# A comparision of benthic macroinvertebrate diversity between organic farming and inorganic farming in Mueang District, Khon Kaen Province

Student : Miss Sujidtra  Limsoongnurn

Project  advisor : Dr. Sarun  Keithmaleesatti

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The aim of this study was to investigate the diversity of benthic macroinvertebrate communities between organic farming and inorganic farming. The study of benthic macroinvertebrate communities and physicochemical parameters were taken from two sites (Tambon Sila and Tambon Buengneim), Mueang District, Khon Kaen Province by point transects. The study was carried out from August to October 2009 using hand net. The standard time for collection  of  samples was 3 minutes per point. The results indicated that 11 orders of benthic macroinvertebrate, including 20 families and 24 species were found in  inorganic farming and 11 orders 25 families  and 38 species were found in organic farming. The species richness of benthic macroinvertebrates in both sites were significantly different ($p<0.05$) and species diversity of benthic macroinvertebrates in inorganic farming calculated by using Shannon-Weiner diversity index was higher than organic  farming (H'= 3.9689 and H'= 2.9762) respectively. The results of statistical analysis showed that physicochemical parameters were not significantly different ($p>0.05$). The results suggest that the use of agricultural  chemicals can change the community structure of benthic macroinvertebrates along the pollution gradient  in agroecosystems.

**Key word** : Macroinvertebrate  Diversity

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**Key word** : macroinvertebrate

**A survey of large tree for shaded area temperature reduction  in urban communities**.

Student  : Miss Panusil  Saiyakij

Project  advisor  :  Associate Professor. Kitti   Akamphon

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

This research aimed to study <u>capability</u> and factors affecting the reduction of shade area temperature under big trees in Khon Kaen University.  The goal of this research was to obtain huge trees that fit and could be used to decrease the surface temperature in the urban area by studying basic data and factors that had impact on the reduction of shade are temperature under all 10 kinds of huge trees.  The researcher had divided studied factors into 3 groups including the main factor such as light intensity, temperature, dimension of canopy areas, and leaf-shedding, the associate factor such as price, application, and the sub factor such as the height of the first fresh sprout, wind resistance, sunlight requirement, moisture requirement, soil type that suits for growth, maintenance, and blooming duration. Then, the data would be used to compare with capability of the shade area temperature reduction under big trees for beneficial use in urban community by converting the data into score.  The results showed that species from *Samanea saman*  from a large fitness and performance used to used to benefit communities in the city. The Total Score 76.75% effective in reducing the average temperature under 31.44% shade and effective in reducing shedding light through the shade under the average of 92.86%.

**Key  word**  : Large tree, Temperature reduction

**Analysis of the Drinking Water Quality in Khon Kaen University.**

Student : Miss Sureeporn Kaew-u-dorn

Project advisor : Dr. Lamyai Neeratanaphan

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

Study on water quality provided at Khon Kaen University Services Centers. Various parameters under study were physical properties such as pH and turbidity, chemical properties such as total solid and residual chloride and of biological properties such as total coliform bacteria and faecal coliform bacteria. Six water samples were collected from six water sampling sites, each sample was taken from Food and Services Rongchai Site 1 and Site 2, Food and Services Complex Site 1 and Faculty of Medicine Cafeteria Site 1, Site 2 and Site 3. Results of this study physical and chemical which was within range of standard value for drinking showed mean value of pH for all water samples from all collecting Sites was 6.89; turbidity values were in the range of 0.96 to 1.25 NTU; total solid was found in the range of 32 to 170 mg/ml; whereas residual chloride values were in the range of 17 to 44 mg/liter. Values for physical and chemical properties showed well within the standard value for drinking water. However the results for biological parameters are not suitable for drinking as their total coliform bacteria and faecal coliform bacteria are higher than allow limit of <3 MPN/100 ml. Those water samples were from Food and Services Rongchai Site 1 and Site 2 with total coliform bacteria of 3 and 4 MPM/100 ml and faecal coliform bacteria of 4 and <3 MPN/100 ml respectively; whereas for Food and Services Complex Site 1 with total coliform bacteria of 127.5 MPM/100 ml and faecal coliform bacteria of 12 MPN/100 ml respectively; as for Faculty of Medicine Cafeteria Site 2 showed to have total coliform bacteria of 4 MPN/100 ml.

**Applying the principles of clean technology in rice mill. Case study : mill at Lub district, Amphoe Muang, Kalasin province.**

Student : Mr. Khomson Chaiworramookkul

Project advisor : Asst. prof. Turenjai Doolgindachbaporn

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

Applying the principles of clean technology in rice mill at Lub district, Amphoe Muang, Kalasin province. This project intends to investigate the factors which caused of the broken rice and considered worker performance and economics value. The study showed the important factor was the operation of whitening machine. When installation of automatic control systems, the result was rice had been increased 1.44 percent and rice brokens decreased 1.11 percent. There was increased revenue from the sale of rice up to 20,000 baht per month.

**Key word** : Clean Technology

**Assessment of Water Quality in East and West Si-Tan Water Reservoir at Khon Kaen University.**

Student : Miss Praewphan Kaewsai

Project advisor : Dr. Lamyai Neeratanaphan

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

The assessment of water quality in East and West Si-Tan water reservoir at Khon Kaen University. Studying of physical and chemical properties of water quality by examining nine parameters, color, odor, temperature, acid-alkaline (pH), Electric conductivity (EC) , Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Ammonia-Nitrogen ($NH_3$-N) and Nitrate-Nitrogen ($NO_3$-N) were used as indicators. Water was collected from 3 points in each reservoir at interval of 2 times during August – September 2009. The results showed that the mean value for most of physical and chemical properties were not different while the mean value of Electric conductivity in the East and the West has an average of 817.3, 118.7 µs/cm, respectively, and the mean value of DO were 5.46, 7.36 mg/L, respectively. Comparison of DO and BOD values from previous studies 2003, 2007, 2009 showed the average DO in the East was 5.99, 5.81, 5.21 mg/L, respectively, However the average DO in the West was 8.28, 6.3, 7.36 mg/L, respectively, and BOD in the West had an average of 4.06, 5.44, 9.25 mg/L, respectively. However findings of the average BOD in the West was 10.08, 7.6, 9.97 mg/L, respectively. These data showed that the water quality in the East Si-Tan water reservoir is better than the West.

**Key word** : Water Quality

Diversity  of Amphibian in Khon Kaen University case study on Natural pond and Artificial pond

Student :   Watcharapol         Pingwong

Project advisor : Dr. Sarun  Keithmaleesatti

**Department of Environmental science, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand**

Diversity  of amphibian in Khon Kaen University on Artificial and Natural pond were studied during July – September 2009. The field survey methods in this study is Total count. The results found that  three families, seven species were classified  included  *Bufo melanostictus (*family Bufonidae*), Rana erythaea , Fejervarya limnocharis*, *Hoplobatrachus regulosus  Occidozyga martensii* (family Ranidae), *Kaloula pulchra*, *Microhyla pulchra* (family Microhylidae). The most species in this survey is *Bufo melanostictus*. Similarity Index presented 92.3% in both area. All amphibian in this study are not as protected species in the wild animals and protection act B.E. 2535.

**ความหลากหลายของสัตว์สะเทินน้ำสะเทินบกในมหาวิทยาลัยขอนแก่น กรณีศึกษา แหล่งน้ำตามธรรมชาติและแหล่งน้ำที่มนุษย์สร้างขึ้น**

**นักศึกษา** : นายวัชรพล ปิงวงค์ รหัสนักศึกษา 493020299-0
**อาจารย์ที่ปรึกษาโครงการวิจัย :** ดร.ศรัณย์ เกียรติมาลีสถิต
ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น

การศึกษาความหลากชนิดของสัตว์สะเทินน้ำสะเทินบกในมหาวิทยาลัยขอนแก่น บริเวณสระพลาสติกและบริเวณบึงสีฐาน ระหว่างเดือนกรกฎาคม ถึง เดือนกันยายน พ.ศ. 2552 โดยทำการสำรวจโดยวิธี Total count และเก็บตัวอย่างเดือนละ 2 ครั้ง พบสัตว์สะเทินน้ำสะเทินบกจำนวน 3 วงศ์ 7 ชนิด ประกอบด้วย วงศ์คางคก (Bufonidae) พบ 1 ชนิดคือคางคกบ้าน (*Bufo melanostictus*) วงศ์กบเขียด (Ranidae) พบ 4ชนิด คือ กบบัว (*Rana  erythaea*) กบหนอง (*Fejervarya  limnocharis*) กบนา (*Hoplobatrachus  regulos*us) และเขียดทราย (*Occidozyga martensii*) วงศ์อึ่งอ่าง (Microhylidae) พบ 2 ชนิดคือ อึ่งอ่างบ้าน (*Kaloula pulchra*) อึ่งขาคำ (*Microhyla pulchra*) ซึ่งชนิดที่พบมากที่สุดในการสำรวจครั้งนี้คือ คางคกบ้าน (*Bufo melastictus*) และจำนวนชนิดที่พบในทั้งสองพื้นที่มีค่าดรรชนีความเหมือน (Similarity index) คิดเป็น 92.3 % และไม่พบว่ามีชนิดใดที่มีสถานภาพเป็นสัตว์ป่าคุ้มครองตาม พระราชบัญญัติสงวนและคุ้มครองสัตว์ป่า พ.ศ. 2535

Diversity  of Amphibian in Khon Kaen University case study on Natural pond and Artificial pond .

Student  : Mr. Watcharapol    Pingwong

Project  advisor  :  Dr. Sarun  Keithmaleesatti

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

Diversity  of amphibian in Khon Kaen University on Artificial and Natural pond were studied during July – September 2009. The field survey methods in this study is Total count. The results found that  three families, seven species were classified  included  *Bufo melanostictus (*family Bufonidae*), Rana erythaea , Fejervarya limnocharis, Hoplobatrachus regulosus  Occidozyga martensii* (family Ranidae), *Kaloula pulchra, Microhyla pulchra* (family Microhylidae). The most species in this survey is *Bufo melanostictus.* Similarity Index presented 92.3% in both area. All amphibian in this study are not as protected species in the wild animals and protection act B.E. 2535.

**Key  word**  :  Amphibian, Natural pond and Artificial pond .

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

Student :   Prapassorn  Khruaklang

Project advisor : Asst. Prof. Adcharaporn Pagdee

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

This study is to identify tools and equipment currently used for wetland product harvesting at Nonghan Kumpawapee, 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 Screen while 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 (*Actinoscirpus grossus*) and water stems (*Nymphaea lotus*), respectively.

**ความหลากหลายของเครื่องมืออุปกรณ์ในการใช้ประโยชน์พื้นที่ชุ่มน้ำ หนองหานกุมภวาปี จังหวัดอุดรธานี**

**นักศึกษา** : นางสาวประภัสสร เครือกลาง

อาจารย์ที่ปรึกษาโครงการวิจัย : ผศ.ดร. อัจฉราภรณ์ ภักดี

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น

การศึกษาความหลากหลายของเครื่องมืออุปกรณ์สำหรับเก็บหาผลผลิตในพื้นที่ชุ่มน้ำหนองหานกุม
ภวาปี จ. อุดรธานี ดำเนินการระหว่างเดือนมิถุนายน – เดือนกันยายน พ.ศ. 2552 เพื่อสำรวจรายชื่อของ
เครื่องมืออุปกรณ์ที่ชาวบ้านใช้เก็บหาผลผลิตในพื้นที่ชุ่มน้ำในปัจจุบัน ทั้งอุปกรณ์ในการจับสัตว์น้ำ เครื่องมือ
ดักสัตว์และเครื่องมือสำหรับเก็บหาพืชพรรณ รวมทั้งสำรวจชนิดผลผลิตคือ พืชพรรณ สัตว์น้ำ สัตว์สะเทินน้ำ
สะเทินบก สัตว์เลื้อยคลาน และสัตว์เลี้ยงลูกด้วยนม ที่ชาวบ้านเก็บหาเป็นประจำ รวมถึงวิธีการใช้เครื่องมือ
อุปกรณ์ การเก็บข้อมูลใช้วิธีการศึกษาเชิงสำรวจ (Survey–based research) อาศัยแบบสอบถามและการ
สัมภาษณ์เชิงลึกชาวบ้านรอบหมู่บ้านหนองหาน การสำรวจข้อมูลกับชาวบ้าน ที่ได้รับการบอกกล่าวจากผู้นำ
ชุมชนว่ามีการเก็บหาผลผลิตเป็นประจำ 14 คน ในหมู่บ้านทั้งหมด 7 แห่ง พบว่ามีอุปกรณ์ เครื่องมือที่
ชาวบ้านใช้เก็บหาผลผลิตทั้งหมด 37 ชนิดจำแนกเป็น 12 ประเภท โดยประเภทของเครื่องมือที่ชาวบ้านใช้มาก
ที่สุด 3 อันดับแรก ได้แก่ ประเภทช่วยในการจับสัตว์น้ำ ประเภทยกช้อน และประเภทลอบและไซ ตามลำดับ
และสำรวจพบเครื่องมือในพิกัดที่ชาวบ้านบางส่วนยังคงใช้เก็บหาผลผลิต 4 ชนิด ได้แก่ สะดุ้งใหญ่ แห ข่าย
(มองหยั่ง) และ เฝือก ในส่วนของผลผลิตที่ชาวบ้านเก็บหามีทั้งหมด 19 ชนิด โดยปลาเป็นผลผลิตที่ชาวบ้าน
จับหามากที่สุด รองลงมาได้แก่ ผือ และสายบัว

**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 , Khon Kaen University. Thailand.

This survey-based study estimates economic value of wetland resources harvested from Nong Han Kumpawapee, Udornthani province, using a market price method. Household representatives from villages located around Nong Han were interviewed of 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 of 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 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

**Effect of trees in electricity use reduction in development housing community.**

Student : Mr. Patipat  Busamrong

Project  advisor  :  Associate Professor. Kitti   Akamphon

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

With  the  effect  of  global  warming  and  the  shortage  of  energy   supply,  the electricity cost of air conditioning in urban buildings is steadily increasing. Such a problem is particularly  worrisome  in  tropical  country  like  Thailand.  The  use  of  shades  from  trees planted  around  building  has  been  shown  to  be  a  promising  and  sustainable  method  to reduce the electricity use for air conditioning.

The objective of this study is to compare the amount of electricity used and the  cost  of  electricity  between  houses  with  appropriate  trees  planting   sites  and  houses without tree. The study is carried out at Kaenthong Thani 1 Housing development, Muang distric, Khon Kaen province. Ten households for each of the two categories are used in the investigation. The result shows that houses with trees growing at  appropriate sites can help homeowners save electricity on an average of14,109 kilowatt-hours per household per year and  hence  cause  the  electricity  bill  to  reduce  on  an  annual  average  of  4,455.69bath  per house per year. Moreover ,it is found that there is a mean of electricity between shaded area of house wall and the amount of electricity use and the cost of electricity. The planting trees project at appropriate sites around a house can help reduce both energy consumption and in the same time the electricity cost for homeowners.

**Key  word**  :   Effect of trees

**Efficient treatment for Domestic Waste Water by the Floating Plants. (Water Hyacinth and Water Mimosa).**

Student : Miss Nipaporn Thinchuay

Project advisor : Dr. Lamyai Neeratanaphan

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

Efficient treatment for domestic waste water by the floating plants using water hyacinth and water mimosa under natural condition using confined space of enameled basin with the area of 2,042 square centimeters. Which water hyacinth and water mimosa for treat the water from 2 places for example, the water from Plastic pond and the waste water treatment system in Khon Kaen University. Which the aquatic plant appeared enameled kind basin vacates 6 the enameled basin of source of each water total up 12 the enameled basin for compare with aquatic plant bilateral kind efficiency in each water before and the back use the aquatic plant treat. The parameters of water quality were water temperature, acid alkaline(pH), impurity of the water (Biochemical Oxygen Demand, BOD) and organic nitrogen in the water for 4 week. The results showed the water quality from Plastic pond in Khon Kaen University after being treated by using the water hyacinth and water mimosa effective reduced numerous parameters such as reduced water temperature, organic nitrogen in the water (with values of 9.49 % and 98.85% respectively). While the values of pH and BOD were reduced by 25.11% and 70.58 % respectively. In the case of the water from the waste water treatment pond in Khon Kaen University, after using the water hyacinth treatment effectively reduced the value of water temperature by 3 $^{\circ}$C (9.84%), the value of pH was reduced by 3.55 (33.61 %), the value of BOD was reduced by 22.39 mg/l (76.24 %) and the value of organic nitrogen was reduced by 28 mg/l (99.01 %). The effectivenest of water mimosa treatment could reduced the value of water temperature by 3 $^{\circ}$C (9.84%), the value of pH was reduced by 3.39 (29.36 %), the value of BOD was reduced by 13.91 mg/l (75.55 %) and the value of organic nitrogen was reduced by 27.93 mg/l (98.76 %). From using aquatic plant bilateral data treatment of the water from 2 places. Water hyacinth was more effective in water remediation than that form the treatment of water mimosa.

**Key word** : Domestic Waste Water

**Electricity saving potential of trees planted at inappropriate sites in development housing community.**

Student : Miss Wilawan Ammartmontri

Project advisor : Associate Professor Kitti Akamphon

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

With the effect of global warming and the shortage of energy supply, the electricity cost of air condition in urban buildings is steadily increasing. Such a problem is particularly in a tropical country like Thailand. The use of shades from tree planted around buildings has been shown to be a promising and sustainable method to reduce the electricity use for air conditioning.

The object of this study is to compare the amount of electricity use and the cost of electricity between houses with inappropriate tree planting sites and houses without tree. The study is carried out at Kaenthong Thani1 Housing Development, Muang District, Khonkaen Provine. Ten households for each of the two categories is used in the investigation. The result shows that houses with tree growing at Inappropriate site can help to reduce electricity bill on average of 3,683.19 Bath per year. Moreover, it is found that temperature different is significant between trees planted at inappropriate sites in houses and houses without tree. The planting trees project at appropriate sites around a house can help reducing both energy consumption and in the same time the electricity cost for homeowners.

**Key word** : Electricity saving

**Emission rate of Volatile Organic Compounds (VOCs)from Oil Terminal Station. Case study: Fugitive Sources and Truck Transferred, Oil Terminal Petroleum Authority of Thailand(PTT), Khon Kean.**

Student  : Miss  Charoyboon Boonsing

Project  advisor  : Asst. Prof. Turenjai Doolgindachbaporn

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

Emission rate of volatile organic compounds(VOCs) from fugitive sources and truck transferred, Oil Terminal Petroleum Authority of Thailand (PTT), Khon Kean were studied in form of Total Organic Compounds(TOCs). The study using average emission factor for refinery oil, US-EPA method, number of equipments and working times per year were counted. Whenever the average transfer value of 2007-2009 Gasoline91 were used for calculated. The result showed that rate of volatile organic compounds from fugitive sources were 48,978 kilograms per year and 174,911.8 tons per year for truck transferred.

**Key  word  :** Emission rate

# Geographic Information System Application on the Location and Information of Solid Waste Disposal Bin Location in Khon Kaen University

Student : Mr. Jaturong Phonboon

Project advisor : Asst. Prof.Dr.Pisit Chareonsudjai

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

The objective of this project was to produce a map show the geographical information and the position of Solid Waste Bin in Khon Kaen University for administrative purpose. The study was conducted during July – December 2009. A planimatic map was created using a GIS (geographic information system) program; Arcview® 3.2. The position of Solid Waste Bins were read as UTM (Universal Transverse Mercator) from a GPS (Global Positioning System). There were of 110 solid waste containers which was. Classified to 3 sizes; 8 cubic meter containers size of 12, 240 liters bins of 94.and 200 liters bins of 226. The average solid waste generation rate was 0.40 kg./capita/day. The average density of solid waste in KKU was 102.30 kg /m$^3$ the type of solid waste were 4 groups, the degradable solid waste was 53.72 %, general garbage 16.14 %, recycled waste 29.77 % and hazardous waste 0.37 %. The GIS map was enable to show the between position coordinates, quantitative and qualitative data from personal and students in KKU.

**Key word** : Geographic Information

**Indirect carbon dioxide reduction by residential energy saving vegetation.**

Student  : Mr.Preecha  suebsamran

Project  advisor  :  Associate Professor. Kitti   Akamphon

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

In this project, indirect $CO_2$ reduction due to tree planting around a house for energy saving purpose is investigated. The study is carried out at Kaenthong Thani  1 Housing Development. Muang Distric.  Khon Kaen Province. The objective of this study is to compare the amount of $CO_2$ released from 3 categories of houses with different tree plant planting schemes: I.e. houses with appropriate tree planting location. Houses with inappropriate tree planting location and houses without tree. Ten house for each of the  three  categories is used in the investigation.     Data  of electricity bill for each household is obtained from the Provincial Eletricity Authority of Thailand  and is used to calculate for the amount of $CO_2$ released from the electricity generation.

The result shows that houses without tree produce the highest amount of $CO_2$ and houses with appropriate tree planting location produce the  lowest amount of $CO_2$.The amount of $CO_2$ indirectly produced by houses without tree, houses with inappropriate tree planting location, and houses with appropriate tree planting location produce $CO_2$ on an average of  53.325  , 37.466  and  34.107 ton per house per year, respectively. It is clearly seen that  tree plant around house other than can directly benefit homeowners through energy saving, indirectly  it can help reduce $CO_2$ emission and hence help relief global warming  situation as well.

**Key  word** :  Energy saving

**Noise Measurement in Dormitory Environment Areas near Modindang Market.**

Student : Miss Wipaporn Pumpuang

Project advisor : Asst.Prof.Dr. Penprapa Phetcharaburanin

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

The objective of this study was to measure the volume level qenesated from Modindang market in which it affected the dormitory environment area. The sample was collected at dormitory number 2,13 and 14.The sample was collected from one dormitory for 3 day a week. Each dormitory has three floors, therefore there were 12 points set up for the sound-level meter. The measurement was corrier cut between 6 and 8.30 pm. When the dormitory has been affected by the noise produced from the market due to the busiest time of the market. The method of measurement by using the sound-level meter to use the average noise Leq 5 min in comparison with the standard(US.EPA) and WHO standard that are less than 45 dBA. The result showed that there were 20 points of dormitory number 2 a that had the sound-level greater than that of standard of ($2^{nd}$ floor =6 point, $3^{nd}$ floor = 8 point and $4^{nd}$ floor =6 point).Similarly , the sound level of 9 point at female dormitory number 13 was greater than that of standard ($2^{nd}$ floor = 3 point ,$3^{nd}$ floor = 3 point and $4^{nd}$ floor = 3 point). In contrast , the sound-level measured at female dormitory number 14 reached standard. As a result , the conclusion may be down that the most problematic area was the area facing MODINDANG market and road.

**Key word** : Noise Measurement

**Noise Level Monitoring in the central library (Building 2)  Khon Kaen University**

**Student: Nutchuporn  Sunato**.

Student  :  Miss Nutchuporn  Sunato

Project  advisor  : Asst. Prof. Dr.Penprapa Phetcharaburanin

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

The objectives of this study is to monitor the noise levels in the central library (Building 2) Khon Kaen University. In December 2009,to the sound level has measure the following room foreign language journals, Thesis and research A-P, Thesis and research Q-Z. , Human and social science collection A-P, Human and social science books collection Q-Z, Science and technology collection A-P and Science and technology collection Q-Z. 4 measurement points per room (each corner of the room). There were 32 points in total points. The average noise level for 5 minutes (Leq5min) was measured by using sound level meter. When compared to the standard of World Health Organization (WHO) stated that the appropriate volume standard for sound level of library are expected is 40-45 dBA and Japan the standard volume on the desired day of quiet is 45 dBA.The results showed that were 15 with a volume that exceeds the standards of the World Health Organization and Japanese . At point 1 (front of air-conditioned in all rooms)and point 4(front room) of all room sound level were lower their standard, but point 4 of the Human and social science collection A-P room section, the sound level is not exceeded the standard. Points 2 and 3 (back room) they had a voice level is not exceeded the standard.

**Key word** :  Noise Level Monitoring

**Potential and Development of Tourism Market  In Khao Yai National Park by Weighting Score Method and Rating Scale Method.**

Student : Miss  Boossabongpan  Namtong

Project  advisor  :  Dr. Sarun  Keithmaleesatti

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

The  primary  objective  of  this  study  is  to  assess  the  potential  and  development  of tourism  market  at  Khao  Yai  National  Park,  using  Weighting  Score  Method  and  Rating  Scale Method. From July to September 2004, 400 questionnaires were distributed to tourists, using a  convenient  sampling  technique,  at  Khao  Yai  National  Park.  The  weighting  score  Method indicates  that  the  potential  of  Khao  Yai  National  Park  as  a  tourist  place  falls  in  the  high – potential  level ,  with  (the  score  obtained  is  2.5  on  scale  of  3.0).  Furthermore,  the opportunity  for  market  development  falls  in  the  moderate  level  according  to  the  Rating Scale Analysis (the score is 3.0 on scale of 5.0). Approximately 13.5 % of the respondents expect no market development and 19% are not sure if market development is a good idea. These  groups  of  respondents  explained  that  market  development  could  result  in environmental  disturbances.  On  the  other  hand,  67.5%  understand  that  market development  is  highly  possible  due  to  the  great  diversity  of  tourist  attraction  at  Khao  Yai National  Park.  In  addition,  the  majority  of  respondents  97%  reported  that  they  would  come back to Khao Yai National Park again. Natural richness and aestheticism of the Park are key factors that attract a large numbers of tourists to Khao Yai every year.

Key  word  :  Tourism

Potential of Bird Watching Source Standard assessment in Nam Nao National Park, Phetchabun Province.

Student  :  Miss Pannapat  Chongko

Project  advisor  :  Dr. Saran Keithmaleesatti

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

Bird watching is an important activity to indicates the potential of ecotourism. The assessment of bird watching ability at Nam Nao national park, Phetchabun Province is determined by using the bird watching source standard of Office of Tourism Development (OTD). Five components are used in the evaluations which are natural components, facilities, the management and administration, information and public participation. The study was conducted from August to September 2009 by using the total counts survey method. Results of the study reveal that twenty-nine families, sixty-five species of bird were found in the study area. Moreover, five species were classified as an important conservation species. The standard of potential of bird watching source at Nam Nao national park, Phetchabun Province was classified in level two from five levels.

Keywords  : Bird watching standard, Bird watching, Nam Nao national park, Ecotourism

**Quality standard evaluation of the natural tourist destinations; cliff type in Phuphan National Park , Sakonnakorn.**

Student : Miss Chalermporn Nontapa

Project advisor : Dr. Wirongrong Mongkonthum

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

The purpose of this study was to evaluate the quality standard of natural tourist destinations; cliff type in Phuphan National Park , Sakonnakorn. Two cliffs were evaluated which are Nangmern cliff with Saw-Eh field and Saweay cliff. The quality standard of natural attraction of the office of tourism Development , Ministr of tourism and sport was used to evaluate the places. There were three major components in the evaluation process which are, value of natural resources and the risk of being destroyed, potential of tourism development and the management and there are 26 indicators .

Results of the study show that, Nangmern cliff with Saw Eh filed was classified at the third standard level which is " good " and the potential of tourism development is the strongest indicator. Saweay cliff was classified in the first standard level which is " low " due to lack of participation of the community and the proper management of the tourist destinations. The encouragement to local organization and community to participate and preserve their natural resources and the better management system will increase the standard of these two tourist destinations.

**Key word** : Natural tourist

**Quantity of Illumination in the Reading Room of the Central Library,Khon Kaen University.**

Student : Ms.Pornphet Sopawong
Project advisor : Asst. Prof. Dr. Phenprapha Phetcharaburanin
Department of Environmental Science, Faculty of Science , Khon Kaen University. Thailand.

This study is survey research aimed and example. Measure the quantity of illumination in the Reading Room of the Central Library,Khon Kaen University. Compared with standard values of the International Commission on Illumination and ministerial of Labour. There were 9 rooms as samples and date was collected 3 times a day,the morning,afternoon and evening sectors;whereas in libraries,at libraria's table,reading table,computer table and bookcase. Lower illumination with an average of the day than the standard (300 Lux) at 4 rooms (44.44%),1 room(11.11%) in the morning. 1 room(11.11%) in the afternoon and 9 rooms (100%) in the evening. There was no library with higher illumination than 1000 Lux.

**Key word** : Quantity of Illumination

**Research TitleT : hreats and Wetland Ecosystem Conservation by local community, Nonghan Kumpawapi, Udornthani Province.**

Student  :  Miss Nuchamad Sodama

Project  advisor  : Asst. Prof. Dr. Acharaporn Pagdee

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

This study identifies problems and threats towards Nong Han wetland ecosystem, Udornthani 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

## Solid Waste Management in Khon Kaen University Dormitory : Private Management Male Dorminitory.

Student : Mr. Chaichan Nuamphukdee

Project advisor : Asst. Prof. Dr.Pisit Chareonsudjai

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

In order to improve the solid waste management system in the male dormitory managed by private company at the Khon Kaen University, solid waste samples were collected and were analyzed for quantitative and qualitative characteristics, solid waste disposition attitudes of resident students were studied and also the collection of disposal in the right bins and the reduction of solid waste were investigated. The results sevealed their the management system at the male dormitory composed of collection of all types of solid waste into a plastic bag and disposed without separation, some of valuable solid waste, such as plastic bottles, were scavenged by housekeeper, and the collection and the transfer were done by the municipal once in alternate day durving 01.00 – 01.30 am. Solid waste production was 200.25 Kg/d in average. With production rate of 0.28 Kg/capita/d. According to the criteria of department of environmental quality promotion, the composition of solid waste were 48.50% valuable waste, 40.50% degradable waste, 9.78% general waste and 1.22% hazardous waste. The solid waste had the average density of 139.37 $Kg/m^3$ and average moisture of 27%.Result form the analysis of 93 students attitudes for solid waste disposal showed that less than half of all(48.85%) understood how to disposal the solid waste correctly but only 19.35% practically disposed the solid waste into the separate solid waste bins provided by the dormitory, however 91.40% of they do interested in participation if enough reparation bins were prepared. The project prepared 3 typed of the solid waste bin, recycleable waste, food debris, and non – recycleable waste and the correction of the type of solid waste in these bins were checked. The results showed that 42.32%, 33.54% and 32.30% in the recycleable bin, food debris bin and non – recycleable bin were disposed correctly, respectively. This reflected that although the students were interested in

participation of the solid waste separation project, practically they still did not change the disposal behaviors. Reccomendation of a longer term study of behaviors change was suggested.


**Key word** : Solid Waste Management

**Species Diversity of Birds in Kaeng Lawa Wetland, Ban Phai District, Khon Kaen Province.**

Student : Mr. Kraisorn Thaisaentha

Project advisor : Asst. Prof. Samang Homchuen

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

The purposes of this studies were to obtain checklist, relative abundance, life forms, legislative status, and conservative status of the birds in Kaenglawa Wetland, Ban Phai District, Khon Kaen Province. The studies were performed in rainy season between July and September 2009. The point count technique was utilized,13 points were selected and these selected sports were surveyed for three times during the studies. The result showed that there were 40 species and . In this studies 36 species were found. The endangered species recored was *Milvus migrans* and the and near threatened species was *Glareola lactea*. Three species with the greatest relative abundance were *Glareola maldivarum* (18.99%), *Dendrocygna javanica* (18.80%), and *Bubulcus ibis* (18.71%) respectively. In this study, a data base of the bird habitats was constructed by the utilization of Geographic Information System (GIS) using ArcView 3.3.

**Species Diversity of Plants in Kaeng Lawa Wetland, Khon Kean Province.**

Student  :  Miss Sawika  Dokkrathok

Project  advisor  : Asst. Prof. Samang Homchuen

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

The purpose of this study was to obtain a checklist of aquatic plants and trees in Kaeng Lawa Wetland, Ban Pai District, Khon Kean Province. This study was taken place between June and August 2009. The quadrat technique was used at 106 sample plots with the size of 1 x 1 meter to survey aquatic plants or annual crops while the belt transect with the size of 6 x 3,000 meters was used to survey trees on the margin of the wetland. It was discovered that the aquatic plants were in 59 species and 35 families. In this number, submerged plants were in 7 species and 7 families, emerged plants in 4 species and 2 families, floating plants in 13 species and 10 families, and marginal plants in 35 species and 19 families.  47 species of these are native plants and 12 ones are non-native plants. On the margin of the wetland there were 16 species and 14 families. 10 species of them are native plants and 6 species are non- native plants. Also, it was found from an interview that 16 species of the wetland plants were used and the three most useful plants were *Typha angustifolia* L. , *Nelumbo nucifera* Gaertn. and *Actinoscirpus  grossus* (L.f.) Goetgh. & D.A.Simpson respectively. In this study, a data base of the dominant plant distribution was constructed with Geographic Information System (GIS) using Arcview 3.3.

**Key  word** : Species Diversity

**Species diversity of Wildlife trade at Udon Thani Province.**

Student : Miss Nattaya Kaewnan

Project advisor : Dr. Sarun Keithmaleesatti

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

Wildlife in Thailand is protected by the wild animal reservation and protection act B.E. 2535 however; Illegal wildlife trade had been found at local market, Species Diversity of Wildlife Trade in Phen district, Bandung district and Muang district, Udon Thani Province were studied in July to September 2009. Field Survey method was used to collect the data in area. Twenty species of wildlife in the market were identified and classified to four group including one species of mammals, fifteen species of birds, one species of reptiles, three species of amphibians. Furthermore, seven species is alien wildlife. Wildlife in this market are classified as two vulnerable species from IUCN Red Data (2009). and used three type of benefit including pet, food and merits.

**Key word** : Wildlife trade

**Species Diversity of Wildlife Trade between the Thai-Cambodia Border at Chong Sa-Ngam, Phu Sing District, Si Sa Ket Province**

Student :   Miss Pattariya  Thonglue  Identification number 493020293-2

Project advisor : Dr. Sarun  Keithmaleesatti

Department of Environmental Science Faculty of Science, Khon Kaen University

Illegal wildlife trade is a terrible threat to wildlife species. Southeast Asia is a major hub for global wildlife trade especially Thailand border. The objectives of this study were as follows: to survey species diversity of Wildlife Trade between the Thai-Cambodia Border at Chong Sa-Ngam, Phu Sing District, Si Sa Ket Province were studied in July to September 2009. Field survey method was used to collect the data in area. Seventeen families, nineteen species were identified and found in this market. The wildlife were classified to four group including eight families of mammals, four families of birds, three families of reptiles and two of amphibians. *Manis javanica* and *Elephas maximus* are classified as endangered species from IUCN Red List (2009). Furthermore, *Capricornis sumatraensis* is evaluated a reservation species in the wild animals reservation and protection act. B.E.2535. Wildlife's in this market are used six type of benefit including pet, food, collectibles, furniture, medicine and merits.

## ความหลากชนิดของสัตว์ป่าที่มีการซื้อขายระหว่างชายแดนไทย-กัมพูชา ที่ช่องสะงำอำเภอภูสิงห์ จังหวัดศรีสะเกษ

**นักศึกษา** : นางสาวภัทริยา ทองลือ รหัสนักศึกษา 493020293-2
อาจารย์ที่ปรึกษาโครงการวิจัย : ดร.ศรัณย์ เกียรติมาลีสถิต
ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น

        การค้าสัตว์ป่าที่ผิดกฎหมายเป็นภัยคุกคามร้ายแรงต่อสัตว์ป่า เอเชียตะวันออกเฉียงใต้เป็นศูนย์กลางการค้าสัตว์ป่าที่สำคัญของโลก โดยเฉพาะบริเวณชายแดนไทย ซึ่งการศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาสำรวจความหลากชนิดของสัตว์ป่าที่มีการซื้อขายระหว่างชายแดนไทย-กัมพูชา ที่ช่องสะงำ อำเภอภูสิงห์ จังหวัดศรีสะเกษ ทำการศึกษาในเดือนกรกฎาคม ถึง กันยายน 2552 โดยใช้วิธีการสำรวจเก็บข้อมูลในพื้นที่ตลาดแห่งนี้ พบว่า มีสัตว์ป่าที่มีการซื้อขาย จำนวน 17 วงศ์ 19 ชนิด โดยจำแนกสัตว์ป่าออกเป็น 4 กลุ่ม เป็นสัตว์เลี้ยงลูกด้วยน้ำนม (Mammals) 8 วงศ์ นก (Birds) 4 วงศ์ สัตว์เลื้อยคลาน (Reptiles) 3 วงศ์และสัตว์สะเทินน้ำสะเทินบก (Amphibians) 2 วงศ์ ในที่นี้เป็นสัตว์ที่อยู่ในสถานภาพใกล้สูญพันธุ์ ตามทะเบียน IUCN Red List (2009) 2 ชนิด คือ ลิ่นชวา (*Manis javanica*) และช้างเอเชีย (*Elephas maximus*) เป็นสัตว์ป่าสงวน ตาม พ.ร.บ.สงวนและคุ้มครองสัตว์ป่า พ.ศ.2535 คือ เลียงผา (*Capricornis sumatraensis*) สัตว์ป่าทั้งหมดนี้ถูกนำมาใช้ประโยชน์ 6 ประเภท คือ เป็นสัตว์เลี้ยง อาหาร ของสะสม เครื่องประดับตกแต่งบ้าน ใช้เป็นยาแผนโบราณและปล่อยทำบุญ

**Studies of the Potential of Namnao National Park as Tourist Attraction     place by Standard Potential Index Method.**

Student : Miss Poranee Kiettisin

Project advisor : Dr. Sarun Keithmaleesatti

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

The study of Namnao National Park as potential tourist attraction by measuring standard quality indices. The indices were physical of attraction place, environment, economic-social and value of education. This would involve gathering of basic information with regard to touring sites and conducting field surveys to identify the potentiality of this touring sites.

Various opinions acquired through 404 sets of questionnaire; by distribution as followed: 289 sets given to tourists, 35 sets given to National Park Officials and 80 sets to local population. Results for survey were showed Namnao National Park to be of the excellent degree of satisfaction, by relying the decision on the standard quality of ranking for tourist spots at 83.81%.

This could be concluded that local population should be promoted to participate and get themselves involve closely with the National Park Officials. Lastly this survey showed that there should be a period of rehabilitation of forest back to a balanced ecology system suitable for eco-tourism.

**Key word** : Tourist Attraction

**Study of Solid Waste Management in the Student Dormitory at Khon Kaen University : A Case Study of Female Student Dormitory.**

Student : Miss Jarinyaporn Hongprasit

Project advisor : Asst. prof. Dr. Pisit Chareonsudjai

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

The Objective of this study is to improve the solid waste management for the central female student dormitory. Khon Kaen University. Studied female dormitory at 3, 13, 18 and 25 by the survey and data analysis. The data was collected during August to September 2009. Solid wastes were collected from the Female Student Dormitory at Khon Kaen University and was analysed for quantity and quality properties. To be used in evaluating the appropriate management model by comparison with standard values of the cost of that value. been restored and the value of investments in economic garbage. The results showed that. The amount of solid waste generate was 1,227.52 kg / day and the generation rate was 0.44 kg/person/day. Bulk Density to 140.42 kg/m$^3$ and 53.58% moisture content. Type improving of the present process. The estimated decomposable waste 43.80%, residual waste 33.96%, recycle waste 17.56% and hazardous waste 4.68%. The proposed method compose of separation at source, collecting in a storate bin. Should have a new management model is 1) to improve the form of waste disposal is left to a separate category. The increase trash classified as Category 3 categories: trash waste dry / general waste bin 1 will use the yellow bin. Category 1 wet garbage trash bin by bin to the green. Both the cylinder size is 240 liters, and Tank Type 1 hazardous waste tanks. 2) the establishment of a center for recycling or buy junk junk value for the central female student dormitory Khon Kaen University. Be divided into 2 Center campus student center is a central zone of 1-3 women (of 11 dormitories) and zone 4 (of 4 dormitories).

**Key word** : Solid Waste Management

**Survey location and nature of the types of facilities provide services around  the fence , Khon Kaen University in the 1000-meter radius.**

Student  : Miss  Phinyapat  Kanyuen

Project  advisor  : Asst. Prof. Dr. Phenprapha  Phetcharaburanin

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

This study aimed to explore location and types of service facilities within 1000 meters of the fence, Khon Kaen University. During June to September 2552 Buddhist era storage device using GPS coordinates for office data point is the midpoint location of the service location. 1 data point per 1 times.

The results showed that. Location service is a fence around Khon Kaen University in the 1000 meter radius all 14 stores have 6 shops in a radius of less than 500 meters and 8 additional stores are within 1000 meters. Type of location service is a pub, bar, club, cocktail lounges, 12 restaurants, a Disco, Music Hall, 2 restaurants and 5 of the restaurant store data to be mapping. Specified location. Basic information. Using Arcview 3.3.

**Key  word** : Facilities  provide services

**The evaluation of quality standard of natural tourist destinations; waterfall in Phuphan National Park ,Sakonnakorn.**

Student : Miss Choltirot   Boonlab

Project  advisor  :  Dr. Wirongrong   Mongkonthum

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

The  quality  standard  of  natural  attraction  of  the  office  of  tourism  Development , Minister  of  tourism  and  sport was used to evaluate the quality standard of waterfall in Phuphan   national park ,Sakonnakorn. Three  major  components  were  considered  in  the evaluation process which are, value  of  natural  resources  and  the risk  of  being destroyed, potential of tourism development and the  management. Forty two indicators were studied and scored.

Results of the evaluation showed that the quality standard of the Kamhom waterfall was classified at the good standard level. While the Prechasuksun waterfall was classified at the moderate level. To  increase  the  level  of  the  quality  standard  of  these  two waterfalls, the  improvement  of  some indicators  such  as  the  participatory of  local people  to  manage  the  tourist  destinations  are  required.

**Key  word** : Natural tourist

**The format and behavior of electric power, Khon Kaen University students live in university dormitories and private dormitories .**

Student : Maliwan   Sawangnet

Project advisor : Dr. Wirongrong  Mongkonthum

Department  of Environmental  Science Faculty  of  Science

This study aimed to compare models and electric power behavior of female, Khon Kaen University students . Accommodation  in the dormitory of the university dormitories and private dormitories . And compare the amount of carbon dioxide emissions. From the electrical. The sample used in this study is student accommodation in the dormitories of the university is a dormitory 14 and private dormitories is a Noparut dormitory by questionnaire.

The   results showed that students stay in  private dormitories used electricity is the average amount of electricity consumption per capita is equal to 114.9 kWh/month **,** the devices that use the maximum amount of light is 54.82 kWh/month **,** secondary areas include general cooling volume using 25.48 kWh / month, and the amount of emissions $CO_2$ is 1.27 tons / person / year. And University dormitories   electricity usage per person is equal to 113.86 kWh / month, The devices that use the maximum amount of light is 53.59 kWh / month, secondary areas include general cooling volume using 42.44 kWh / month  and the amount of emissions $CO_2$ is 1.24 tons / person / year.

# รูปแบบและพฤติกรรมการใช้พลังงานไฟฟ้าของนักศึกษาหญิงมหาวิทยาลัยขอนแก่นที่พักในหอพักมหาวิทยาลัยและหอพักเอกชน

นักศึกษา : นางสาวมะลิวัลย์  สว่างเนตร        รหัสประจำตัว 493020295-8

อาจารย์ที่ปรึกษา        ดร. วิรงรอง  มงคลธรรม

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม  คณะวิทยาศาสตร์   มหาวิทยาลัยขอนแก่น

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อเปรียบเทียบรูปแบบและพฤติกรรมการใช้ไฟฟ้าของนักศึกษาหญิงมหาวิทยาลัยขอนแก่นที่พักในหอพักของมหาวิทยาลัย  และ หอพักเอกชน   รวมทั้งปริมาณเปรียบเทียบ การปล่อยก๊าซ คาร์บอนไดออกไซด์ จากการใช้ไฟฟ้า โดย กลุ่มตัวอย่างที่ใช้ในการศึกษาครั้งนี้ คือ นักศึกษาที่พักในหอพักของมหาวิทยาลัย คือ หอพักที่ 14 และ หอพักเอกชน คือ 9 หลัง ทำการเก็บรวบรวมข้อมูลโดย แบบสำรวจและสอบถาม

ผลการศึกษา พบว่า นักศึกษามหาวิทยาลัยขอนแก่นที่พักในหอพักของมหาวิทยาลัย และหอพักเอกชน มีปริมาณการใช้ไฟฟ้าในหอพักแตกต่างกัน  โดยหอพัก 9 หลังมีปริมาณการใช้ไฟฟ้ามากกว่า หอพักที่ 14  คือ มีปริมาณการใช้ไฟฟ้าเฉลี่ยต่อคน เท่ากับ 114.9 kWh/ เดือน โดยอุปกรณ์ที่ให้แสงสว่างมีปริมาณการใช้สูงสุด คือ 54.82  kWh/ เดือน  รองลงมา ได้แก่  อุปกรณ์ทั่วไปด้านความเย็น มีปริมาณการใช้  25.48 kWh/ เดือน และมีปริมาณการปล่อย $CO_2$  1.27 ตัน /คน / ปี   ในขณะที่หอพักที่ 14  มีปริมาณการใช้ไฟฟ้าเฉลี่ยต่อคน เท่ากับ  113.86 kWh/ เดือน   โดยอุปกรณ์ที่ให้แสงสว่างมีปริมาณการใช้สูงสุด  คือ  53.59 kWh/ เดือน รองลงมา ได้แก่ อุปกรณ์ทั่วไปด้านความเย็น มีปริมาณการใช้  42.44  kWh/ เดือน   และ ปริมาณการปล่อย $CO_2$  เท่ากับ  1.24 ตัน /คน / ปี

The Studies Water Quality of Wastewater Treatment System in Khon Kaen University
(Domestic Wastewater)

Student : Miss Chanutporn  Soontornchai

Project advisor : Dr.Lamyai  Neeratanaphan

Department of Environmental Science  Faculty of Science  Khon Kaen University

Qualitative study on water qualities in wastewater treatment system within Khon Kaen University was conducted on nine parameters. They were pH, temperature, Dissolved Oxygen(DO), Settleable Solids(SS), Total Suspended Solids(TSS), Total Dissolved Solids(TDS), Biochemical Oxygen Demand(BOD), Grease and Oils and Nitrate Nitrogen($NO_3$-N). Wastewater samples under study were taken from Common Wastewater Treatment Ponds at the entering point and effluent point. The results were compared with the Standard Quality Control for Wastewater from Building (Type A) to ascertain the quality of wastewater after treatment. The quality of wastewater after full circle of treatment showed to have BOD values reduced from 207.31 mg/L down to 10.65 mg/L which considered to be 95% reduction. TSS values reduced from 73.44 mg/L down to 5.55 mg/L which was 92% reduction. As for SS was completely removed which considered to be 100% reduction. However for pH, DO, TDS, $NO_3$-N, grease and oils, this wastewater treatment system were not in accordance with theoreticed hypothesis but the value of pH and TDS were in good agreement with stated standard. Temperatures of wastewater were also fluctuated along with the surrounding temperature duing the time of study. Conclusively, the wastewater treatment system operating within Khon Kaen University effectively removed BOD, TSS and SS so as to keep values with in the Standard Quality Control for wastewater from Building (Type A).

การศึกษาคุณภาพน้ำในระบบบำบัดน้ำเสียมหาวิทยาลัยขอนแก่น(น้ำเสียชุมชน)

นักศึกษา : นางสาวชนุตพร สุนทรไชย รหัสประจำตัว 493020724-1

**อาจารย์ที่ปรึกษา**โครงการวิจัย : ดร.ลำใย ณีรัตนพันธุ์

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น

   การศึกษาคุณภาพน้ำในระบบบำบัดน้ำเสียมหาวิทยาลัยขอนแก่น ทำการศึกษา 9 พารามิเตอร์ คือ ความเป็นกรด-ด่าง(pH) อุณหภูมิ ออกซิเจนที่ละลายน้ำ(DO) ตะกอนหนัก(SS) ของแข็งแขวนลอยทั้งหมด (TSS) ของแข็งละลายทั้งหมด(TDS) ความต้องการออกซิเจนทางชีวเคมี(BOD) น้ำมันและไขมัน(Grease and Oil) และไนเตรท-ไนโตรเจน(NO$_3$-N) แล้วนำผลมาเปรียบเทียบกับค่ามาตรฐานควบคุมการระบายน้ำทิ้งจาก อาคารประเภท ก. ซึ่งทำการศึกษาในส่วนของน้ำเสียที่เก็บมาจากบ่อบำบัดน้ำเสียที่รองรับจากอาคารทั่วไป ภายในมหาวิทยาลัยขอนแก่น โดยทำการเก็บตัวอย่างทั้งหมด 3 จุด ได้แก่ จุดน้ำเข้าระบบบำบัด บ่อกลาง และจุดปล่อยน้ำออกจากระบบบำบัด ระหว่างเดือนสิงหาคม-กันยายน 2552 ผลการศึกษาพบว่า เมื่อน้ำเสีย ผ่านระบบบำบัดครบวงจรค่าของ BOD ลดลงจาก 207.31 มก./ล. คงเหลือ 10.65 มก./ล. คิดเป็นร้อยละ 95 ส่วนค่า TSS ลดลงจาก 73.44 มก./ล. คงเหลือ 5.55 มก./ล. คิดเป็นร้อยละ 92 สำหรับค่า SS สามารถบำบัด ได้ร้อยละ 100 ค่า pH, DO, TDS, NO$_3$-N, น้ำมันและไขมัน ระบบบำบัดไม่สามารถลดค่าเหล่านี้ได้ตามทฤษฎี ที่คาดไว้ โดยค่า pH และ TDS มีค่าเกินเกินมาตรฐาน ส่วนอุณหภูมิของน้ำเสียที่ผ่านการบำบัดมีค่าแปรผัน ตามอุณหภูมิทั่วไปในช่วงวันที่ทำการศึกษา แสดงว่าระบบบำบัดน้ำเสียมีประสิทธิภาพในการใช้บำบัดตะกอน หนัก ปริมาณความต้องการออกซิเจน และของแข็งละลายทั้งหมด ได้ดีตามลำดับ และไม่เกินเกณฑ์มาตรฐาน การควบคุมคุณภาพน้ำทิ้งจากอาคารประเภท ก.

**The study of biodiversity of birds and the habitat in the Ubonratana Dam.**

Student : Mr. Teerasak Masraksa

Project advisor : Dr.Wirongrong Mongkonthum

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

The objective of the study was to survey the biodiversity, subsistent condition, habitat, and relative abundance of birds at Ubon Rattana Dam, Khon Kaen Province. In the study, point count surveys were conducted between July and December 2009.  The results of the surveys showed that the birds in the area were in 48 types and 27 families which were 4.87 percent of the bird population found in Thailand.  Among these types of birds, there were 35 types of local birds, 6 of immigrant birds, 6 of both local and immigrant birds, and 1 of immigrant and passing-by birds.  As for the habitation of the surveyed birds, it was found that 48 percent of them lived in Deciduous Dipterocarp forests: 11 percent lived under bushes: 6 percent lived around swamps and on the dam: 34 percent lived in agricultural areas: 4 percent lived throughout villages.  Also, the study of the relative abundance of the types of birds showed that there were 10 types of the highest, 10 types of high, 12 types of moderate, and 16 types of low relative abundance.

**Key word** : Biodiversity of Birds

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

STUDENT : NUCHAMAD SODAMA

Project advisor : Asst. Prof. Adcharaporn Pagdee

Department of Environmental science, Faculty of Science, Khon Kaen University

This study identifies problems and threats towards Nong Han wetland ecosystem, Udornthani 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).

คุกคามและการอนุรักษ์ฟื้นฟูพื้นที่ชุ่มน้ำหนองหานกุมภวาปี จ.อุดรธานี

นักศึกษา : **นางสาวนุจมาศ โสดามา**

อาจารย์ที่ปรึกษาโครงการวิจัย : ผศ.ดร. อัจฉราภรณ์ ภักดี

ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น 40002

การศึกษาครั้งนี้สำรวจปัญหาและภัยคุกคามต่อพื้นที่ชุ่มน้ำหนองหาน จ. อุดรธานี และกิจกรรมการอนุรักษ์ฟื้นฟูหนองหานของชุมชน การเก็บข้อมูลอาศัยการสำรวจเชิงประจักษ์และแบบสอบถามโดยการสัมภาษณ์ตัวแทนครัวเรือนและผู้นำชุมชนหรือตัวแทนสมาชิก อบต. ระหว่างเดือน ก.ค.-ก.ย. 2552 จากการศึกษามีชาวบ้าน 120 คน จาก 15 หมู่บ้านในทุกตำบลรอบหนองหานร่วมตอบแบบสอบถาม ภัยคุกคามที่เห็นชัดเจน ได้แก่ การมีวัชพืชต่างถิ่นรุกรานแล้วขึ้นหนาแน่น โดยเฉพาะไมยราบยักษ์ (93.33% ของกลุ่มตัวอย่างที่ตอบว่าเป็นภัยคุกคามที่เพิ่มมากขึ้น) รองลงมา คือมีศัตรูพืช ได้แก่ หอยเชอรี่แพร่ระบาด (87.50%) และมีวัชพืชน้ำ จำพวกผักตบชวา จอก แหน ขึ้นหนาแน่น (83.33%) มีส่วนทำให้หนองหานตื้นเขิน สำหรับกิจกรรมการอนุรักษ์ฟื้นฟูที่ชุมชนทำอยู่ในปัจจุบันที่เห็นชัดเจนได้แก่ การควบคุมการใช้อุปกรณ์จับหาปลาและวิธีจับหาให้ถูกวิธี (26.66% ของกิจกรรมฯ ที่กลุ่มตัวอย่างระบุว่ามีการดำเนินการในชุมชน) และชุมชนได้เสนอแนะกิจกรรมฯ เพื่อการอนุรักษ์อย่างยั่งยืน คือ การส่งเสริมการท่องเที่ยวเชิงอนุรักษ์ให้ทั่วถึงทุกหมู่บ้านรอบหนองหาน (17.86% ของข้อเสนอแนะฯ ที่กลุ่มตัวอย่างแสดงความคิดเห็น)

**Using the Macro - Benthic Fauna as an Indicator for Water Quality at Huay – Ang Reservoir in Roiet Province.**

Student :   Miss  Sukunya   Hachai

Project  advisor  :  Dr. Lamyai  Neeratanaphan

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

The  study  of  Macro - Benthic  Fauna  as  an  indicator  for  water  quality  at  Huay - ang  Reservoir  in  Roiet  province  during  the  month  of  July  to  September  2009. Ten  sampling  sites  were  selected  under  this  study.  The  results  showed  2 Phyla  of  invertebrate  were  Mollusca and  Arthropoda  consisting  of  9 Orders , of  benthic  fauna  with  15 Families. There  were Order  Mesogastropoda (F. Bithyniidae), Order Veneroida (F. Corbiculidae), Order Odonata (F. Libellulidae, F. Coenagrionidae), Order Ephemeroptera (F. Caenidae, F. Baetidae), Order  Trichoptera (F. Leptoceridae),  Order  Decapoda (F. Palaemonidae), Order Hemiptera (F. Notonectidae, F.Nepitae, F.Corixidae), Order Coleoptera (F. Noteridae, F. Dytiscidae, F. Dytistidae) and Order Diptera (F. Chironomidae) .  After  acquiring  the  Biological  Data  for  BMWP  Score  in  Three  consecutive  analysis  BMWP  mean  values  obtained  were  4.665, 5.760  and  5.844  respectively.  These  mean  values  indicated  that  water  quality  is  moderate  and  were  in  good  agreement  with  other  physical  parameter  such  as  pH  values  in  the  range  of  6.36 – 10.43  , mean water  temperature are both  three moth of  32.83  ±  1.12  $^{\circ}$c , mean value  of  dissolved  oxygen  are  both  three moth  of  7.83  ±  0.99   mg/l. Show  that  water  quality  at  Huay – ang  Reservoir  suitable  for  live  those  living  in  the  water  standard  of  Freshwater  Fisheries  Institute  of  Thailand.

**Key  word :** Macro - Benthic  Fauna

**Volume measurement of  the entertainment and effect to the dormitory nearly. Ban Nonmuang, Sila District, Khonkhan.**

Student  :  Miss Thanruthai  Kaewkanda

Project  advisor  : Asst. Prof. Dr. Penprapha  phetcharaburanin

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

The objectes of this study were to measure are examine the sound level generated from entertainment faulty affecting residential areas during December 2009.Two private dormitories such as Kanaporn dormitory and Gaseansin dormitory were samples in which there were 28 point. There were 12 points at Kanaporn dormitory and 16 points at Kaseansin dormitory measured by using sound level meter. The sound level was measured between 9.00 and 10.30 pm for the average at five minutes ( $L_{eq5min}$) The results shared that the sound level at all pant was in the range 40.5 dBA – 48.2 dBA therefore, the value obtained was are  standard which is 35 dBA state by World Health Organization (WHO). And measuring the volume of entertainment activities, found that while the volume was not measured through benchmarks announced by Interior Ministry security in the working environment. Less than 7 hours a day volume that the employee was not more than 91 dBA.


**Key  word  :** Volume measurement

**Waste Management and the Attitude of the Studen's in Ter Private Management in Female Domitories at Khon Kaen University.**

Student : Miss Aumaporn  Kanjanasuppakit
Project advisor : Asst. Prof. Dr. Pisit Chareonsudjai
Department of Environmental Science, Faculty of Science , Khon Kaen University. Thailand.

The objective of this research were to investigate the solid waste management process of the female dormitories which were managed aitomously at Khon Kaen University and the attitudes of the students on solid waste disposal. Solid waste samples were collected and phe co-chemical characteristics vegetate six times August 2009. The attitudes of female students residing in the dormitories were collected using questionnaires solid wasted from the dormitories consisted of 3 types ; decomposable waste (15.77 %) , general waste (23.14 %) and recycle waste ( 78.30%) . The average production rate of 1147.82 kg/d/person. Company solid waste  the production ral the Noparatana and the KKU Wararesident dormitory female that the KKU Wararesident produced at a much lower rate because the students disposal the recyclable waste into the recycle  bin which provided by the dormitory . From the attitudes average , the dormitory  (59.5%) of the students in Wararesident dormitory positively supported the recycle process compared to the operation dormitory (28.30). It is clear that the attitude of students had high impact on the solid waste production rate.

**Key word** : Waste Management , Attitude