A Comparison of Air Pollutant Dispersion Estimated by a Mathematical Model with Field Monitoring Results of Phoenix Pulp & Paper Company Limited

Student : Miss Pairin Kok- oun

Project advisor : Asst.prof.Turenjai   Dooljindachabaporn

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A comparison of air pollutant dispersion estimated by using mathematical model with Field Monitoring Results of Phoenix Plup & Paper Company Limited by mathematics model used in this study is Screening Air Dispersicn Model (Screen View). The comparison with the results of measurements of air pollutants of the four stations were Ban Kumbong stations, Ban Nong Bua Noi stations, Ban Non Udom stations and Ban Udomsilp stations between year 2551-2553. The evaluates concentration of intensity dust (TSP), sulfur dioxide (SO_2) and ,nitrogen dioxide (NO_2) from the assessment of Screen view little then field monitoring results about 1-250 equal , 6 equal , and 3-8 equal and The study found that the sensitivity. Flow rate and the rate of release of pollutants that affect the concentration of pollutants in the process. Screen view of the application for a preliminary assessment of air quality from the point source.

Key word : Air Pollutant Dispersion, Mathematical Model

A comparison study of electricity consumption between male and female students in the university dormitories, Khon Kaen University.

Student : Miss Panida Chodchai

Project advisor : Dr. Wirongrong Mongkonthum

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

This study aimed to compare the electricity consumption of students in university dormitory at Khon Kaen University and the amount of carbon dioxide emissions from the electricity consumption. The sample which have been used in this study is students in any accommodation which contain 2 students in one room. The sample size is 508 students. The questionnaire has been used to collect the data.

The results showed that the average of electricity consumption between male and female students is different. The average consumption of female students is equal to 594.33 kWh/person/year. The highest consumption level is the heathing equipments which are electriciron and the electricity consumption for these equipment is 152.14 kWh/person/year, Follow by cooling equipments which are electricfan and the electricity consumption is equal to 142.13 kWh/person/year, The amount of carbon dioxide emissions from electricity consumption of female student is 0.395 tons/person/year. The average consumption of male students is equal to 524.99 kWh/person/year. The highest consumption level is the notebook and computer and the electricity consumption for these equipment is 133.42 kWh/person/year, Follow by cooling equipments which are electricfan and the electricity consumption is equal to 125.00 kWh/person/year, The amount of carbon dioxide emissions from electricity consumption of male student is 0.348 tons/person/year.

Key word : Electricity Consumption

A study in factor of clay house can save energy and save energy efficiency :Case study clay house Saitrie 4 South Tamborn Buengjareen Bankruat District Burirum Province.

Student : Miss Rungtiwa Pummipun

Project advisor : Dr.Wirongrong Mongkonthum

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

This study was conducted at the clay house sample at Saitrie 4 South Village Tamborn Buengjareen Bankruat District Burirum Province. The objective was to study the characteristics and composition of clay house samples to study the factors that make clay home save energy and useful in various fields. The study collected data on clay home sample. The characteristics clay house sample. Techniques used to build the house is raw clay bricks from the study the temperature of the clay house sample. The temperature inside the clay house is 29.58 °C and the temperature outside the clay house is 30.64 °C the main factor that makes the raw clay bricks the temperature inside the clay house and the temperature outside the clay house. The clay home don't the kept of heat in the walls however, there insulation into the house. The results of this study should be encouraged to build clay houses because low-cost clay home using local raw materials such as straw, rice husk and soil. Reduce energy consumption Do not destroy the environment and natural resources.

Key word : Clay house, Save energy

Acute toxicity of paraquat on survival rate of Dark-sided Chorus Frog *(Microhyla heymonsi)*

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Project advisor : Dr. Sarun Keithmaleesatti

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Paraquat is the famous herbicides which used in Thailand agricultural area. However, many reports presented that the chemical are adverse effects to aquatic fauna. Acute toxicity of paraquat on survival rate of Dark-sided Chorus Frog *Microhyla heymonsi* was studied in June 2011. Two hundred and forty tadpoles which hatched ten-hour *Microhyla heymonsi* were collected at Plastic pond Khon Kaen University. The tadpoles were separated to control group and three treatment in vivo toxicity testing groups including 1 mg/L., 5 mg/L. and 10 mg/L *in vivo*. Additionally, the acute toxicity was monitored 24, 48, 72 and 96 hour. The results in this study showed the significantly different between control and all treatment group ($p<0.05$) at 96 hr. Furthermore, the survival rate was 100 percentages of control group. All treatment group were low survival rate. At 1mg/L, the survival rate was 13.3 percentages, moreover all die were found both 5mg/L and 10 mg/L.

Key word : Acute toxicity, Dark-sided Chorus Frog

Analysis of C/N ratio of food garbage on Khon Kaen University cafeteria.

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Project advisor : Dr. Sarun Keithmaleesatti

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Food waste is food discarded or lose uneaten. The important food waste sources are restaurant and cafeteria. The use of recycled food waste has many environmental benefits such as producing fertilizers, and improving soil quality. Carbon / Nitrogen (C/N) ratio in food waste at Complex food cafeteria Khon Kaen University were examined in June to August 2011. The objective of this study was known as C/N ratio in Khon Kaen University food. Furthermore, the information will apply to produce organic fertilizers. The results found that the moisture of food waste from Complex food cafeteria Khon Kaen University was 74.74 ± 2.09 percentages. Carbon of food waste was 3.58 ± 0.12 percentages and Nitrogen was 0.86 ± 0.12 percentages. The C/N ratio of food waste was 3:1 to 6:1. The result present that the food waste at Khon Kaen University is suitable to produce the organic fertilizers. Furthermore, the C N ratio is an acceptable level in the Thailand Fertilizer Act 2008.

Key word : Analysis of C/N, food garbage

Behavior in electric waste usage and management of students in Faculty of Science, Khon Kaen University.

Student : Miss Thanyarat   Thaneepoon

Project advisor : Asst. Prof. Dr. Penprapa   Phetcharaburanin

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This survey –base study knowledge level of electric waste and Behavior in electronic waste usage and management of student in faculty of science, Khon Kaen University. The survey was conducted in July, 2011, distribute 360 all group questionnaire. Data was using descriptive statistic. The simple were female of 70.28% and male 29.72%. Majority of them studying Environmental science (14.17%).Most of them have a better understanding about e-waste, That should not be discarded electronic waste ground, buried under ground, into sewers or waterways or mixed with general trash.(97.50 %)But there are don't know that, within Khon Kaen university has electronics dustbin. (58.61%).The use of electronic products, a mobile phone is the products that everybody has , in this amount has 1 , 16.67 % and 2 more than 2.5 % next be notebook computer(84.17%), camera(51.94%),Music player(31.11%),computer(30.56%) and Tablet(5%) Buying products with new technology, , the majority will buy sometime.(79.44%) A major cause of the change of electronic products is decayed.(80.56%) in last year has been changed to a new product in 141 persons,(39.17%) Total of 166 pieces, mainly mobile phones 134 pieces. The management of electronic devices that are used, kept to him (74.17%) How to manage the battery and the battery is deteriorated, the most common trash.(61.11%).Comments and suggestions to tackle the problem of electronic waste, most agree that it should provide knowledge about the problem of electronic waste (79.94%), and preparation of espial e-waste bins(68.88%).For the campaign that the media should be used to produce a thorough 89.94% and 84.17% of the incentive.

Key word : Electric Waste

Breeding ecology of Little Grebe (*Tachybaptus ruficollis*) at the wastewater treatment area,Khon Kaen University

Student : Mr. Kowit Somjai

Project advisor : Dr. Sarun Keithmaleesatti

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

Little grebe *Tachybaptus ruficollis* is known as the smallest of the grebe family. The bird is a native species in Thailand. In 2007, the little grebe was found in Khon Kaen University waste water treatment pond. Breeding ecology of the *Tachybaptus ruficollis* was monitored on last May to August 2011 at Khon Kaen University waste water treatment pond. The three objectives of this study were to study on clutch size, hatching and survival rate of the little grebe. Fourteen nests were collected the data in study time. The results found that the clutch size of *Tachybaptus ruficollis* was 3-5 egg/nest. The interval period was 12-24 hour and the incubation period was 25 day. The average width, length and weight were 25.62 cm, 35.64 cm and 12.77g, respectively. Hatching rate of all eggs were 74.07 percentage and one week survival rates were 64.81 percentage

Key word : Breeding ecology

Changes and tendency of Landuse changes in the forest areas of   Khon Kaen University.

Student : Miss Neeranuch Usahaphan

Project advisor : Asst.Prof. Dr.Penprapa Phetcharaburanin

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

The study the objective of the Changes and tendency of Landuse changes in the forest areas of Khon Kaen University.in 1990, 1995, 2000,2005 and 2010 by using satellite image data and GIS. The interpretation of LANDSAT satellite imagery recorded the year 1990, 1995, 2000, 2005 and 2010. The analysis of changes in forest area using Arc View 3.1,mapping and land use. The results of this study showed that Forest in the year 1990. Since 2010 the area decreased by 478 Rai of space and reduction of the year area fell by 27 Rai. Most of the area to an area where construction has increased from the year. Until the area increased to 300 Rai and water sources increased the area to 179 Rai,The University currently has number of faculty and courses to 22 facuities and 419 courese. And the number of students, as 41,012 students. As a result, construction increased as well. Most of the school buildings and dormitories. As a result of an increase in the number of students and courses offered by the University.

Key word : Landuse changes

Changes of Soil Nitrogen at the Plant Genetic Protection Area Sirindhorn Dam, Ubon Ratchathani province under the Royal Initiation of Her Royal Highness Princess Maha Chakri Sirindhorn .

Student : Miss Apisit Woranpan

Project advisor : Asst. prof. Dr. Pisit Chareonsudjai

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

This study aimed to study aimed amount of total soil nitrogen and the changes to other forms during November 2010 – July 2011 at the plant genetic protection area, Sirindhorn dam, Sirindhorn District, Ubon Ratchathani. Under the initiative of HRH Princess maha Chakri Sirindhorn. Five quadrats of 10×10 m^2 were studied in the dry Dipterocarp forest and in the mixed Dipterocarp forest. Soil samples in each quadrat were collected at the top 15 cm and then total nitrogen, organic nitrogen, and inorganic nitrogen (NO_3^- and NH_4^+) were analysed. The nitrogen content in falled leaves were also determined. The result revealed that the major input of nitrogen were from falled leaves. In mixed Dipterocarp and dry Dipterocarp had the total nitrogen in leaves ($\bar{x}$ ±SD) at 7616.00 ± 0.92 and 5936.00 ± 1.29 mg / kg, respectively. In mixed Dipterocarp and dry Dipterocarp had total nitrogen in soil ($\bar{x}$ ±SD) at 1383.17 ± 336.43 and 990.79 ± 312.24 mg / kg soil dry wt. or 3.02 and 2.2 ton / ha, respectively. Average of 98% of the total nitrogen in soil was organic nitrogen and approximately 2% was inorganic nitrogen. Organic nitrogen in the mixed Dipterocarp and dry Dipterocarp ($\bar{x}$ ±SD) at 1359.93 ± 332.22 and 972.68 ± 307.51 mg / kg soil dry wt. or 2.97 and 2.16 ton / ha, respectively. The minority of soil nitrogen was in inorganic forms (NO_3^- and NH_4^+). Inorganic nitrogen ($\bar{x}$ ±SD) in the mixed Dipterocarp and dry Dipterocarp were 23.24 ± 4.70 and 18.11 ± 5.72 mg / kg soil dry wt. or 0.05 and 0.04 ton / ha, respectively. Comparasion study among the month of study, were found that the total nitrogen in soil was the highest in July ($\bar{x}$ ±SD) at 1603.00 ± 2.90 and 1099.00 ± 3.89 mg / kg and lowest in March

Key word : Soil Nitrogen

Comparison filter material between sand and rice husk ash for filtering filamentous form algae in effluent from Khon Kean Brewery Co., Ltd.

Student : Miss Chutsuda Pimpasaeng

Project advisor : Dr.Lamyai Neeratanaphan

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

The aim of this research was to investigate comparison filter material between sand and rice husk ash for filtering filamentous form algae in effluent from Khon Kean Brewery Co., Ltd on period June to July, 2011. This study focused on suspended solid quantity, filamentous form algae quantity and flow rate were experiment by 3 samples (effluent, filtered by sand and filtered by rice husk ash). The result showed that the average suspended solid quantity of effluent, filtered by sand and filtered by rice husk ash were 50.9, 36.4 and 39.3 mg /L, respectively. The average filamentous form algae quantity of above- mentioned samples were 19,040 , 7,040 and 5,640 filaments per 2 litres, respectively as well as the average flow rate of filtered by sand and filtered by rice husk ash was 50.7 and 145.3 cm3/minute. Comparison effluent when passed filtration differences filter material on suspended solid quantity, filamentous form algae quantity and flow rate found that sand filter could decrease suspended solid quantity higher than rice husk ash filter statistics significantly ($p < 0.05$). The average of filamentous form algae quantity showed that the both not differently and flow rate of rice husk ash faster than flow rate of sand statistics significantly ($p < 0.0001$).

Key word : Filter Material

Distribution Of Non-timber Forest Products : A Case Study of KOKNONGJAN Community Forest, Nongdu Village, NONGSONGHONG District, KHON KAEN Province.

Student : Mr. Suchon Tavara

Project advisor : Asst. Prof. Dr. Phenprapha Phetcharaburanin

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

        This survey-based research aims to examine distribution pattern of non-timber forest products   (NTFPs)and ecological factors affecting the distribution of NTFPs.A permanent plot of 100x100 m^2(1 ha)was placed in an area at Koknongjan community forest where villagers usually gather NTFPs. Trees and their coordinates were recorded in order to create a tree distribution diagram as well as a list of identified trees used as NTFPs. NTFPs at a forest floor were identified using ten 10x10m plots placed in the 100x100m permanent plot. Ecological factors, including light intensity, relative humidity, soil moisture, temperature, soil temperature, soil pH, and texture were measured in two areas-1) dense clump of trees and understory plants and 2) open area with scattered trees and understory plants, in each of the ten 10x10m plots. From the study, 40 tree species used as NTFPs were identified. The majority of these NTFPs are used for medicinal purposes. ,of which Used as herbs. were most frequently used by villagers. The distribution pattern of high density NTFPs trees, including *Canarium subulatum* Guill, *Dipterocarpus obtusifolius* Teijsm. ex Miq, and *Azadirachta indica* Juss. var. siamensis Valeton. Blume shows as clump distribution (estimated using Poisson distribution). Understory NTFPs Found 45 species were observed highly dense in areas with greater number of trees. Finally, ecological factors measured at 1) dense clumps of trees with understory plants and 2) open area with scattered trees and understory plants which show significant difference (p<0.05) include light intensity, soil moisture, soil pH, temperature and soil temperature both at soil surface and underground (15cm)

Key word : Non-timber Forest Product

Diversity of bird nest at Khon Kaen University

Student : Mr.Pratompong Chuensombut

Project advisor : Dr. Sarun Keithmaleesatti

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

Nesting habitat is an important area for bird reproduction. Diversity of bird nest at Khon Kaen University. Its purpose is to study the Diversity of bird nest at Khon Kaen University were studied in January to August 2011. Four area including agricultural farm, fishery farm of Faculty of agricultural, waste water treatment pond and faculty of Science were used to observation areas. The results found that 17 species of plants species were used to build the nest. Furthermore, White popince (*Leucaena leucocephala*) was the most used to nest site of 5 species such as Ashy Woodswallow (*Artamus fuscus*), Pied Fantail (*Rhipidura javanica*), Spotted Dove (*Streptopelia chinensis*), Zebra Dove (*Geopelia striata*) and Common Myna (*Acridotheres tristis*). The nest shape in this study was found six shape including globular nest, cavity nest, platform nest, floating nest, statant Cupped nest and pensile nest. Fourteen species and ninety-eight nests were found in all study areas. Top three bird including Plain Prinia (*Prinia inornata*), Little Grebe (*Tachybaptus ruficollis*) and Eurasian Tree – Sparrow (*Passer montanus*) were found 38 nest, 15 nest and 15 nest, respectively. Three birds had nest more than other species in study areas. However, only nest of Sooty-headed Bulbul (*Pycnonotus aurigaster*) was found in this area. The result presented that Lesser Reedmace (*Typha angustifolia*) was specific nesting habitat of Plain Prinia (*Prinia inornata*).

Key word : Bird nest

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Key word : Diversity of bird

Drinking water quality of some parameters in the water vending machine located at dormitories around Khon Kaen University.

Student : Miss Kannika Sarabun

Project advisor : Dr. Lamyai Neeratanaphan

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The objective of this study was to investigate drinking water quality in physical water quality in pH meter and the turbidity, the chemical quality in total solids and the amount of chloride and biological quality in total coliform bacteria and fecal coliform bacteria. The study was taken in June 2011 from 5 Water Vending Machines which has the same brand and model located around Khon Kaen University dormitory. The water vending machin located at Milinhouse dormitory, Peamsuk dormitory, Glodemview-ingmor dormitory, Banrow-resort dormitory and Pimancondo dormitory.

The result of this study in physical showed that pH of water samples from 5 locations were in the range of 7.19 to 7.42 ; turbidity values were in the range of 0.030 to 0.047 SSU. The chemical analysis showed that total solid values were in the rang of 46.58 to 231 mg/liter ; whereas residual chloride values were in the rang of 9.04 to 20.21 mg/liter. However, the results for biological parameter showed that the total coliform bacteria and fecal coliform bacteria were undetected which were in the standard of drinking water quality not more than 2.2 MPN/100 ml. According to the study can be summarized that pH value, turbidity, total solids, chloride, total coliform bacteria and fecal coliform bacteria of water samples from 5 water vending machine located at dormitories around Khon Kaen University dormitories are within the standard value for drinking water.

Key word : Drinking water quality, Water Vending Machine

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

Student : Mr.Taweechoke   Kokthaisong

Project advisor : Asst. Prof. Dr. Adcharaporn   Pagdee

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

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 of 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

Environmental Impact Assessment of Forest on the Wild Animal Culture Khao Suan Kwang Construction Project , Khon Kaen Province.

Student : Miss Yanika Chompoojak
Project advisor : Asst. Prof. Samang Homchuen
Department of Environmental Science, Faculty of Science , Khon Kaen University. Thailand.

The study was aimed to assess the impacts of forests on the construction of Wild Animal Culture Khao Suan Kwang Project.Taking place from October to November 2010, the study used the Quadrat Sampling Technique in 44 plots of 20 X 20 meters. The results of the assessment showed that the forest had an open liked canopy called Dry Dipterocarp Forest with 3 strata. It was found that there were 36 families and 66 species of trees in the surveyed site. Among all the species, the *Shorea obtusa* Wall. had the highest density (93.36 trees/rai), the highest dominance (0.0005353), the highest frequency (0.9545) and was the most important (68.70%). According to the legislative status of the surveyed species, there were 28 common species, 37 forbidden species, and 1 special forbidden species which was the *Strychnos nux-vomica* Linn. The assessment of the conservative status showed that there was a rare species the *Terminalia pedicellata* Nanakorn , and there were no endangered and endemic ones. The density of the trees was 1.47 tree/rai (The standard density is 2 trees/rai.), so the forest was regarded as decadent. It was suggested that the local people be permitted to utilize the forest. It could be concluded that the impacts of the construction project were at the moderate level. The loss of the *Shorea obtusa* Wall. and the other species would not be a serious problem yet since they are still found in the Northeast forest of Thailand. Also, the rare and the forbidden species are not found in the construction site. They can remain intact.

Key word : Environmental Impact Assessment

Environmental Impact Assessment of Birds on the Wild Animal Culture Khao Suan Kwang Construction Project, Khon Kaen Province .

Student : Miss Praphavadee   Leabua

Project advisor : Asst. Prof. Samang   Homchuen

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

The purpose of this study was to survey the species and establish checklists,relative abundance, life forms, legislative status, and conservative status of the birds in the construction site of Khao Suan Kwang Wild Animal Culture Project in Khon Kaen Province. Taking place from October to November 2010, the study used McKinnon Lists method with a scope of 11 checklists each of which consisted of 12 species. The results showed that the birds belonged to 29 families, 53 species. Among these species, there were 31 resident birds, 11 winter visitor birds, 8 resident and winter visitor birds, 1 resident and breeding winter visitor bird, and 2 passage migrant birds. They all were classified into 51 protected wildlife species and 2 non-protected wildlife species (general) which were the *Streptopelia chinensis* (Spotted Dove) and the *Geopelia striata* (Zebra Dove). Based on their conservation status, none of them were regarded as rare, endangered, or endemic species. In addition, the degrees of the relative abundance among these species were ranged from the highest as the *Nectarinia jugularis* (Olive-backed Sunbird) of 81.82 percent, the *Dicrurus paradiseus* (Greater Racket-tailed Drongo), the *Phylloscopus   inornatus (*Inornate Warbler), and the *Cypsiurus balasiensis* (Asian Palm –Swift) of the same 54.55 percent, and the *Dicaeum cruentatum* (Scarlet-backed Flowerpecker) and the *Megalaima linerta* (Lineated Barbet) of 45.55 percent. The assessment of the impacts of the construction site on the environment indicated that all the birds were not yet rare, endangered, or endemic. They could still migrate and hide for living at the forest near by.Therefore, the impacts of the Wild Animal Culture Khao Suan Kwang Project could be concluded at the slightly level.

Key word : Environmental Impact Assessment, Birds

Factor affecting the selection of fuel type, Khon Kaen University.

Student : Miss Arunya Kanjanakunti

Project advisor : Dr. Wirongrong Mongkonthum

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

This study is aimed to research the factors that influence of choice of fuel. According to the opinion of the Khonkaen University's student in 2010. In research, we use the questionnaires to obtain the qualitative data and analyze the data by descriptive statistic.

The data from 400 students' show that they use vehicles is approximately 69% , divide into motorcycle (58%) and automobile (11%). The fuel that they use the most is Gasohol 91 (51.81%) following *Benzene* 91(34.42 %), Gasohol 95(7.61%) and *Benzene* 95 (6.17% , respectively. The factor that has the most influence on their decision to use fuel is the price/liter. The second factors are the effect on engine, the instructions in guide book, convenience (the amount of vending machine) and environmental impact. According to the result, if we want to support the renewable energy (Gasohol) campaign, the above factors are considered. Because the students are emphasize and think that these factors have an effect on choice of fuel.

Key word : Fuel Type

Fertility of soil in Deciduous Dipterocarp Forest and Mixed Deciduous Forest at Plant Genetic Protection Area,Sirindhorn Dam, Sirindhorn district,Ubonratchathani province under the Royal Initiation of Her Royal Highness Princess Maha Chakri Sirindhorn .

Student : Mr. Adisak Wadoerywong

Project advisor : Asst. prof. Dr. Pisit Chareonsudjai

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

The objectives of this project were the assessment of soil fertility by the chemical analysis of soil and compare the plant macronutrients (N, P, K). The study was conducted at the deciduous dipterocarp forest and mixed deciduous forest at the Plant Genetic Protection Area, Sirindhorn Dam, Sirindhorn district, Ubonratchathani province under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn. Top 15 cm soil samples were collected in each quadrat of 10 x 10 m^2 of the deciduous dipterocarp forest and mixed deciduous forest in January, March and July 2011. They were analyzed for available phosphorus, exchangeable potassium, organic matter, cation exchange capacity and base saturation for evaluating the soil fertility according of the soil survey method (1980). From the study, it were found that the fertility of soil in the deciduous dipterocarp forest and the mixed deciduous forest 6 and 7 respectively. They both were at low levels of the assessment scale is of 5-15. Comparative analysis of soil fertility during the month of January, March and July, the soil fertility of the dipterocarp forest were between 5-7, which were at the low level. The soil fertility in mixed deciduous forest was low only in March, with the fertility levels of 7, in January and in July the fertility scale were at the moderate level of 8. Comparing the macronutrients of plant (N, P, K), in January, March and July in **the deciduous dipterocarp forest** and the mixed deciduous forest, it was found that no difference significant was found (p >0.05) .The total nitrogen in the **deciduous dipterocarp forest** were at the range of 0.051-0.081%, the available phosphorus were in the range of 6.248-8.423 ppm and the exchangeable potassium were in the range of 38.552-53.768 ppm. However, the mixed deciduous forest had total the nitrogen were in the range of 0.070-0.120%, the available phosphorus were in the range of 7.871-11.371 ppm and the exchangeable potassium were in the range of 40.026-59.339 ppm.

Key word : Fertility of soil, Deciduous Dipterocarp Forest

Forest Structure at a community forest: A case study of Khok Nong Jan community forest, Dongkeng sub-district, Nongsonghong district, Khon Kaen Province.

Student : Mr. Tiwanon Simsawat

Project advisor : Asst. Prof. Dr. Adcharaporn Pagdee

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

This study aims to study forest structure at Khok Nong Jan community forest, Dongkengsub- district, Nongsonghong district, Khon Kaen 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/$m_2$or 97.66 tree/rai. The species with highest density is *Shorea obtusa* Wall. Ex Blume (41.53 tree/rai), highest frequency is *Shorea obtusa* Wall. Ex Blume 0.95, highest dominance is *Shorea obtusa* Wall. Ex Blume 0.005, and highest important value index is *Shorea obtusa* 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

Fuel consumption of the population in the KHON KAEN province.

Student : Miss Nantana Sangwichian

Project advisor : Dr.Wirongrong Mongkonthum

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

The objective of this study were to type of fuel and knowledge about alternative energy of car.The primary data were collected by conducting a questionnaire survey among 400 car drivers in Muang District, KHON KAEN province with convenience sampling method. All parameters were analyzed by frequency and percentage. The results of the study were concluded as following : Majority of respondents were male whose age was between 31 to 40 years old, and held bachelor degrees. Most respondents were government officials and had monthly incomes 10,001 to 20,000 baht. Most of their cars are TOYOTA brand, the engines capacity are more than 2000 CC, The age of the car is less than 3 years old and cars use diesel 45 % as fuel .The frequency refueling 1 time per week. The reasons for the respondents were terms of cars and not change the type of fuel to use because fuel to use appropriate and good for the engine. Regarding the cognitive component, the respondents had knowledge of alternative energy used at good level.The information of gender, age, education level, occupation and income with the choice to fuel use. Found that the respondents are gender, education level, occupation and income can affect fuel consumption, age had no effect on fuel consumption.

Key word : Fuel consumption

Impact of tourism activities to water quality at Tapae Bangsaen 2   Ubonrat dam, Khonkaen Province.

Student : Miss Sinjai   Muangpil

Project advisor : Dr. Lamyai Neeratanaphan

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

This study was impact of tourism activities to water quality at Tapae Bangsaen 2Ubonrat dam, Khonkaen province by exploration and sampling of water 3 points that was Tapae Bangsaen 2 area, distance from Tapae 50 meters and 100 meters. The samples of water were collected for analysis before and after Songkran festival. Water quality parameters were measured; temperature, pH, dissolved oxygen, biochemical oxygen demand, turbidity, total suspended solids and total dissolved solids. The study found that before Songkran festival had 3,200 tourists per day and most of them prefer to had the activities were eating and swimming at Tapae Bangsaen 2 than elsewhere. The parameters at Tapae area were 28 °C, 10.75, 7.98 mg/l., 3.11 mg/l., 8.93 NTU, 52 mg/l. and 101.33 mg/l., respectively. Distance from Tapae 50 meters were 27.87 °C, 12.24, 8.15 mg/l., 1.73 mg/l., 1.8 NTU, 5.33 mg/l. and 98 mg/l., respectively. Distance from Tapae 100 meters were 27.2 ° C, 11.94, 8.41 mg/l., 1.32 mg/l., 1.97 NTU, 4 mg/l. and 94 m/l., respectively. Values of this parameters found that the most of excess water quality standard for surface in type2 except for dissolved oxygen. After Songkran festival had 16,716 tourists per day and the activities were same as before. Distance from Tapae 50 meters, the tourists had swimming with rubber rings and riding water cycle while distance from Tapae 100 meters, playing banana boats. The parameters at Tapae area were 29.5 °C, 10.08, 7.61 mg/l., 3.48 mg/l., 26.17 NTU, 92.67 mg/l. and 115.33 mg/l., respectively. Distance from Tapae 50 meters were 29.7 °C., 10.23, 7.77 mg/l., 3.47 mg/l., 15.93 NTU, 6 mg/l. and 110.67 mg/l., respectively. Distance from Tapae 100 meters were 29.53 °C, 9.98, 8.09 mg/l, 2.87 mg/l., 1.93 NTU, 6 mg/l. and 103.33 mg/l., respectively. The result of this study showed that the water quality after the Songkran festival was dirty as it had been affected by tourist activities.

Key word : Water Quality, Impact of Tourism Activities

Impact of tourism activities to water quality at Tapae Bangsaen 2 Ubonrat dam, Khonkaen Province

Student : Sinjai   Muangpil

Project advisor : Dr. Lamyai Neeratanaphan

Department of Environmental Science   Facalty of Science, Khon Kaen University

This study was impact of tourism activities to water quality at Tapae Bangsaen 2Ubonrat dam, Khonkaen province by exploration and sampling of water 3 points that was Tapae Bangsaen 2 area, distance from Tapae 50 meters and 100 meters. The samples of water were collected for analysis before and after Songkran festival. Water quality parameters were measured; temperature, pH, dissolved oxygen, biochemical oxygen demand, turbidity, total suspended solids and total dissolved solids. The study found that before Songkran festival had 3,200 tourists per day and most of them prefer to had the activities were eating and swimming at Tapae Bangsaen 2 than elsewhere. The parameters at Tapae area were 28 °C, 10.75, 7.98 mg/l., 3.11 mg/l., 8.93 NTU, 52 mg/l. and 101.33 mg/l., respectively. Distance from Tapae 50 meters were 27.87 °C, 12.24, 8.15 mg/l., 1.73 mg/l., 1.8 NTU, 5.33 mg/l. and 98 mg/l., respectively. Distance from Tapae 100 meters were 27.2 ° C, 11.94, 8.41 mg/l., 1.32 mg/l., 1.97 NTU, 4 mg/l. and 94 m/l., respectively. Values of this parameters found that the most of excess water quality standard for surface in type2 except for dissolved oxygen. After Songkran festival had 16,716 tourists per day and the activities were same as before. Distance from Tapae 50 meters, the tourists had swimming with rubber rings and riding water cycle while distance from Tapae 100 meters, playing banana boats. The parameters at Tapae area were 29.5 °C, 10.08, 7.61 mg/l., 3.48 mg/l., 26.17 NTU, 92.67 mg/l. and 115.33 mg/l., respectively. Distance from Tapae 50 meters were 29.7 °C., 10.23, 7.77 mg/l., 3.47 mg/l., 15.93 NTU, 6 mg/l. and 110.67 mg/l., respectively. Distance from Tapae 100 meters were 29.53 °C, 9.98, 8.09 mg/l, 2.87 mg/l., 1.93 NTU, 6 mg/l. and 103.33 mg/l., respectively. The result of this study showed that the water quality after the Songkran festival was dirty as it had been affected by tourist activities.

ผลกระทบจากการท่องเที่ยวต่อคุณภาพน้ำบริเวณท่าแพบางแสน2 เขื่อนอุบลรัตน์ จังหวัดขอนแก่น

นักศึกษา : นางสาวสินจัย เมืองพิล รหัสประจำตัวนักศึกษา 513020361-3
อาจารย์ที่ปรึกษาโครงการวิจัย : อ.ดร.ลำใย ณีรัตนพันธุ์
ภาควิชาวิทยาศาสตร์สิ่งแวดล้อม คณะวิทยาศาสตร์ มหาวิทยาลัยขอนแก่น

การศึกษาผลกระทบจากการท่องเที่ยวต่อคุณภาพน้ำบริเวณท่าแพบางแสน2 เขื่อนอุบลรัตน์ จังหวัด ขอนแก่น โดยการสำรวจและเก็บตัวอย่างน้ำจำนวน 3 จุด คือ บริเวณท่าแพบางแสน2, ห่างจากท่าแพ 50 เมตร และห่างจากท่าแพ 100 เมตร ซึ่งแบ่งการเก็บตัวอย่างน้ำเพื่อการวิเคราะห์คุณภาพก่อนและหลังเทศกาล สงกรานต์ พารามิเตอร์ที่ทำการตรวจวัดคุณภาพน้ำ ได้แก่ อุณหภูมิ, ความเป็นกรด-ด่าง, ออกซิเจนละลาย, บี โอดี, ความขุ่น, ของแข็งแขวนลอยทั้งหมดและของแข็งละลายทั้งหมด ผลการศึกษาพบว่า ก่อนเทศกาล สงกรานต์มีนักท่องเที่ยวเดินทางมาเที่ยวประมาณ 3,200 คนต่อวัน นักท่องเที่ยวนิยมมานั่งรับประทานอาหาร และเล่นน้ำบริเวณท่าแพมากกว่าจุดอื่น โดยค่าพารามิเตอร์ที่ทำการตรวจวัดบริเวณท่าแพ คือ 28 °C, 10.75, 7.98 มก./ล., 3.11 มก./ล., 8.93 NTU, 52 มก./ล. และ 101.33 มก./ล.ตามลำดับ ระยะห่างจากท่าแพ 50 เมตร คือ 27.87 °C, 12.24, 8.15 มก./ล., 1.73 มก./ล., 1.8 NTU, 5.33 มก./ล.และ 98 มก./ล. ตามลำดับ ระยะห่างจากท่าแพ 100 เมตร คือ 27.2 °C, 11.94, 8.41 มก./ล., 1.32 มก./ล., 1.97 NTU, 4 มก./ล. และ 94 มก./ล. ตามลำดับ ค่าพารามิเตอร์ส่วนใหญ่มีค่าเกินเกณฑ์มาตรฐานคุณภาพน้ำผิวดินประเภทที่2 ยกเว้น ค่าออกซิเจนละลายมีค่าอยู่ในเกณฑ์มาตรฐาน ช่วงเทศกาลสงกรานต์มีนักท่องเที่ยวเดินทางมาเที่ยวประมาณ 16,716 คนต่อวัน มีนักท่องเที่ยวมานั่งรับประทานอาหารและลงเล่นน้ำเป็นจำนวนมาก ห่างท่าแพออกไป 50 เมตร มีการเล่นห่วงยางและจักรยานน้ำ และห่างท่าแพ 100 เมตร มีการเล่นบานาน่าโบ๊ต ค่าพารามิเตอร์ที่ทำ การตรวจวัดหลังเทศกาลสงกรานต์บริเวณท่าแพ คือ 29.5 °C, 10.08, 7.61 มก./ล., 3.48 มก./ล., 26.17 NTU, 92.67 มก./ล. และ 115.33 มก./ล. ตามลำดับ ระยะห่างจากท่าแพ 50 เมตร คือ 29.7 °C, 10.23, 7.77 มก./ล., 3.47 มก./ล., 15.93 NTU, 6 มก./ล. และ110.67 มก./ล. ตามลำดับ ระยะห่างจากท่าแพ 100 เมตร คือ 29.53 °C, 9.98, 8.09 มก./ล., 2.87 มก./ล., 1.93 NTU, 6 มก./ล. และ 103.33 มก./ล. ตามลำดับ ค่าพารามิเตอร์ส่วนใหญ่มีค่าเกินเกณฑ์มาตรฐานคุณภาพน้ำผิวดินประเภทที่ 2 ยกเว้น ออกซิเจนละลายมีค่า อยู่ในเกณฑ์มาตรฐาน จากผลการศึกษาพบว่า คุณภาพน้ำหลังเทศกาลสงกรานต์มีความสกปรกมากกว่า คุณภาพน้ำก่อนเทศกาลสงกรานต์ นั่นแสดงให้เห็นว่ากิจกรรมการท่องเที่ยวที่เกิดขึ้นส่งผลให้คุณภาพน้ำ เปลี่ยนแปลงไป

Invasive Alien Plants species in Huaisuaten Wetland, Nam Phong District,

Khon Kaen Province.

Student : Miss Umarin Jomnonkhaow

Project advisor : Assistant Professor Samang Homchuen

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

This study was aimed to examine the invasive alien plants species and to explore the prevention and control of the spread of the invasive alien plants species by indigenous knowledge. The study took place at the Huai Sua Ten wetland with an area of 7,860 rai in Nam Phong District, Khon Kaen Province during November 2010 – August 2011.To examine the water plants, the study used secondary data and Line Transect Technique which included two survey lines transecting each other at the middle of the swamp. The two survey lines were divided into sections each of which was 100 meters long. The results of the study showed that there were 40 families and 26 species of water plants. Among these, 9 families and 8 species were invasive alien plants species. The majority of the invasive alien plants species were *Typha angustifolia* L. and *Eichhornia crassipes* (C.Mart.) Solms respectively. The study also explored the locals' wisdom used to prevent and control the spread of the invasive alien plants species. The data was collected through a questionnaire conducted among locals at 7 villages surrounding the wetland. It was discovered that they made use of 4 families and 4 species of the invasive alien plants species; *Typha angustifolia* L., *Imperata cylindrical* (L.) P.Beauv., *Eichhornia crassipes* (C.Mart.)Solms*, and Pistia stratiotes* L. The first most used was *Typha angustifolia* L. which was used to make traditional mats. The second most used was *Imperata cylindrical* (L.) P.Beauv. which was used to make thatching roof. The locals revealed through the questionnaire that *Typha angustifolia* L. was a threat to a native plant, *Actinoscirpus grossus* (L.f.) Goetgh. & D.A.Simpson in that it could not grow and spread. This resulted in a smaller number of this native plant.

Key word : Alien Plants species

Pattern of the trip of student in university's dormitory.

Student : Miss Mananya Phaderm

Project advisor : Dr.Wirongrong Mongkonthum

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The objectives of this research are to 1) study patterns of the trip of student in Khon Kaen University dormitory. The study targeted on the students who live in boys dormitory unit in 5, 6, 7, girl dormitory unit 4, Noppharat dormitory and Woraresident dormitory, study the student's understanding to the environmental problem and 3) predict the level of CO_2 emission from the vehicles that have been used by students by using the questionnaire. Results or the study show that there are 6 patterns of the trip of the student. Most of the students prefer to travel by motorcycle which is about 46.50 percent follow by shuttle bus 12.00 percent, motorcycle and shuttle bus 5.75 percent, motorcycle and walk 5.25 percent, shuttle bus and local transportation and walk 5 percent, shuttle bus and walk 5 percent, respectively. Result of the study also reveal that total carbon dioxide emission from all type of the trips is about 114.54 ton per year.

Key word : Trip of Student

Pesticide Usage in agricultural area at Sila subdistrict Mueng district Khon Kaen Province.

Student : Miss Thatsanee Chaihan

Project advisor : Dr. Sarun Keithmaleesatti

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

Pesticide usage in agricultural area at Sila subdistrict Mueng district Khon Kaen province were studied July to August 2011, the aim of this study was type of pesticide which used in this area and reasoned to usage the chemical pesticides. Three hundreds and eighty seven farmers were collected the information. The results found that rice was the most popular plant in Sila subdistrict and 94.3 percentages was used in areas. The most of farmers are using pesticide 92.8 percentages. Golden apple snail (*Pomacea canaliculata*) is the famous pest which found in the rice field. Morover, Golden apple snail was killed by chemical about 63.9 percentages. Abamectin which is an insecticide as well as an acaricide and a nematicide was applied to destroy the golden apple snail 32.3 percentages. Fifty seven point one percentages bought the chemical at local shop. The statistical analysis presented that the correlation between income and chemical usage was significantly different (p<0.05). Additionally, the size of agricultural area and chemical usage showed the significantly different (p<0.05).

Key word : Pesticide

Quality Analysis of Surface Water Nong La Lerng Keng Lake.

Student : Miss Kanjana Achuayram

Project advisor : Dr. Sarun Keithmaleesatti

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

Quality Analysis of Surface Water at Nong La Lerng Keng, Thombon Dong Keng Ampher Nong Sonk Hong, Khon Kaen was studied. Parameters studied were Oxygen Demand (DO), pH, Temperature ($^{\circ}$C), Biochemical Oxygen Demand (BOD), Total Coliform Bacteria and Fecal Coliform Bacteria. Water samples were collected from Nong La Lerng Keng during July-September 2004. The results were as follows: pH ranged between 6.69-7.14, Oxygen Demand (DO) ranged between 5.95-6.16 mg/l, Temperature ($^{\circ}$C) ranged between 28.03-29.33 $^{\circ}$C, Biochemical Oxygen Demand (BOD) ranged between 2.36-3.12 mg/l, Total Coliform Bacteria ranged between 228-783 MPN/100 ml and Fecal Coliform Bacteria ranged between 20-223 MPN/100 ml. Biochemical Oxygen Demand (BOD) is parameter wasn't within the standard criteria of quality surface water kind of the second and third.

Key word : Surface Water, Quality Analysis

Key word :

Reduction of phosphate and total solids by using filter alum of wastewater derived from constructed wetland wastewater treatment systems in Ubonrat Dam municipality, Ubonrat District, Khon Kaen

Student : Mr. Manit Panchot

Project advisor : Asst. Prof. Dr. Phenprapha Phetcharaburanin

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

The purpose of this study was to the proper amount of filter alum to reduce phosphate and total solids in the effluent from constructed wetland in Ubonrat Dam Municipal, Amphoe Ubonratana, Khon Kean Province. By chemical precipitation process by using filter alum .The study used filter alum remove phosphate doses of pH rating of 4,5,6,7,8 and 9 and add filter alum rating 0.2,0.4,0.6,0.8 and 1.0 g. sing in water samples then adjust pH and study used filter alum remove total solids in effluent doses of filter alum rating 0.1 to 1.0 g. The results from study that the most suitable filter alum rating of 0.4 g. and pH rating of 6 in effluent 100 ml. to remove phosphate which remove phosphate from 0.9597 mg./l. decrease to 0.00 mg./1. or 100 %. If the pH rating increase the performance remove phosphate it decrease too and the result from study that the most suitable filter alum rating of 0.6 g in effluent 100 ml. remove total solids which remove total solids from 89 mg./1. decrease to 1.7 mg./1. or 98.08 %.If the low or more filter alum rating the performance remove phosphate it decrease too.

Key word : phosphate and total solids, constructed wetland

Reduction of phosphate and total solids by using filter alum of wastewater derived fromconstructed wetland wastewater treatment systems in Ubonrat Dam municipality, Ubonrat District, Khon Kaen.

Student : Mr. Manit Panchot

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Key word : phosphate, total solids, wastewater treatment systems

Response of Khonkaen University Students to Electricity Conservation Campaign.

Student :Miss Kamonwan Kakandee

Project advisor : Dr.Wirongrong Mongkonthum

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

Response of Khonkaen University Students to Electricity Conservation Campaign has been done to lean about comprehension of Electricity saved , behavior of Electric used and opinion about the campaign.

The result showed the majority of students was familia with saving electric campaign (80.2%) by signboard (63.8%). and most student agree with the campaign that using the best media is advertisement (63.6%) follow by signboard (39.5%). In comprehension and behavioral response, the majority of students was in moderate but the lowest was rather high when compare to the well understood.

Pattern of behavioral response in electricity utilization showed the different when compare to statistically in male and female.

Majority of students agreed and recommended that the electricity conservation campaign should be going on. And the students opinion on electricity conservation campaign was well recognized.

Key word : Electricity Conservation

Satisfaction of villagers on tap water from the Phoenix Pulp and Paper factoy at Khonkaen province.

Student : Miss Pichitra Boonnam

Project advisor : Dr. Lamyai Neeratanaphan

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

The purposes of this study were to study satisfaction of villagers on tap water from the Phoenix Pulp and Paper factoy at Khonkaen province. The questionnaires were used 444 copies in 5 villages (Kambongpattana, Nhongbuanoi, Nonudom, Huawjode and Nonkhampae), the most score of satisfaction is 5. The results showed that the satisfaction level on tap water utilization of villagers 5 village average level was 2.71 ± 0.30. The satisfaction was medium level. However, found that the satisfaction level on tap water utilization of Nhongbuanoi's villagers, Nonudom's villagers and Huawjode's villagers average level were 2.47 ± 0.11, 2.48 ± 0.11 and 2.53 ± 0.24, respectively. The satisfaction was low level. The satisfaction level of cleanness and quality assurance on tap water in the low level. And the satisfaction level of regularity, water pressure, clarity, smell (unless the smell of chlorine) and volume on tap water in the medium level. Present, the number of water users in 593 familys indicated the Phoenix Pulp and Paper factory generate tap water 2,000-3,000 m^3/day. The suggestion of villagers were quality improvement and clean up of tap water. However, water pressure increase of tap water.

Key word : Satisfaction of villagers

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

Student : Miss Pichitra Tiekprakon

Project advisor : Assist. Prof. Dr. Adcharaporn Pagdee

Department of Environmental Science, Faculty of Science , Khon Kaen 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 Keng subdistrict, Nongsonghong district, Khon Kaen 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

Solid Waste Management in Ba Kham, Muang district, Khon Kaen province.

Student : Miss Anchulee Yoskumthon

Project advisor : Dr. Wirongrong Mongkonthum

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

The objective of this study was to investigate the mechanism of solid waste management in the community and the attitudes of local community to the solid waste management and the environmental issue at Ba Kham, Muang District, Khon Kaen. The study was conducted by the interview with 2 local leaders and the questionnaire for local community. Descriptive statistics was applied for the analysis data processing which result of 2 local leader and sample of 232 people, it's found that the main factors contributing to the successful result in solid waste management caused by 4 factors: 1) Vision of their community leader 2) Community's activities are scheduled for the waste management is clear and effective 3) Local participation of local people 4) The monitoring activities in a systematic manner.

From the survey's used by questionnaire, found that the majority sample had the better own understanding of waste management at well level. The participation of local people in community's activity to solid waste management system was at the moderate level. And environmental problems caused by solid waste in the community where it was at most common sources of waste near local home areas or other places of its local events.96.55 per cent was satisfied with the waste management system and needed the project has been continued for their community. 3.45 per cent disagreed to the community's waste system and needed more adding garbage in any way disposing of its. The main problem encountered was any bins located nearly home area among with smelly garbage disturb people who live nearby from some residual waste that has not been disposed.

Key word : Solid Waste Management

Some attributes of drinking water from female student dormitories at Khon Kaen University.

Student : Miss Nachawan Choempru
Project advisor : Asst.Prof.Dr. Penprapa Petcharaburanin
Department of Environmental Science, Faculty of Science , Khon Kaen University. Thailand.

The objective of this study was to determine the physical, chemistry, and biological attribute of drinking water from the service point of female student dormitories at Khorn Kaen University to compare The drinking water standards of the Ministry of Public Health. The water samples were collected before and after cleaning the water cooler. The experiment on period from June 2011 to July 2011. Tested two times and then be compared to the drinking water standards of the Ministry of Public Health. The results showed that the physical attribute of drinking water such as turbidity before and after cleaning the water cooler was (0.12+0.01 SSU) and (0.08+0.004 SSU) respectively; pH before and after cleaning the water cooler was (7.62 ± 0.07) and (7.36 0.04) respectively; chemical attribute such as total solids before and after cleaning the water cooler was (132.59 ± 4.64 mg / 1) and (124.64 ± 6.42 mg / 1) respectively, chloride before and after cleaning the water cooler was (13.00±0.52mg/1) and(13.05±0.49mg/1) respectively; concluded that the physical and chemistry attribute both before and after cleaning the water cooler were within the standards criteria of drinking water that announced by Ministry of Public Health. For The biological attribute such as coliform bacteria before and after cleaning the water cooler was (13.53±3.82 MPN/100 ml) and (3.56±1.10 MPN/100 ml) respectively; fecal coliform bacteria before cleaning the water cooler was (2.60±0.97 MPN/100 ml) but fecal coliform bacteria after cleaning the water cooler was not found ,concluded that fecal coliform bacteria before cleaning the water cooler (75%) is over than the standards criteria and coliform bacteria both before and after cleaning the water cooler all the sample is over the standards criteria.

Key word : attributes, drinking water

Some Wastewater Characteristics from a constructed wetland systems in Ubonrat Dam municipality, Khon Kaen Province.

Student : Miss Piyaporn Saiwat

Project advisor : Asst. Prof. Dr. Phenprapha Phetcharaburanin

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

Analysis Some Wastewater Characteristics from constructed wetland systems in Ubonrat Dam municipality, Khon Kaen Province. The objective is to know the water quality influent and effluent from constructed wetlands system with these parameters -i.e. pH, BOD, TSS, Oil and Grease, phosphorus and nitrogen. Compared the effluent from constructed wetland with the standard Quality Control for Municipal Wastewater Treatment of Pollution Control Department. The collected water samples from influent pond and effluent pond of a constructed wetland, water samples were collected every 15 days 3 times each was done 3 times from June 2011 until July 2011. The result showed that pH, BOD, TSS, Oil and Grease, phosphorus and nitrogen of influent from constructed wetland in the range 6.28 - 8.43, 72 - 98, 22.67 - 28.59, 0.065 - 0.945, 1.76 - 1.96 and 21.95 – 26.98 mg/l respectively. pH, BOD, TSS, Oil and Grease, phosphorus and nitrogen of effluent from constructed wetland in the range 5.80 - 8.09, 16.45 – 18.02, 4.67 – 8, 0.001 - 0.03, 1.04 - 1.14 and 9.5 - 11.76 mg/l respectively. Compared the effluent from constructed wetlands with the Standard Quality Control for Municipal Wastewater Treatment. The result showed that pH, TSS, oil and grease, phosphorus and nitrogen not exceed the Standard Quality Control for Municipal Wastewater Treatment of Pollution Control Department.

Key word : Wastewater Characteristics, Constructed Wetland

Species Diversity of Understory Plants in The Plant Genetic Protection Area Sirindhorn Dam, Sirindhorn district, Ubonratchathani province Under The Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn.

Student : Miss Emika Tangman

Project advisor : Asst. Prof. Dr. Pisit Chareonsudjai

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

Project aimed to study the plant genetic protection area, Sirindhorn. The objectives of this research were to study a biodiversity of understory plants at species level and study the relationship between density understory plants and some soil properties. The method which used in this research was nine belts transects of 1×50 meter were conducts in three survey trails. There were total of understory plant 120 species in 93 genus, 44 families, which could be classified into five groups for instance, Monocotyledons 5 families, Dicotyledons 35 families, Gymnosperm 1 family, Ferns (Pteridophyta) 2 families and Parasitic plants 1 family. The species diversity index of understory plants (H' of Shannon-Weaver Index) in the study area was 3.09. The species diversity index (H') the deciduous dipterocarp forest was 3.23, which was significantly higher than the mixed deciduous forest of 2.34. The light intensity might be the limitary factor of these two habitats. The Sorensen's coefficient of society between the two communities was 51.44% revealed the difference of the species. There were 95 species in the deciduous dipterocarp forest and Krachiew Lai (*Curcuma rhabdota*) was the highest density plant in the system, while there were 78 species in the mixed deciduous forest and Star Jasmine (*Aphaenandra uniflora*) was the highest density plant. Study on relationship of some dense plants Asiatic bitter yam (*Dioscorea hispida*), Krachiew Lai (*Curcuma rhabdota*) Star Jasmine (*Aphaenandra uniflora*) and some soil properties. Soils in the area where found these plants were significantly different and were different from the control in the surrounding area. This finding revealed the significance of soil properties for the plant conservation, particularly for transplantation.

Key word : Species Diversity, Understory Plants

Study The Relationship Between Birds And Habitat Types At   Nong La-Lerng-Keng ,

Khon Kaen , Province

Student : Mr. Niti Sukumal

Project advisor : Dr. Sarun Keithmaleesatti

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

The Relationship between birds and habitat types at Nong La-Lerng-Keng , Khon Kaen Province was studied by point station. The studies were conducted between June 2004 and September 2004.

56 species of bird were found in study area. The aquatic birds and March birds were 20 species (35.71%). The habitat types were found 5 types such as floating weed zone, open water zone, emergent weed zone, island zone, mixed habitat zone. The 36 species were used island zone. The aquatic birds and march birds in the floating weed zone were found 14 species whereas the birds in open water zone were found only 4 species. The abundant birds were 8 species and the rare birds where 9 species.

Key word :   Habitat

Surface thermal reduction efficiency of ornamental hanging plant.

Student : Miss Usa Bandasak

Project advisor : Associate Professor. Kitti   Akamphon

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

This research presents for Surface thermal reduction efficiency of ornamental hanging plant. In real environment, hanging plant ornamental in west according to the balcony on building SC.04 Faculty of Science, Khon Kaen University and the scientific tools are used to collect data The study period was between January 2011 to July 2011 time 2PM to 3PM.

The results of the the research found that hanging plant has an excellent performance for surface thermal reduction on Summer be effective best is 6.84% ,second on Winter is 6.04% and minimal on rainy season is 4.88% . and light transmission reduction on Summer be effective best is 72.37 %   ,second on Winter is 69.21%and minimal on rainy season is 60.77% . Testing the relationship between temperature and light transmission It appears that relationship between the level of significance 0.01.

Key word : Surface thermal

The Impact of common myna <u>Acridotheres</u> <u>tristis</u> and white-vented myna <u>Acridotheres</u> <u>grandis</u> community on Human at sichan Road, Khon Kaen municipality Mueang District Khon Kaen Province.

Student : Mr. Sermsak Koosakunrat

Project advisor : Dr. Sarun Keithmaleesatti

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

Common myna <u>Acridotheres</u> <u>tristis</u> and white-vented myna <u>Acridotheres</u> <u>grandis</u> are member of family Sturnidae. Both mynas are the native birds of Northeastern Thailand. The myna has adapted very well to urban environments. The impact of both myna community on human at Sichan Road between The City Pillar Shrine to The Bank of Thailand Khon Kaen branches, Khon Kaen municipality, Mueang district, Khon Kaen Province were determinated on January to July 2011. The results found that Sichan Road between the City Pillar Shrine to The Bank of Thailand Khon Kaen branches was an important myna community on Khon Kaen municiparity. Additionally, this area was usage to nesting habitat of both spicies. The populations of both mynas in this area at dry season were higher than wet season (p<0.05). The hight impacts of both mynas on human community in study area were noise and excrete waste.

Key word : *Acridotheres tristis*, *Acridotheres grandis*

The relation of pH, Chemical consumption and biogas quality in wastewater treatment (UASB).

Student : Miss Saipin Prajuk

Project advisor : Asst.prof.Turenjai Dooljindachabaporn

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

This study aims to determine the pH value of the biogas digester that affect substance use Sodium hydroxide Old lime and quality of methane gas and measure the pH of the wastewater pond EQ pond Pump sump pit MUR consumption of Sodium hydroxide Old lime and the percentage of methane comprehensive study. Biogas digester pH 3 with a range from 6.81 to 6.90 6.91 to 7.00 and 7.01 to 7.10 The result of study show that pH of the biogas digester was not relate to the amount of chemicals used to adjust pH of wastewater(p-value = 0.123) at significance level 0.05 and the production of microbial methane was different at 53.133% vol, 55.467% vol, and 60.400% vol, respectively, from the pH of digester gas for the study is related to the production of methane by microbes(p-value = 0.000) significance level 0.05 from the result of the study, therefore the pH MUR at 7.01 to 7.10 UASB digester model of Britain's the National Starch and Chemical (Thailand) Co., Ltd, microbial methane production was the best quality.

Key word : Chemical consumption, biogas quality

II

The Relationship between Plant Community and Soil Properties and Indicator Species on Salt Affected Areas.

Student : Miss Dudsadee Tuanmareng

Project advisor : Assistant Professor Samang Homchuen

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

The study of the relationship between plant community and soil properties and indicator species on salt affected areas was conducted in Bamnetnarong District, Chaiyaphum Province between March and August 2011. The results of the study revealed that the average of the electrical conductivity (1:5) was 10.26 ms/cm in the dry season (March) and 7.56 ms/cm in the rainy season (August). This indicated that the soil, which was reddish yellow, was salty. It was basically assessed that the soil abundance was low. Most of the soil was sand and loamy sand which drained water well, but not absorb. As a result, the moisture in the soil was low with an average of 10.71% in the dry season and 13.51% in the rainy season. Even though it rose in the rainy season, the moisture in both the seasons was regarded as low. In average, the soil reaction was acid at 6.86 in the dry season and base at 7.30 in the rainy season. The difference of the soil reaction between the two seasons mainly resulted from the salty ground water moving upward and downward through the soil easily.The study of the plant community showed that there were 11 families and 14 species in the dry season and 15 families and 19 species in the rainy season. It was also found that there were five species of halophyte; *Panicum repens* L*., Azima sarmentosa* B&H*., Maytenus diversifolia, Pluchia indica* L*.,* and *Synostemon bacciformis.* The other 14 species were salt tolerance. The study of the distribution of the plant community unveiled that more than 60% of the areas was barren, but the rest was covered by the four most found plants; *Panicum repens* L., *Azima sarmentosa* B&H*., Maytenus diversifolia,*and *Pluchia indica* L*.* respcetively These plants are halophyte. Most of the plants in the studied areas were emblements. It could be concluded that the seasons had direct effects on the electrical conductivity and the moisture in soil which further affected the distribution of the plant community.

Key word : Soil Properties, Indicator Species

The studizes of Soil Nitrogen at the Plant Genetic Protection Sirindhorn Dam, Ubon Ratchathani province under the Royal Initiation of Her Royal Highness pincess Maha Chakri Sirindhorn.

Student : Mr. APISIT WORANPAN

Project advisor : Asst. prof. Dr. Pisit Chareonsudjai

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

This study aimed to study aimed amount of total soil nitrogen and the changes to otherforms during November 2010- July 2011 at the plant genetic protection area, Sirindhorn dam, Sirindhorn District, Ubon Ratchathani. Under the initiative of HRH Princess maha Chakri Sirindhorn. Five quadrats of 10x10 m^2 were studied in the dry Dipterocarp forest and in the mixed Dipterocarp forest. Soil samples in each quadrat were collected at the top 15 cm and then total nitrogen, organic nitrogen, and inorganic nitrogen (NO_3 and NH_4^+) were analysed. The nitrogen content in failed leaves were also determined. The result revealed that the major input of nitrogen were from failed leaves. In mixed Dipterocarp and dry Dipterocarp had the total nitrogen in leaves ($\bar{x}$ +SD) at 7616.00 ± 0.92 and 5936.00 ± 1.29 mg / kg, respectively. In mixed Dipterocarp and dry Dipterocarp had total nitrogen in soil ($\bar{x}$ ±SD) at 1383.17 ± 336.43 and 990.79 ± 312.24 mg / kg soil dry wt. or 3.02 and 2.2 ton / ha, respectively. Average of 98% of the total nitrogen in soil was organic nitrogen and approximately 2% was inorganic nitrogen. Organic nitrogen in the mixed Dipterocarp and dry Dipterocarp ($\bar{x}$ ±SD) at 1359.93 ± 332.22 and 972.68 ± 307.51 mg / kg soil dry wt. or 2.97 and 2.16 ton / ha, respectively. The minority of soil nitrogen was in inorganic forms (NO3 and NH_4). Inorganic nitrogen ($\bar{x}$ ±SD) in the mixed Dipterocarp and dry Dipterocarp were 23.24 f 4.70 and 18.11 ± 5.72 mg / kg soil dry wt. or 0.05 and 0.04 ton / ha, respectively. Comparasion study among the month of study, were found that the total nitrogen in soil was the highest in July ($\bar{x}$ ±SD) at 1603.00 + 2.90 and 1099.00 ± 3.89 mg / kg and lowest in March.

Key word : Soil Nitrogen

The Study of Chemical Compound in Salt-tolerant Species on Salt Affected Area,Bamnet Narong district, Chaiyaphum Province.

Student : Mr. Maroot Poobalchuen

Project advisor : Asst. Prof. Samang Homchuen

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

This study was aimed to examine important substances and their relationships in plants growing on salt affected area in different. The study took place in a very high salinity in Bamnetnarong District, Chaiyaphum Province between the dry season (April 2011) and the rainy season (August 2011). Two groups of plants were analyzed; halophyte and salt tolerance. The halophyte group consisted of *Azima sarmentosa, Maytenus mekongensis,* and *Pluchea indica* whereas the salt tolerance group comprised *Ahernanthera sessilis, Typha angustifolia,* and *Fimbristylis miliacea.* The results of the substance analyzes showed that in the dry season all the plants had higher electrical conductivity. The plants produced proline, peroxidase activites, and a higher quantity of malondiadehyde. In contrast, the quantity of hydrogen peroxide and the electrolyte leakage became smaller. During the rainy season that when the electrical conductivity rose, the plants produced proline, hydrogen peroxide, peroxidase activites, the quantity of malondiadehyde and the electrolyte leakage would also become greater but the electrical conductivity and the quantity of substances in the plants were lower in comparison to those in the dry season. This indicated that when the plant under stress decreased, the quantity of substances produced by plants also dropped. Additionally, the plants in the halophyte group produced less substances than those in the salt tolerance group. The best self-adjustment mechanism was discovered in *Azima sarmentosa,* which produced a small and stable quantity of substances even though the electrical conductivity rose up.

Key word : Chemical Compound, Salt-tolerant Species

The study rate of litter decomposition and accumulation in soil at the Plant Genetic Protection Area Sirindhorn Dam , Ubon Ratchathani Province under the initiative of her royal highness Princess Maha Chakri Sirindhom.

Student : Miss Tipkamon Pumipan

Project advisor : Asst. prof. Dr. Pisit Chareonsudjai

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

The objective of this study was to estimate the amount of leave fall, the litter decomposition rate and organic carbon accumulation in soil at the plant genetic protection area Sirindhorn Dam , Ubon Ratchathani province under the initiative of her royal highness Princess Maha Chakri Sirindhorn. Two types of forest, deciduous dipterocrap forest and mixed deciduous forest were studied in January to July 2554. The amount of leaves fall was including determined using litter trap method, the rate of decomposition of the leaves was studied by litter bag method, some decomposition related factors were studied including physical, chemical and biological factors in the area, the carbon accumulation as organic carbon in soil was measured by wet oxidation method. The relationship of soil organic carbon and the rate of degradation was studied. The result found that the average amount of organic carbon accumulation in the deciduous dipterocrap forest was between 12.45 to 20.14 ton/ha and the mixed deciduous forest was between 20.67 to 44.82 ton/ha on top layer soil about 15 centimeters. Considering changes in the year round, the amount of the average leaf fall of deciduous dipterocrap forest was about 0.80 to 1.02 ton/ha and mixed deciduous forest was about 0.19 to 1.33 ton/ha. In January was the higheat leave fall of 1.02 and 1.33 ton/ha in deciduous dipterocrap and mixed deciduous forest, respectively. However, they were not different significantly. Rate of decomposition during seven months in the deciduous dipterocarp forest was lesses than the mixed deciduous forest . The average degradation rates were 48.42 and 66.72% in these two forests,

respectively. The decomposition constant (k) of leaves in the deciduous forest was 1.141 and mixed deciduous forest was 1.586. It found that the amount of organic carbon accumulated in the soil related to rate of degradation.

Key word : litter decomposition, accumulation in soil

Thermal Reduction Efficiency of Blue Trumpet Vine, Orange Trumpet, Rangoon Creeper and Jasmine Vine.

Student : Miss Piyanut Onputta

Project advisor : Asst. Prof. Dr. Phenprapha Phetcharaburanin

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

The purpose of the project was studied of variation in three seasons, study to thermal reduction efficiency of where under the climber, and studied effect factors which was thermal reduction efficiency. Select decorate to trees planted from 4 species of climbers: *Jasminum auriculatum, Thumbergia laurifolia , Pyrostegia venusta* and *Quisqualis indica*. Study was to thermal reduction efficiency of where climber and factors the light transmission, increasing humidity and deciduous .The data were collected every two weeks from 12 times both in shade and sunlight at 4 points.

The results showed that ; In winter *Quisqualis indica* had thermal reduction efficiency with 14.46 % as high group of thermal reduction efficiency. *Pyrostegia venusta* with 13.55 % , *Jasminum auriculatum* with 13.46 %, *Thumbergia laurifolia* with 12.09% as subordinate from high group. In Summer *Quisqualis indica* had thermal reduction efficiency with 20.91 % as high group of thermal reduction efficiency. *Pyrostegia venusta* with 19.19 %, *Jasminum auriculatum* with 18.83%, *Thumbergia laurifolia* with 18.04% as subordinate from high. In rainy season *Thumbergia laurifolia* had thermal reduction efficiency with 13.32 %, *Quisqualis indica* with 12.04 % as high group of thermal reduction efficiency. *Jasminum auriculatum* with 9.84%, *Pyrostegia venusta* with 9.80 % as subordinate from high group.The four Species of thermal reduction efficiency have not different. Furthermore, it was found that there were correlations among thermal reduction efficiency and light transmission. It correlation found not with increasing humidity.

Key word : Thermal Reduction

Thermal Reduction Efficiency of Desmos, Bagnit Vine, Climbing Ilang- Ilang and Hammock viperstail.

Student : Miss Tipparat Luansoongnoen

Project advisor : Associate Professor. Kitti Akamphon

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

The purpose of the project was studied of variation in three seasons , study to thermal reduction efficiency of creeper and studied effect factors which was thermal reduction efficiency. The selected 4 varieties of creeper: *Desmos chinensis* , *Tristellateia australasiae* ,*Artabotrys siamensis* **,** *Pentalinon luteum* . Study was to thermal reduction efficiency of where of the shadow and the light transmission factor. Relative humidity The data in both shade and sun averaged 4 points, measured every 2 weeks, all 12 times.

The study found that in the winter. *Pentalinon luteum* effective temperature is the highest 26.74 percent.*Tristellateia australasiae* , followed by 24.04 per cent subsidiary *Artabotrys siamensis* 21.13 percent and *Desmos chinensis* 18.74 percent respectively. In the summer finds *Tristellateia australasiae* the effective temperature is the highest 25.56 percent. *Pentalinon luteum* , followed by 21.89 per cent subsidiary *Artabotrys siamensis* 20.29 percent and *Desmos chinensis* 15.76 percent respectively. Finally, in the rainy season the *Pentalinon luteum* effective the highest temperature is 16.58 percent. *Artabotrys siamensis* percent, followed by 15.18 percent and 15.74 *Tristellateia australasiae* network *Desmos chinensis* 11.24 percent, respectively. The four Species of thermal reduction efficiency have not different . Futhermore, it was found that there were correlations among thermal reduction efficiency and light transmission.

Key word : Thermal Reduction Efficiency

Thermal reduction efficiency of large trees.

Student : Miss Pornsuda Somattanai

Project advisor : Associate Professor Kitti Akamphon

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

The objective of this research project was to study the thermal reduction efficiency and the factor that efficiency of large tree, during the winter, summer and rainy season. Five species of tree were selected, i.e. *Samanea saman* (Jacq.) Merr., *Millingtonia hortensis* Linn. f., *Tamarindus indica* L., *Mangifera indica* Linn., *Albizia lebbeck* (L.) Benth. Three replicates of each species were investigated.Tree's diameter, size of the shadow-covered surface and study factor the light transmission and increasing humidity. The data were collected every two week for 12 times both in the shadow at 4 sites and in the sunlight at 4 sites.

The study found that the winter season group which is effective is reducing the temperature is *Mangifera indica* Linn., *Albizia lebbeck* (L.) Benth., *Tamarindus indica* L., *Samanea saman* (Jacq.) Merr. percentage of 27.62, 26.35, 24.93, 24.44 respectively and *Millingtonia hortensis* Linn. f. had the lowest efficiency percentage of 17.33. The summer season that *Mangifera indica* Linn., *Tamarin indica* L., *Samanea saman* (Jacq.) Merr. had highest efficiency percentage of 27.58, 25.79, 22.23 respectively and followed was *Albizia lebbeck* (L.) Benth*. Millingtonia hortensis* Linn. f. had percentage of 21.56, 17.9 respectively. The rainy season that *Samanea saman* (Jacq.) Merr., *Mangifera indica* Linn*., Tamarindus indica* L., *Albizia lebbeck* (L.) Benth. had highest efficiency percentage of 24.02, 22.6 , 22.57, 20.39 respectively and *Millingtonia hortensis* Linn. f. had the lowest efficiency percentage of 14.67. Correlation were found between the thermal reduction efficiency with light transmission reduction efficiency. No correlation with the increasing humidity and the size of the shadow-covered surface.

Key word : Thermal reduction efficiency

Thermal reduction efficiency of medium trees.

Student : Miss Naritsara Krasae

Project advisor : Associate Professor. Kitti   Akamphon

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

The purpose of the project was studied of variation in three seasons, study to thermal reduction efficiency of where under medium trees, and studied effect factors which was thermal reduction efficiency. Select decorate to trees planted from 5 species of medium trees: *Cassia fistula , Cassia bakeriana , Lagerstroemia speciosa , Terminalia catappa , Michelia champaca.* Study was to thermal reduction efficiency of where under medium trees and factors the light transmission, increasing humidity, Shadow area covered and deciduous .The data were collected every two weeks from 12 times both in shade and sunlight at 4 points.

The results showed that ; In winter *Terminalia catappa* had thermal reduction efficiency with 29.36 % , *Michelia champaca* with 25.26 % as high group of thermal reduction efficiency. *Cassia fistula* with 23.56 % .*Cassia bakeriana* with 22.56 % as subordinate from high group and *Lagerstroemia speciosa* as low of thermal reduction efficiency with 12.77 %. In Summer *Terminalia catappa* had thermal reduction efficiency with 26.52 %, *Lagerstroemia speciosa* with 24.49 % and *Michelia champaca* with 23.45% ,as high group of thermal reduction efficiency. *Cassia bakeriana* with 21.18 % as subordinate from high group and *Cassia fistula* as low of thermal reduction efficiency with 12.49 %. In rainy season *Cassia bakeriana* had thermal reduction efficiency with 21.51 %, *Lagerstroemia speciosa* with 20.73 %, *Cassia fistula* with 20.61 %, *Terminalia catappa* with 18.28 % and *Michelia champaca* had thermal reduction efficiency 15.92 % .The five Species of thermal reduction efficiency have not different . Futhermore, it was found that there were correlations among thermal reduction efficiency and light transmission. It correlation found not with increasing humidity and Shadow area covered.

Key word : Thermal reduction efficiency

Title Surface thermal reduction efficiency of ornamental pot plants.

Student : Miss Pattra Bandasak

Project advisor : Associate Professor Kitti Akamphon

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

The purpose of the project were to studied efficiency of temperature reduction in the third season and where under the shadow and studied factors which was reduced temperature was   the light transmission.Conllected pot plants. The data collected by measured temperature and light intensity under the shade and opening.Storage two weeks at a time between January to July 2011 The results shown that; summer had efficiency of temperature reduction of 9.10%. Winter had efficiency of temperature reduction of 7.15%. Rainy season had efficiency of temperature reduction of 7.05%and summer had efficiency of light reduction of 77.67%. winter had efficiency of light reduction of 77.22%. Rainy season had efficiency of temperature reduction of 64.05%. Efficiency of light related to temperature reduction

Key word : Surface thermal

Using the Water flea (*Moina macrocopa*) to improve effluent quality from wastewater treatment at Khon Kaen University.

Student : Miss Ginggamol Doodech

Project advisor : Dr. Lamyai Neeratanaphan

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

The objective of this study was investigate using Water flea (*Moina macrocopa*) to improve effluent quality from wastewater treatment at Khon Kaen University. The parameters were pH, Temperature (T), Biochemical Oxygen Demand (BOD) and Total Suspended Solid (TSS). The experiment were divided into two units : control and experiment water flea treatment, water flea input 20 g/20 liters and the experiment were tested 3 times in 3 weeks. The result of this study in control showed that pH, Temperature , BOD and TSS values were 10.00, 30.60 °C, 14.60 mg /l and 59.00 mg /l, respectively. The experiment water flea treatment showed that values were 8.90, 28.10°C, 9.30 mg/l and 37.00 mg/l, respectively. The efficiency of treatment in each parameters were 10.50, 8.16, 36.30 and 36.98%, respectively. The data of this study were analyzed by Independent Samples T-Test the results showed that the reduction of this TSS and BOD between the control and experiment water flea treatment was significantly different ($p < 0.05$) and pH between the control and experiment water flea treatment was not significantly different. The result of this study showed that the water flea has been improved effluent quality from wastewater treatment at Khon Kaen University. They was reduced the best of TSS compared with other parameters.

Key word : Water Flea, Wastewater Treatment

Using of Agricultural Residues : Case Study Ban Kokkee District Bua Yai   Amphoe Nampong Khonkaen Province.

Student : Miss Wannaporn Kinnasen

Project advisor : Dr. Wirongrong Mongkonthum

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

This research is conducted for purpose of eliminate agriculture residue and possibility in turning agriculture residue into replacing energy of Kokkee village Bua-yai subdistrict Nam-pong district Khon Kaen by using survey on villagers that practice agriculture for career . From the observation and study secondary information , the study shows Kokkee village has 122 families that practice . agriculture for main career and has 1,806 rais and the agriculture activities of two are Farm and Livestocks . The farm agriculture residues are rice hay nad rice stubble which are the most surplus residue from harvesting . For rice hay , most of them are not use for anything , farme usually burn or bury . For the use of agriculture residue (pigs excrement) , usually the farm will use as fertilizer . The usr of renewable energy it should no use but has potential of renewable energy.

Key word : Agricultural Residues

Utilization and Economic Valuation of the gathering of Non-Timber Forest products in
community forest areas : A caes study of Kok Nong Chan Community Forest, Nong
Song Hong, Khon Kaen.

Student : Miss Nujiraporn Seesunam

Project advisor : Asst. Prof. Dr. Adcharaporn Pagdee

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

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 Khok Nong Chan Community Forest, Nong Song Hong district, Khon Kaen 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

Water characteristics after the initial treatment from SC.08 building.

Student : Miss Patamawadee Kompoh

Project advisor : Asst. Prof. Dr. Phenprapha Phetcharaburanin

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

This research purposes study of water characteristics after the initial treatment from SC.08 building before sent to waste water treatment system. Studies by collect water samples every day (Monday to Friday) for three weeks. The parameters for study are pH, BOD and phosphate. Study of pH by pH meter, BOD by direct method and phosphate by Vanado molybdo phosphoric acid method. The results are pH value of the average of three weeks are 8.65, 8.60, 8.24 the BOD value are 60.67, 71.53, 82.07 mg./L. and phosphate value are 4.72, 6.05, 5.44 mg./L. The compared with water quality standard found to only the pH value meet the standard because the initial treatment of laboratory science adjusting the pH value only not adjust other parameters, therefore after the initial treatment should be adjusting other parameters for qualify before sent to waste water treatment system.

Key word : Water characteristics

Water quality of some parameters in Sam Chan reservoir at the area of Ban Kham Bon landfill site, KhonKaen province .

Student : Miss Thanawan Pinawet

Project advisor : Dr. Lamyai Neeratanaphan

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

The objective of this study was investigate water quality of some parameters in the surface water Sam Chan reservoir at the area of Ban Kham Bon landfill site. The parameters were studied on June 2011 in the rainy season, which will result in an excessive amount of leachate and potential contamination of surface water in Sam Chan reservoir. Sampling of water 3 times was conducted on six parameters. They were Temperature, Positive Potential of Hydrogen ion(pH), Dissolved oxygen(DO), Chemical Oxygen Demand(COD), Total Suspended Solid(TSS) and Coliform bacteria. The average results of this study showed values were 31.0 °C, 6.94, 5.27 mg/l, 15.82 mg/l, 21.92 mg/l and 193.33 MPN/100ml, respectively. Comparison of this data with surface water quality standard found that the parameters were keep values with in the type 3 of the surface water quality standard for consumption and agriculture.

Key word : Water quality