties are regular rice. Six varieties can be cultivated in saline soil, including, KhawDokmali 105, KorKhor 6, KorKhor 8, San Pa Tong, KumPhay and ChoaSaiBua. However, only two varieties, KhawDokmali 105 and KorKhor 6 are cultivated nowadays because of their high market demand, high yield and tolerating to drought and saline soil. As a result, relevant governmental authorities promote farmers to grow these two varieties, while native varieties become unattractive and a number of farmers growing them are decreasing.

Key word : Rice Species Planted

Diversity of tools and equipment for wetland resource use at NonghanKumpawapee wetland Udontanee.

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This study is to identify tools and equipment currently used for wetland product harvesting at NonghanKumpawapee, Udonthanee Province. It is also to list wetland products, including fish, amphibians, reptiles, mammals and aquatic plants, villagers harvested from Nonghan. The study took place from June to September 2009. Data were collected using an in-depth interview of villagers referred by community leaders whom harvest wetland products from Nonghan. According to 14 interviewed villagers from 6 villages located around Nonghan, 37 tools and equipment (12 groups) were reported being used. The three most frequently used tools and equipment are clothed with the flesh of spreads, coop and None pocket Cast Net respectively. Furthermore, there are 4 types of equipment being used, including Bug Lift Net, Set Gill Net, None pocket Cast Net and Bamboo Screenwhile they are on the control list of tools and equipment regulated by Department of Fisheries. Finally according to the survey, 19 wetland products were recorded of which fish is the most frequently harvested product, followed by Bulrush(*Actinoscirpusgrossus*) and water stems (*Nymphaea lotus*), respectively.

ความหลากหลายของเครื่องมืออุปกรณ์ในการใช้ประโยชน์พื้นที่ชุ่มน้ำ หนองหานกุมภวาปี จังหวัดอุดรธานี

นักศึกษา :นางสาวประภัสสร เครือกลาง

อาจารย์ที่ปรึกษาโครงการวิจัย : ผศ.ดร. อัจฉราภรณ์ ภัคดี

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น

การศึกษาความหลากหลายของเครื่องมืออุปกรณ์สำหรับเก็บหาผลผลิตในพื้นที่ชุ่มน้ำหนองหานกุมภวาปี จ. อุดรธานี ดำเนินการระหว่างเดือนมิถุนายน – เดือนกันยายน พ.ศ. 2552 เพื่อสำรวจรายชื่อของเครื่องมืออุปกรณ์ที่ชาวบ้านใช้เก็บหาผลผลิตในพื้นที่ชุ่มน้ำในปัจจุบัน ทั้งอุปกรณ์ในการจับสัตว์น้ำ เครื่องมือตักสัตว์และเครื่องมือสำหรับเก็บหาพืชพรรณ รวมทั้งสำรวจชนิดผลผลิตคือ พืชพรรณ สัตว์น้ำ สัตว์สะเทินน้ำสะเทินบก สัตว์เลื้อยคลาน และสัตว์เลี้ยงลูกด้วยนม ที่ชาวบ้านเก็บหาเป็นประจำ รวมถึงวิธีการใช้เครื่องมืออุปกรณ์ การเก็บข้อมูลใช้วิธีการศึกษาเชิงสำรวจ (Survey-based research) อาศัยแบบสอบถามและการสัมภาษณ์เชิงลึกชาวบ้านรอบหมู่บ้านหนองหาน การสำรวจข้อมูลกับชาวบ้าน ที่ได้รับการบอกกล่าวจากผู้นำชุมชนว่ามีการเก็บหาผลผลิตเป็นประจำ 14 คน ในหมู่บ้านทั้งหมด 7 แห่ง พบว่ามีอุปกรณ์ เครื่องมือที่ชาวบ้านใช้เก็บหาผลผลิตทั้งหมด 37 ชนิดจำแนกเป็น 12 ประเภท โดยประเภทของเครื่องมือที่ชาวบ้านใช้มากที่สุด 3 อันดับแรก ได้แก่ ประเภทช่วยในการจับสัตว์น้ำ ประเภทยกช้อน และประเภทลอบและไซ ตามลำดับ และสำรวจพบเครื่องมือในพิกัดที่ชาวบ้านบางส่วนยังคงใช้เก็บหาผลผลิต 4 ชนิด ได้แก่ สะดุ้งใหญ่ แห ข่าย (มองหยั่ง) และ เฝือก ในส่วนของผลผลิตที่ชาวบ้านเก็บหาทั้งหมด 19 ชนิด โดยปลาเป็นผลผลิตที่ชาวบ้านจับหามากที่สุด รองลงมาได้แก่ ผีเสื้อ และสายบัว

Ecological factors affecting rice production in saline soil : A case study of Ban Na Fri, Wa Pee Pa Tum District, Mahasarakham Province.

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This study examines the relationship between ecological factors of soil and rice productivity in saline soil: a case study of Nafai Village, Wapipatum district, Mahasarakham province. Rice production data were collected by interviewing a village leader and household representatives. Composite soil sampling was used to sample soil from rice paddies of villagers having salt-affected soil problem. Soil samples were collected from two areas: 1) a paddy where saline soil occurs and 2) a paddy without saline soil. Electrical conductivity (EC), soil pH and soil texture were measured. The study took place during April-July, 2011. In total, 40 villagers (80% of Nafai's rice farmers who encounter a saline soil problem) participated in the study. Approximately, 15% of farmer rice paddies are affected by saline-soil. An average EC of soil samples from saline soil paddies is 1.907 dS/m, classified into three levels: 1) non-saline soil (<2dS/m), accounted for 57.5% of all soil samples (n=40), 2) slightly saline-soil (2-4 dS/m), 35.0% of all soil samples, and 3) moderately saline soil (>4dS/m), 7.5% of all soil samples. An average rice yield of farmers encountering saline soil problem is 330.98 kg/Rai. Finally, Pearson correlation did not show significant correlation between EC and rice yield and between a ratio of saline and non-saline soil and rice yield.

Key word : Ecological factors, saline soil

**Economic valuation of direct use of wetland resources at Nong Han Kumpawapee,
Udonthani Province.**

Student : Miss Rachaneephon Koranee

Project advisor : Asst. Prof. Dr. Acharaporn Pagdee

Department of Environmental Science, Faculty of Science, KhonKaen University, Thailand.

This survey-based study estimates the economic value of wetland resources harvested from Nong Han Kumpawapee, Udonthani province, using a market price method. Household representatives from villages located around Nong Han were interviewed about their access and use of the wetland resources. In total, 122 villagers from 14 villages participated in this study. The majority of villagers (82% of all respondents) reported access and harvesting of wetland products from Nong Han for household consumption and income generation. From the survey, 55 wetland products, classified into three groups, including fish, other aquatic animals and aquatic plants and vegetables were harvested. A net economic value within the sample group was estimated at 2,037,903.75 Baht or 20,370.89 Baht/household (data in 2009). This value is accounted for approximately 33.95% of an annual household income.

Key word : Economic valuation, Wetland resources

ENVIRONMENTAL IMPACTS COMMUNITIES ENCOUNTERED AT SAMLIEM INTERSECTION TUNNEL CONSTRUCTION SITE (WORKING PHASE)

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Project advisor : Asst. Prof. AdcharapornPagdee

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This survey-based study aims to identify environmental impacts communities in/around Samliem Intersection Tunnel Construction Site (working phase) have encountered. It is also to survey community opinions towards this construction project, especially alternatives to reduce impacts. Data were collected using self-administered questionnaire. Data analysis includes descriptive statistics and Chi-square Test of Independence. Three hundreds and eighty four (384) people living in/around the construction site within 500 m proximity participated in this survey. From the survey, 57.70% of samples reported that they did not get any impact from the project. However, the majority of samples (32%) identified that traffic congestion is the most obvious problem caused by the construction. Furthermore, the respondents (68%) expressed when the project was paused that finding a new contract company so that construction works could continue was urgently needed. They (26%) suggested that to reduce impacts the project needs to follow a time table strictly so it can be done on time. Finally, community perception on environmental impacts, including noise disturbance, vibration from machine operations, dust, wastewater and garbage problems shows significant connection with distance from the site to where the respondents live ($\chi^2 = 53.135, 33.108, 29.666, 22.587, 28.569$, p-value < 0.05, respectively).

ผลกระทบด้านสิ่งแวดล้อมต่อชุมชนในพื้นที่ก่อสร้างทางลอดสี่แยกสามเหลี่ยม (ระยะก่อสร้าง)

นักศึกษา : ศิรินันท์ บัณฑิตพานิชชา

อาจารย์ที่ปรึกษาโครงการวิจัย : ผศ.ดร. อัจฉราภรณ์ ภักดี

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การวิจัยมีวัตถุประสงค์เพื่อสำรวจผลกระทบด้านสิ่งแวดล้อมที่สำคัญต่อชุมชนในพื้นที่ก่อสร้างทางลอดสี่แยกสามเหลี่ยมในระยะก่อสร้าง ความคิดเห็นของชุมชนต่อโครงการฯ และแนวทางเพื่อลดผลกระทบจากการดำเนินการก่อสร้างการเก็บข้อมูลอาศัยแบบสอบถามที่ให้ผู้ตอบกรอกข้อมูลเอง (Self-administered questionnaire) ทำการวิเคราะห์ข้อมูลเชิงพรรณนา และทดสอบความสัมพันธ์ทางสถิติระหว่างผลกระทบสิ่งแวดล้อมกับคุณลักษณะส่วนบุคคลของกลุ่มตัวอย่าง ด้วย Chi-square Test of Independence จากการสำรวจมีผู้ร่วมตอบแบบสอบถามซึ่งเป็นประชาชนที่อาศัยประจำในบริเวณพื้นที่ก่อสร้างฯ ภายในรัศมี 500 เมตร จากสี่แยกสามเหลี่ยม ทั้งหมด 384 คน ร้อยละ 57.70 ของกลุ่มตัวอย่างระบุว่าไม่ได้รับผลกระทบด้านสิ่งแวดล้อม ส่วนผลกระทบสิ่งแวดล้อมที่กลุ่มตัวอย่างส่วนใหญ่ (ร้อยละ 32) ระบุว่าส่งผลกระทบต่อชุมชนมากที่สุด คือ ปัญหาการจราจร สำหรับความคิดเห็นของชุมชนที่มีต่อโครงการเมื่อการก่อสร้างหยุดชะงักลง พบว่าร้อยละ 68 ต้องการให้เร่งจัดหาผู้รับเหมาใหม่โดยเร็ว และวิธีที่ชุมชนต้องการให้โครงการดำเนินงานในการลดผลกระทบสิ่งแวดล้อมคือ ให้รับดำเนินการให้เสร็จเพื่อเป็นการแก้ไขผลกระทบทั้งหมด (ร้อยละ 26) จากการทดสอบความสัมพันธ์ทางสถิติพบว่าระยะทางจากโครงการถึงที่พัก/สถานที่ทำงานที่อยู่ประจำในช่วงเวลาก่อสร้างมีความสัมพันธ์กับ เสียงดังรบกวน การสั่นสะเทือนของอาคาร ฝุ่นละออง น้ำเสีย และขยะ ($\chi^2=53.135, 33.108, 29.666, 22.587, 28.569$ ตามลำดับ, $p<0.05$)

Ethnobotany of Aquatic-plants at Nong Han wetland , Kumphawapi District Udonthani Province.

Student : Miss. ApinyaPornpipat

Project advisor : Asst. Prof. Dr. AdcharapornPagdee

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This ethno-botanic study is to survey aquatic plants used by villagers at Nonghanwetland,Kumphawapee district, Udonthani province. It is also to describe traditional practice for aquatic plant consumption. The study took place at Bandiam village, Kumphawapee,Udonthani from June to August,2006. Data were collected through in-depth interview of seven senior villagers who specialize in herbs consumed in the community and through field and local market surveys. In total, 62 species from 33 families of aquatic plants were reported of being used by villagers. The family mostly used is CYPERACEAE i.e. *Scirpusgrossus*L.f., *Cyperuscorymbosus*Hook.f. Use of aquatic plants is usually for household consumption,including food, medicines, household tools, animal feeds,and others e.g.,ceremonial plants and decoration materials. Edible and medicinal plants are most frequently harvested,accounted for 45% and 26% of all identified plants respectively. Flowers are the most consumed,compared to other parts. The participants reported that traditional knowledge is passed along from generation to generation through storytellers rather than written form. Currently due to technology development and lack of written documents, this traditional knowledge, especially medicinal use is fading away.

Key word : Aquatic-plants

**Factors Affecting Student's Behavior on Solid Waste Separation, Faculty of Science,
KhonKaen University**

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Project advisor : Asst. Prof. Dr. AdcharapornPagdee

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This survey-based study identifies factors affecting student's behavior in solid waste separation. The target population is a group of students from Faculty of Science, KhonKaen University. In total, 338 students were sampled using a quota sampling technique. Students enrolled in the first semester, 2548 were asked to complete a questionnaire, covering background knowledge, attitudes, and experiences of separating solid wastes. The study shows that factors affecting student's behavior in solid waste separation include 1) educational background (Chi-square test of independence, p -value = 0.037), 2) family influence (p -value < 0.0001), 3) incentive for solid waste separation (p -value < 0.0001) e.g., additional income and score for consideration to continue staying in University's dormitories, and 4) influence from surrounding people such as friends and teachers (p -value < 0.0001). Finally, the survey indicates that approximately 86.6% of the sampled students obtain the highest understanding level of solid waste separation.

Key word : Solid Waste Separation

Factors Influencing Business-owners' Participation in Environmental Management

KhonKaen University.

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Project advisor :Asst. Prof. Dr. AcharapornPagdee

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This research project aims to survey business owners' participation in environmental management in KhonKaen University (KKU). It is also to identify factors that influence their participation. Data were collected using self-administered questionnaires with accidental sampling technique. In addition, KKU administrative board member was interviewed for environmental management plans and policies. Data analysis includes descriptive statistics and Chi-square Test of Independence. In total, 180 business owners participated in the survey. The study shows that the majority of participants obtained a high level of knowledge and understanding regarding environmental issues (75%), agreed with current KKU environmental management (73.89%) and had a moderate level of participation (60%). The most severe environmental problem that needs an urgent management plan for is solid waste management, specifically insufficient waste containers. From statistical test of independence, none of the studied factors show significant association with business owners' participation. However, the survey results show that factors reported of having most influence on their participation include good image to their business (mean = 4.16 out of 5), ensuring life and property safety (mean = 4.03 out of 5), and environmental awareness and responsibility (mean = 4.16 out of 5).

Key word : Factors Influencing

Forest Structure at a community forest: A case study of KhokNong Jan community forest, Dongkeng sub-district, Nongsonghong district, KhonKaen Province.

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This study aims to study forest structure at KhokNong Jan community forest, Dongkengsub- district, Nongsonghong district, KhonKaen Province. A quadrat sampling technique was used to study quantitative forest structure and forest profile. The study took place during June to September 2554. Twenty plots of 25x25 m size were placed in the community forest. In total, 50 tree species were identified. Tree density is 0.0625 tree/m² or 97.66 tree/rai. The species with highest density is *Shoreaobtusa*Wall. Ex Blume (41.53 tree/rai), highest frequency is *Shoreaobtusa*Wall. Ex Blume 0.95, highest dominance is *Shoreaobtusa*Wall. Ex Blume 0.005, and highest important value index is *Shoreaobtusa*Wall. Ex Blume (43.25%). The forest profile represents three layers, including forest floor (average height is 1.1m), forest canopy (average height is 10-15 m) and top forest canopy (average height taller than 15 m.). In addition, evidences of community use of the forest were observed, including harvesting of non-timber forest products and planting of introduced species such as eucalyptus and neems.

Key word : Forest Structure,Community Forest

**Fuelwood Plants in Ban Non Chad Community Forest, TambonDongkeng,
Nongsonghong District, KhonKaen Province.**

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This survey-based study investigates fuelwood collection and consumption at Non Chad village, Dongkeng, Nongsonghong, KhonKaen. Seventy-nine face-to-face questionnaires were distributed to Non Chad villagers. Twenty-one quadrats were also conducted to analyze Non Chad community forest structure. Forty-one species of a dry dipterocarp forest were identified of which *Shorea obtusa* has the highest importance value index (60.26), followed by *Dipterocarpus tuberculatus* (41.07), *Canarium subulatum* (39.23), *Iringia malayana* (21.74), and *Xylia xylocarpa* (19.90) respectively. Fuelwood species most frequently harvested by villagers are *X. xylocarpa*, *S. obtusa*, *D. tuberculatus* and *C. subulatum* respectively. Villagers mostly want to collect dry branches (78.13%) because they are easily burned (59.38%) and easy to handle (32.81%). Indeed, dry branches are most often collected by villagers (89.06%). The most important source for fuelwood collection is villager rice paddies (45.31%). Approximately 31.25% of respondents reported harvesting fuelwood in Non Chad community forest. An average amount of fuelwood consumed is 4.47 kg/household/day (0.02 m³/household/ day), while potential fuelwood volume in the forest is approximately 13,578.57 m³. Currently, community forest rules and regulations of fuelwood collection has no major impact on community fuelwood consumption. However, some of the respondents reported that they had to change the place to gather fuelwood, from the community forest to other places e.g., rice field, orchard, and neighbor's rice field (42.19%).

Key word : Fuelwood

Household Solid Waste Management in Chaivaree Sub-district Municipality, Phochai District, Roi-Et Province.

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Project advisor : Asst. Prof. Dr. Adcharaporn Pagdee

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This survey – based study is to identify types and components of household solid wastes. It is also to estimate quantity of solid wastes produced from households and describe household solid waste management in Chaivaree Sub-district Municipality, Phochai District, Roi – Et Province. The survey was conducted in August – September 2005. One hundred household representatives were selected, using a convenient sampling method. The study shows that the majority of solid wastes come from cooking process (80% of the respondents reported). An average amount of household solid wastes is 0.32 kg/person/day of which the majority is garbage : 0.23 kg/person/day, encompassing of left-over food, vegetables and fruits, followed by rubbish 0.09 kg/person/day, including plastic, leaves and plastic bottles, and hazardous wastes, which is less than 50 g/person/day (e.g., lamp and battery). Approximately 86% of the sampled households reported of having a household garbage container. About 58% of households reported that they separated solid wastes that could be reused and recycled before dumping. This group of households explained that the main reason for separation is for sale (77.59%) and reuse (8.62%), because these solid wastes can generate additional family income and reduce household expenses. The three most frequently reported solid wastes that households reused include plastic bottles (53%), plastic bags (34%) and fertilizer bags (20%). For solid waste management, 52% of the sampled households reported that all of their household solid wastes were managed by the Chaivaree Municipality, while 48% reported that they took care of their own solid wastes. The method that households most frequently used is to gather all wastes at one spot and then burn (75%).

Key word : Household Solid Waste Management

Impacts from the use of Nonghan, Kumpawapee District, UdonThani Province for Ecotourism Activities to the Wetland Ecosystem.

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Project advisor : Asst. Prof. Dr.AcharapornPagdee

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This study aims to assess impacts from the use of Nonghan, Kumpawapee district, Udonthani province for ecotourism activities to the wetland ecosystem. A field survey together with questionnaire interviews was conducted at Bandiam village, Kumpawapee district from June to September 2006. Seventy five household representatives selected by an accident sampling method participated in the survey. The study presents that 32 households involve in village's home-stay program, accounted for 11.76% of the total households. Approximately 300 - 400 tourists visit Nonghan per year, of which about 170 tourist use home-stay services (record in 2006). Usually, the highest season for tourist activities is the "water lily blossom" from November to December. Participants perceived that community's capability to organize ecotourism activities is fair due to site accessibility. The majority of participants (84.25%) reported that the use of Nonghan for ecotourism activities does not substantially impact the wetland ecosystem. However, certain environmental problems i.e. trashes around the lake and dense freshwater weeds can be observed. Only 15.75% of the participants thought that ecotourism activities caused ecosystem changes. The three most identified activities causing changes include fishing, boating, and bird and plant watching respectively.

Key word : Ecotourism Activities

Local Community 's and University Students ' Perception and Understanding Toward Community Forest Management

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Project advisor : Asst. Prof. AdcharapornPagdee

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One basic characteristic of community forest is cooperation between local community and outside agencies . With different socioeconomic backgrounds , it is possible that perception shared by the two can be different. This survey – based study investigates local community and university student between understanding and perspectives toward community forest management (CFM). The survey took approximately two months (July – August 2004) to complete . Seventy – nine structured questionnaires were used for personal interviews with local people at Nonchad Village , KhonKaen , where CFM is being implemented . Simultaneously , 79 self – administered questionnaires were distributed to a group of students at Department of Environmental Science whose represents university students. The analysis , which focuses on four aspects of CFM : 1) definitions and characteristics , 2) importance , 3) use of community forest , 4) management practices , indicates that local people and university students have similar understanding and perspectives toward CFM. Community forest is referred to as a forest being used by community for subsistence and protected under community rules and regulations. However , local people specifically understood that the community forest also covered forested areas adjacent to their rice paddies (94.93 %). Regarding to CFM importance , The majority of respondents (94.87% of villagers and 93.67 % of university students) agree that community forest helps conserve and protect native flora and fauna. Furthermore , use of community forest can be classified into two categories : direct and indirect uses . However , the majority of both villagers and university students reveal that indirect use of the community forest , specifically balancing water cycle (88.21 % of villagers and 92.39 % of university students) is more evident than direct use such as fuelwood collection (35.06% of villagers and 53.16 % of university students) and logging (23.07 % of villagers and 22.78 % of university students). Finally , for the understanding about CFM practice , local community agreed that only local people

should have right to use community forest ,while university students indicated that general publics should have right to access the forest . This finding suggests that making CFM successful could be problematic as long as understanding about ownership and rights to community forest remains limited , especially in a group of university students who may be participating in CFM in the future .

Key word : Forest Management

**Noise Pollution in SRITHAIMAI KANKASET Company Limited Muang district
Nhongbualamphoo province.**

Student : Miss PajareeWilaipan

Project advisor :Asst. Prof. Dr.Acharapornpakdee

Department of Environmental Science, Faculty of Science , KhonKaen University. Thailand.

This study is to measure noise levels that may consider pollution in rice mill processing at SRITHAIMAIKANKASET Company Limited Muang district Nhongbualamphoo province. Five milling processes in normal operation, including 1) chip off, 2) winnowing, 3) sieving, 4) polishing, and 5) packaging were measured noise levels (Leq (5)) using a sound level meter in the morning and afternoon on the 20th , 27th of July and the 3rd of August 2006. The study presents that noise levels in the process number 1),2),3), and 5) are close to noise limit allowed for safety working environment in factories. Only the process number 4 exceeds the noise level (90.13-90.93dBA), according the Ministry of Interior and the Ministry of Industry Announcements on safety working environment in factories 2003 (90dBA for 8 hrs working). This noise excess may occur from vacuum fans and polishing motors. Although other processes are within a safety limit, noise levels are close to the margin and that can be harmful to workers. Therefore, wearing earmuffs or earplugs should be mandatory for all onsite workers.

Key word : Noise Pollution

Potential of Briquetted Fuel made from Biomass as Substituted Fuel for Charcoal.

Student : Miss TiwagornIntarakamhaeng

Project advisor :Asst. Prof. Dr.AdcharapornPagdee

Department of Environmental Science, Faculty of Science , KhonKaen University. Thailand.

This study is to preliminarily evaluate the potential of briquetted made from biomass, including sawdust, corncob, and bamboo join as substituted fuel for eucalyptus wood – made charcoal. Five parameters: calorific value (J/g), ash content (%), moisture content (%), time spent to heat one liter of water to a boiling point (minute), and burning time (minute) were used to indicate the potential of the selected briquetted to become substituted fuel, coupled with local market prices offered in the KhonKaen Municipality area.

According to the study result, sawdust – made briquetted is considered the most potential alternative fuel for charcoal with calorific value (J/g), ash content (%), moisture content (%), time spent to heat one liter of water to boiling point (minute), and burning time (minute) as follows: 18,567.88 J/g, 2.61 %, 3.97 %, 5.53 min, and 74.40 min respectively. These parameters for corncob – made briquetted are 17,186.97 J/g, 3.53 %, 7.22 %, 11.32 min and 91.20 min respectively, and for bamboo join – made briquetted are 16,607.76 J/g, 3.69 %, 7.44 %, 12.13 min and 80.40 min respectively. Simultaneously, eucalyptus wood – made charcoal obtains values of these parameters as follows: 21,661.79 J/g, 4.40 %, 5.78 %, 5.17 min, and 90.00 min respectively. Additionally, from the market survey, prices of sawdust – made, corncob – made and bamboo join – made briquetted and eucalyptus wood – made charcoal are 14 Baht, 12 Baht, 12 Baht, and 13 – 15 Baht respectively. From the study, it can be concluded that sawdust – made briquetted has the potential to become alternative fuel but yet substituted fuel for eucalyptus wood – made charcoal. It represents the value added product made from left – over biomass although some of its fuel properties i.e. calorific value, boiling time and burning time are smaller than ones from eucalyptus wood – made charcoal.

Key word : Biomass

Research Title: Threats and Wetland Ecosystem Conservation by local community, Nonghan Kumpawapi, Udonthani Province.

Student : Miss Nuchamad Sodama

Project advisor : Asst. Prof. Dr. Acharaporn Pagdee

Department of Environmental Science, Faculty of Science, KhonKaen University, Thailand.

This study identifies problems and threats towards Nong Han wetland ecosystem, Udonthani province. It also lists community's conservation activities implemented at Nong Han. Data were collected using an onsite observation survey, together with a personal interview questionnaire and interviews of community leaders and local administration representatives during July-September 2009. In total, 120 household representatives from 15 villages in all Tambon located around Nong Han participated in the questionnaire. The three most evident problems and threats include invasion of alien species weeds, particularly *Mimosa pigra* (93.33% of respondents who answered such threat becomes more evident), followed by widespread of pests i.e., golden apple snail (87.50%) and dense aquatic plants that reduce water depth and surface (83.33%), respectively. Furthermore, the conservation activity villagers reported of being implemented is enforcement of rules and regulations on harvesting tool and equipments and techniques (26.66% of all responded conservation activities). Finally, villagers suggested that for sustainable conservation the activity needed to be promoted at all villages is eco-tourism (17.86% of all suggested activities).

Key word : Wetland Ecosystem Conservation

Socio-Economic Factors Affecting Utilization of Non Timber Forest Products in Khok NongCharn Community Forest, Nongdue village, Nongsonghong District.

Student : Miss PichitraTiekprakon

Project advisor : Assist. Prof. Dr. AdcharapornPagdee

Department of Environmental Science, Faculty of Science , KhonKaen University. Thailand.

The main objective of this study is to examine socio-economic factors, including market price that affect non timber forest products (NTFPs) harvesting of villagers at Nongdue village, Dong Kengsubdistrict, Nongsonghong district, KhonKaen province. A village leader, community forest initiative group and villagers were interviewed using a semi-structured questionnaire that covers NTFP harvesting, household social economic factors, price of NTFPs, and villager backgrounds. Chi-square test of independence and Fisher's exact test were used to examine statistic association between socio-economic factors and NTFP harvesting. In total, 51 villagers representing all households at Nongdue village participated in the survey. The majority of villagers (74.5%) harvested NTFPs for household consumption, while 19.6% harvested for sale. The study shows that price of NTFPs significantly associates with harvesting frequency ($p < 0.05$). Villagers tend to harvest NTFPs with higher price more frequently than NTFPs with lower price. Furthermore, when a market demand increased, villagers tend to keep smaller amounts of NTFPs for household consumption in attempts to provide more NTFPs for sale in a market.

Key word : Socio-Economic, Forest Products

Species Diversity of Bird Food Plants in Deciduous Dipterocarp Forest: Khao Noi – Napang Community Forest, Phu Wiang, Khon Kaen.

Student : Miss Daphawan Khamcha

Project advisor : Asst. Prof. Dr. Acharaporn Pagdee

Department of Environmental Science, Faculty of Science, Khon Kaen University, Thailand.

This study identifies bird food plants in Dry Dipterocarp forest at Khao Noi-Napang community forest, Khon Kaen. Bird species feeding in the community forest were also observed from June 15 to August 31, 2004. Ten belt transects with 10 m in width, each transect is 100 m apart, were conducted. Seventy-one plant species (36 families, mostly in Dipterocarpaceae) were recorded of which 28 species were identified bird food plants. Seven species were observed fruiting during the study season and being used by frugivorous birds. These bird food plants include *Flacourtiaindica* (Burm.f.) Merr, *Caseariagrewiaefolia* Ven., *Antidesmasootepense* Crai, *Irvingiamalayana* Oliv.ex.A.Benn, *Ficus* sp, *Memecylonedule* Roxb, and *Ellipanthustomentosus* Kurz. *Eucalyptus* spp. and *Oroxylum indicum* (L.) Kurz were observed being used by nectarivorous birds, while *Rothmaniawittii* (Craib) Bremek was observed being used by both fruit eating and nectarivorous birds. Thirty bird species were recorded. Twelve species were identified plant feeding. Six species are frugivorous: Hill Myna, Eurasian Jay, Stripe-throated Bulbul, Large-billed Crow, Streak-eared Bulbul, Green-eared Barbet, four species are nectarivorous: Olive-backed Sunbird, Grey-breasted Prinia, Common Tailorbird, Dark-necked Tailorbird, and two species are both fruit eating and nectar feeding: Scarlet-backed Flowerpecker and Black-crested Bulbul.

Key word : Bird Food Plants

Species Diversity of Birds on KhonKaen University.

Student : Mr.AtiratRachjaroen

Project advisor :Asst. Prof. Dr. AcharapornPagdee

Department of Environmental Science, Faculty of Science , KhonKaen University. Thailand.

The primary objective of this study is to survey bird species on KhonKaen University campus using the McKinnon List. It is also to preliminarily examine the relationship between species diversity and habitat characteristics. Four main habitat, including forest, agricultural area, marsh and pond, and residential zone were surveyed. Each of the habitat was divide into two site. The survey was conducted in two periods. The first one began in July 2005 and ended in September 2005 (rain season sample). The second period was done from November 2005 to January 2006 (winter season sample). The survey started from 6.00-8.30 am and from 4.00-6.00 pm in the afternoon every Thursday, Saturday and Sunday. In total, 81 bird species, classified into 36 families, including 55 resident bird species, 25 winter visitor species, and one passage migrant were observed. The common bird species found is in Sylviidae Family, consisting of 10 species. From the observed bird list , 77 species are considered protected species. Furthermore, RomklaoKaLaPaPrueg Park and The faculty of agriculture and the faculty of science area are the most similar (Sorensen 's index = 76.19)

Key word : Species Diversity,Birds

SPECIES DIVERSITY OF TREES IN FORESTED AREAS AT THE NATIONAL STARCH AND
CHEMICAL (THAILAND) LIMITED, MUANG DISTRICT, KALASIN PROVINCE

student: Miss YupapornWorpaeng.

Project advisor : Asst. Prof. AdcharapornPagdee

Department of Environmental science, Faculty of Science, KhonKaen University

A study on species diversity of trees in forested areas at the National Starch and Chemical (Thailand) Limited, Muang District, Kalasin Province was conducted as part of the requirements for students enrolled in the course 319 093 Cooperative Education in Environmental Science. The survey-based research aims to identify tree species in the industry's forest areas and to create a checklist of trees and their characteristic description. The study is also to analyze forest structure and compare it to an adjacent forest in an attempt to examine forest condition changes that may occur due to industry's activities. The survey took place from June to September 2006 in two selected study sites: one is the remaining forest in the industry's complex and the other is a private forest located in the west border of the factory. Fifteen quadrats with the size of 10x10 m were used for data sampling and forest structure analysis in each study site. At the industry's forest site, 31 species, 28 genera, 23 families of trees were identified of which *Dipterocarpusobtusifolius*Teijsm. ex. Miq., *Xyliaxylocarpa*(Roxb.) Taub.ver. *Xylocarpa*, and *D. tuberculatus*Roxb. obtained the highest important values, which are 108.53%, 39.50% and 21.69% respectively. At the private forest, 25 species, 23 genera, 19 families of trees were observed. *Xyliaxylocarpa*(Roxb.)Taub.ver. *Xylocarpa*, *D. obtusifolius*Teijsm.ex. Miq., *Canariumsubulatum*Guillaumin are dominant species with important values of 83.90% , 68.27% and 45.28% respectively. In total, 39 species, 34 genera, 26 families were identified in both study sites of which the majority of observed species are in Dipterocarpaceae Family. Shannon-Wiener's diversity index for the industry forest is 3.060675, while the one for the private forest is 2.698813. Finally, the two forest communities share similar species composition and structure. According to Sorensen's Similarity index, approximately 60.71% of tree species could be observed in both communities.

ความหลากหลายชนิดของพรรณไม้ยืนต้นในพื้นที่อุตสาหกรรมบริษัทเนชั่นแนลสตาร์ชแอนด์เคมีเคิล (ไทยแลนด์) จำกัดอำเภอเมือง จังหวัดกาฬสินธุ์

นักศึกษา : นางสาวยุภาพร วอแพง รหัสประจำตัว 463020516-5

อาจารย์ที่ปรึกษาโครงการวิจัย : ผศ.ดร. อัจฉราภรณ์ ภักดี

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์มหาวิทยาลัยขอนแก่น

การศึกษาความหลากหลายชนิดของพรรณไม้ยืนต้นในพื้นที่อุตสาหกรรม บริษัทเนชั่นแนลสตาร์ชแอนด์เคมีเคิล(ไทยแลนด์) จำกัด อำเภอเมือง จังหวัดกาฬสินธุ์ ดำเนินการในช่วงเดือนมิถุนายนถึงเดือนกันยายน พ.ศ. 2549 เพื่อสำรวจชนิดพรรณไม้ยืนต้น วิเคราะห์โครงสร้างป่าไม้ และจัดทำบัญชีรายชื่อพรรณไม้พร้อมคำบรรยายลักษณะและการใช้ประโยชน์ โดยมีการเปรียบเทียบข้อมูลกับป่าไม้ส่วนบุคคลที่มีแนวเขตติดกับโรงงานฝั่งตะวันตก การเก็บข้อมูลใช้วิธีการวางแปลงตัวอย่าง (Quadrat Technique) ขนาด 10 X10 เมตร จำนวน 15 แปลง คิดเป็นพื้นที่ 1,500 ตารางเมตร ในแต่ละพื้นที่ศึกษา ผลการศึกษาพบว่า พื้นที่อุตสาหกรรม บริษัทเนชั่นแนลสตาร์ชแอนด์เคมีเคิล(ไทยแลนด์) จำกัด พบไม้ยืนต้นทั้งหมด 31 ชนิด 28 สกุล 23 วงศ์ พรรณไม้เด่น ได้แก่ ยางเหียง *Dipterocarpus obtusifolius* Teijsm. ex. Miq., แดง *Xylocarpa* (Roxb.) Taub. ver. *Xylocarpa* และ ยางพลวง *Dipterocarpus tuberculatus* Roxb. โดยมีความสำคัญเท่ากับ 108.53%, 39.50% และ 21.69% ตามลำดับ บริเวณป่าไม้ส่วนบุคคล พบไม้ยืนต้นทั้งหมด 25 ชนิด 23 สกุล 19 วงศ์ พรรณไม้เด่น ได้แก่ แดง *Xylocarpa* (Roxb.) Taub. ver. *Xylocarpa*, ยางเหียง *Dipterocarpus obtusifolius* Teijsm. ex. Miq. และ มะกอกเลื้อม *Canarium subulatum* Guillaumin โดยมีความสำคัญเท่ากับ 83.90%, 68.27% และ 45.28% ตามลำดับ โดยการศึกษาทั้งสองบริเวณ พบไม้ยืนต้นรวมทั้งหมด 39 ชนิด 34 สกุล 26 วงศ์ บริเวณพื้นที่อุตสาหกรรม บริษัทเนชั่นแนลสตาร์ชแอนด์เคมีเคิล (ไทยแลนด์) จำกัด มีความหลากหลายทางชีวภาพของพรรณไม้ยืนต้น (Shannon-Wiener's diversity index) เท่ากับ 3.060675 และป่าไม้ส่วนบุคคล มีความเท่ากับ 2.698813 สำหรับการวิเคราะห์ความคล้ายคลึงกันของระบบนิเวศ โดยใช้ Sorensen's Index พบว่าพื้นที่ป่าไม้ทั้งสองแห่ง มีความคล้ายคลึงกันของชนิดพรรณไม้เท่ากับ 60.71 %

The Analysis of Electronic Waste Flowchart : mobile phones and batteries at the Department of Environmental Science, Faculty of Science, KhonKaen University.

Student : Miss PanutdaKummburngkang

Project advisor : Asst. Prof. Dr. AdcharapornPagdee

Department of Environmental Science, Faculty of Science , KhonKaen University. Thailand.

This survey-based study analyzes the flowchart of electronic wastes, including mobile phones and batteries. It also examines amounts of electronic wastes produced by students, faculty members and supporting staff members at the Department of Environmental Science, Faculty of Science, Khonkaen University. Finally, the study investigates how these wastes are being treated. The survey was conducted in August 2005, with 184 self-administered questionnaires distributed to all students, faculty members, and supporting staff members. In total, 143 questionnaires were returned. The majority of respondents are students(95.80%), followed by faculty members(2.10%) and supporting staff members(2.10%). The survey presents that 206 mobile phones and 184 batteries are currently in use. From the survey, 83 mobile phones and 67 batteries were reported no longer in use therefore considered electronic wastes. For mobile phones, these electronic wastes classified not being treated at all include 32.53% being stored with users and 1.20% dumped with other regular wastes. At the same time, the electronic wastes being treated include 30.12% gave away to people e.g., friends and family member, 26.50% sold to mobile phones shops, and 8.43% sold to other users. For batteries, the majority of respondents reported not treating non-used batteries at all, including 79.10% of the batteries being stored and 8.95% dumped to regular waste containers. Only 5.94% of batteries were dumped in hazard waste containers and 4.47% returned the batteries to dealers.

Key word : Electronic Waste, Mobile phones and Batteries

The relationship between household economic social conditions and use of Nong - Han Kumpawapi Wetland, Udonthani Province

Student : Miss YaneePotiwanna

Project advisor :Asst. Prof. Dr. AcharapornPagdee

Department of Environmental Science, Faculty of Science , KhonKaen University. Thailand.

This surveyed-based research examines statistical connection between household socio-economic conditions and use of Nong Han wetland resources, Udonrthani province. It also identifies activities of how households use the wetland resources. Data were collected by onsite observation surveys, together with a personal interview questionnaire during July-October 2009. In total, 122 household representatives from 14 villages in all Tambon located around Nong Han participated in the questionnaire. The majority of villagers (82% of the participants) reported of access to and using Nong Han. The most evident use activities include catching fish and other aquatic animals (27.49%), followed by harvesting of aquatic plants (26.02%). From the statistical test, there is no significant connection between socio-economic conditions and the use of Nong Han wetland. However, villagers who reported not using Nong Han explained their reasons; the important ones are that villagers did not have time and usually wetland products can be bought from other villagers (25%), villagers can harvest similar products from their orchards and/or farms (19.44%) and many market goods can substitute the use of wetland products (13.89%).

Key word:Economic Social

Research Title: Threats and Wetland Ecosystem Conservation by local community, Nonghan Kumpawapi, Udonnathani Province

STUDENT :NUCHAMADSODAMA

Project advisor : Asst. Prof. Adcharaporn Pagdee

Department of Environmental science, Faculty of Science, KhonKaen University

This study identifies problems and threats towards Nong Han wetland ecosystem, Udonnathani province. It also lists community's conservation activities implemented at Nong Han. Data were collected using an onsite observation survey, together with a personal interview questionnaire and interviews of community leaders and local administration representatives during July-September 2009. In total, 120 household representatives from 15 villages in all Tambon located around Nong Han participated in the questionnaire. The three most evident problems and threats include invasion of alien species weeds, particularly *Mimosa pigra* (93.33% of respondents who answered such threat becomes more evident), followed by widespread of pests i.e., golden apple snail (87.50%) and dense aquatic plants that reduce water depth and surface (83.33%), respectively. Furthermore, the conservation activity villagers reported of being implemented is enforcement of rules and regulations on harvesting tool and equipments and techniques (26.66% of all responded conservation activities). Finally, villagers suggested that for sustainable conservation the activity needed to be promoted at all villages is eco-tourism (17.86% of all suggested activities).

ศุภคามและการอนุรักษ์พื้นที่ชุ่มน้ำหนองหานกุมภวาปีจ.อุดรธานี

นักศึกษา: นางสาวนุจมาศโสตามา

อาจารย์ที่ปรึกษาโครงการวิจัย: ผศ.ดร.อัจฉราภรณ์ภักดี

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อมคณะวิทยาศาสตร์มหาวิทยาลัยขอนแก่น40002

การศึกษาครั้งนี้สำรวจปัญหาและภัยคุกคามต่อพื้นที่ชุ่มน้ำหนองหานจ. อุดรธานีและกิจกรรมการอนุรักษ์พื้นที่ชุ่มน้ำหนองหานของชุมชนการเก็บข้อมูลอาศัยการสำรวจเชิงประจักษ์และแบบสอบถามโดยการสัมภาษณ์ตัวแทนครัวเรือนและผู้นำชุมชนหรือตัวแทนสมาชิกอบต. ระหว่างเดือนก.ค.-ก.ย. 2552 จากการศึกษามีชาวบ้าน 120 คนจาก 15 หมู่บ้านในทุกตำบลรอบหนองหานร่วมตอบแบบสอบถามภัยคุกคามที่เห็นชัดเจนได้แก่การมีวัชพืชต่างถิ่นรุกรานแล้วขึ้นหนาแน่นโดยเฉพาะไมยราบยักษ์ (93.33%ของกลุ่มตัวอย่างที่ตอบว่าเป็นภัยคุกคามที่เพิ่มมากขึ้น) รองลงมาคือมีศัตรูพืชได้แก่หอยเชอร์รี่แพร่ระบาด (87.50%) และมีวัชพืชน้ำจำพวกผักตบชวาออกหนาแน่นขึ้นหนาแน่น (83.33%)มีส่วนทำให้หนองหานต้นเขินสำหรับกิจกรรมการอนุรักษ์พื้นที่ชุ่มน้ำที่ชุมชนทำอยู่ในปัจจุบันที่เห็นชัดเจนได้แก่การควบคุมการใช้อุปกรณ์จับปลาและวิธีจับทำให้ถูกวิธี (26.66%ของกิจกรรมฯ ที่กลุ่มตัวอย่างระบุว่ามีการดำเนินการในชุมชน) และชุมชนได้เสนอแนะกิจกรรมฯ เพื่อการอนุรักษ์อย่างยั่งยืนคือการส่งเสริมการท่องเที่ยวเชิงอนุรักษ์ให้ทั่วถึงทุกหมู่บ้านรอบหนองหาน (17.86%ของข้อเสนอแนะฯ ที่กลุ่มตัวอย่างแสดงความคิดเห็น)

Use of Non-timber Forest Products harvested from Dong Namon Community Forest, Khampai village, Rongkham District, Kalasin Province.

Student : Miss KanuengnitSuwanasing

Project advisor : Asst. Prof. Dr. AdcharapornPagdee

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This survey-based study investigates use of Dong Namon Community Forest, Khampai village, Rongkham district, Kalasin province. The use is focused on harvesting of non-timber forest products (NTFPs). The study is also to estimate net economic benefits of NTFPs harvested by local villagers. The survey took place from July to September, 2005. In total, 50 household representatives were selected for a personal interview, following questionnaire questions, which cover use of the Community Forest, harvesting of NTFPs, management of Community Forest, and demographic information. According to the survey result, 76% of households reported that they harvested NTFPs for household use and income generation. These NTFPs frequently harvested include mushrooms (100% of households reported harvesting), wild vegetable — Siam tulip (39.5%), ant eggs (23.7%), wild vegetable — elephant yam (13.2%), insects (13.2%), and fuelwood (13.2%). Total amounts of NTFPs harvested by villagers are as follows: mushrooms 7,100.2 kg , wild vegetable — Siam tulip 877.5 kg , ant eggs 228.6 kg , wild vegetable — elephant yam 63.9 kg , insects 17.2 kg , and fuelwood 2,544 kg. The net economic benefit of these NTFPs is 410,191 Baht in the studied year (2005). The actual income generated and brought to local economy from selling NTFPs of some villagers (60.53% of the total number of households) is approximately 86,780 Baht.

Key word : Forest Products

Utilization and Economic Valuation of Community Forest: A case study of Khoanoi-Napang Community Forest, PhuWiang, KhonKaen.

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This study aims to explore community forest management at Khoanoi-Napang Community Forest, PhuWaing district, KhonKaen province. The study includes a survey of forest utilization and current management practice, and economic valuation of direct benefits derived from non-timber forest products (NTFPs). One hundred and fifty four household representatives were randomly selected for interviews, following a semi-structured questionnaire that covers forest use and harvesting of NTFPs. Khoanoi-Napang Community Forest is currently managed under community rules and regulations in which harvesting of all trees is prohibited, while NTFPs collection remains open to all users. Fire prevention and tree plantation are the major projects implemented to improve forest conditions. Overall use of the Forest is for NTFPs collection (75.32%) with primary purposes for household consumption and income generation. Twenty four types of NTFPs, classified into seven groups, including mushrooms, wild vegetables, insects and animals, ant's eggs, honey, fuelwood, and medicinal plants, were identified being harvested by local [people. Net](#) economic value of NTFPs was estimated 903,011.76 Baht or 4,777.84 Baht/household in 2007, accounted for 14.42% of an average annual household income.

Key word : Economic Valuation, Community Forest

Utilization and Economic Valuation of the gathering of Non-Timber Forest products in community forest areas : A case study of KokNong Chan Community Forest, NongSong Hong, KhonKaen.

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The purposes of this study were to investigate the utilization of non-timber forest products (NTFPs) and to estimate net economic benefits of NTFPs harvest carried out by local villagers at KhokNong Chan Community Forest, Nong Song Hong district, KhonKaen province. Data collection was conducted by interviewing a village leader, community forest initiative group and villagers using a semi-structured questionnaire, which covers use of community forest, NTFP harvesting practices and villager background. The study also included a local market survey and took place during June to July 2011. In total, 51 villagers, representing all households in Nongdue village the closest village to the community forest were interviewed. The study showed that 74.51% of interviewees reported of harvesting NTFPs, which can be divided into seven main categories : mushrooms (97.37% of respondents), wild vegetables (89.47%), wild animals/insects (71.05%), fuelwood (36.84%), wild fruits (26.32%), yam/fiber (26.32%) and bamboo shoot (2.63%). The summed quantity of NTFPs harvested by all households is 24,795.62 kg. The economic value was estimated 343,078.30 baht or 9,028.38 baht per household in 2552/2553. Estimated cost of NTFPs harvested is 5,974.62 or 157.28 baht per household. The net economic benefit of NTFPs harvested by villagers from Nongdue village is 337,103.68 baht or 366.41 baht/Rai or 8,871.51 baht per household. This net value is accounted for 15% of an average annual household income.

Key word : Economic Valuation