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

Student : Miss Khanidta Kertpao

Project advisor : Asst. Prof. Dr. Adcharaporn Pagdee

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

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

Key word : Rice Species Planted

Fuel block from rice husk, water hyacinth and cattail.

Student : Kadsama chaiyasarn

Project advisor : Dr. Lamyai Neeratanaphan

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

Studying the possibility of using rice husk, water-hyacinth and cattail to produce fuel block. The briquetting was non-heating hydrolic process, reinforced with cassava starch glue as binding agent. Two treatments were employed in this study. The ratio of starch to water to be 1:15 and the ratio of starch to water to be 1:30 This study included percentage moisture value, percent ash, heat value. Simple burning test of fuel blocks revealed data acquired through the ratio of starch to water to be 1:15 process with superior quality, lower moisture content, lower ash, as compare to the ratio of starch to water to be 1:30 process. Data analysis showed best binding agent ratio at 1:15 (starch:water). However, the heat value was higher from fuel block by the ratio of starch to water to be 1:30 process when compared to that from the ratio of starch to water to be 1:15 process, with binding ratio of 0.5:15 (starch:water). With regard to percentage moisture content in the First Data Set revealed first three ranking position with binding agent of 1:2 ratio were the fuel block obtained from rice husk in first place, followed by cattail and water-hyacinth ; with percent moisture content of 32.96%, 34.22% and 36.18% respectively. Percent ash found in fuel block by three consecutive order with binding agent ratio of 1:1 were from rice husk, rice-husk mixed with water-hyacinth and rice-husk with binding agent of 1:2; were 10.56%, 22.18% and 24.11% respectively. Second Data Set deal with heat value ranking in three consecutive order with binding agent ratio of 1:2 were as following: rice-husk mixed with water-hyacinth , cattail mixed with water-hyacinth and cattail mixed with rice-husk showed heat value of 5,131.49 kcal / kg 4,883.48 kcal / kg 4,877.85 kcal / kg respectively. However, the ratio of materials to binding agent haven' t difference. For burning test of fuel block in both treatments gave equally good results. However, the best materials for making fuel block, giving good burning quality with low smoke emission are ranking as following: water-hyacinth , rice-husk mixed with water-hyacinth and rice-husk respectively.

Key word : Fuel block

Fuelwood Plants in Ban Non Chad Community Forest, Tambon Dongkeng, Nongsonghong District, Khon Kaen Province.

Student : Miss Wanpen Soonprakhon

Project advisor : Asst. Prof. Dr.Adcharaporn Pagdee

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

This survey-based study investigates fuelwood collection and consumption at Non Chad village,Dongkeng, Nongsonghong, Khon Kaen. Seventy-nine face-to-face questionnaires were distributed to Non Chad villagers. Twenty-one quadrats were also conducted to analyze Non Chad community forest structure. Forty-one species of a dry dipterocarp forest were identified of which *Shorea obtusa* has the highest importance value index (60.26), followed by *Diptercarpus tubercalatus* (41.07), *Canarium subulatum* (39.23), *Irvingia malayana* (21.74), and *Xylia xylocarpa* (19.90) respectively. Fuelwood species most frequently harvested by villagers are *X. xylocarpa*, *S. obtusa, D. tubercalatus* and *C. subulatum* respectively. Villagers mostly want to collect dry branches (78.13%) because they are easily burned (59.38%) and easy to handle (32.81%). Indeed, dry branches are most often collected by villagers (89.06%). The most important source for fuelwood collection is villager rice paddies (45.31%). Approximately 31.25% of respondents reported harvesting fuelwood in Non Chad community forest. An average amount of fuelwood consumed is 4.47 kg/household/day (0.02 m^3/household/ day), while potential fuelwood volume in the forest is approximately 13,578.57 m^3. Currently, community forest rules and regulations of fuelwood collection has no major impact on community fuelwood consumption. However, some of the respondents reported that they had to change the place to gather fuelwood, from the community forest to other places e.g., rice field, orchard, and neigbor's rice field (42.19%).

Key word : Fuelwood

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

Student : Miss Orathai Chaikaeng

Project advisor : Asst. Prof. Adcharaporn Pagdee

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

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

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

Key word : Forest Management

Quantity of Cadmium and Lead in agricultural areas near sanitary landfill of Khon Kaen municipality.

Student : Miss Patcharin Sanpetch

Project advisor : Dr. Lamyai Neeratanaphan

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

This analysis was aimed to study and measure Cadmium (Cd) and Lead (Pb) quantity around agricultural areas: the rice field, sugar cane field and mango plantation near sanitary landfill of Khon Kaen municipality at Ban Kum Bon, Non Thon Sub-district, Khon Kaen Province where are away from the sanitary landfill 200 meter, 20 meter and 20 meter respectively (3 cases for each place) with Atomic Absorption Spectrophotometer Technique.

The study showed that an average Cadmium quantity found in rice field, sugar cane field and mango plantation was 0.5778±0.1271, 0.68707±0.0958 and 0.35±0.0370 ppm respectively while an average of Lead quantity found in those three areas was 16.4167±4.8608, 18.9426±4.6637 and 13.6593±2.0224 ppm respectively. The quantity of Cadmium found in the rice field and sugar cane field was really close to Lead quantity found in those two areas but higher in mango plantation near the sanitary landfill. That meant contamination of these two heavy metals was higher in the farer area from the sanitary landfill than the nearer area because the farer area might be contaminated by blown air from trash burning at the sanitary landfill and by over flown rain. However, the number of these metals found in those three areas was less than the critical level that was 0.1-2 ppm and 1-3 ppm respectively for Cadmium and 0.1-30 ppm and 70-300 ppm respectively for Lead plant-endangering level that was 3-5 ppm for Cadmium and 100-400 ppm for Lead and soil quality standards utilization for reside and agriculture in Thailand that was no more than 37 ppm for Cadmium and 400 ppm for Lead

Nevertheless, in the long term, the number of these heavy metals might be accumulated and passed on human' s food chain through plants and animals . Thus, environmental samples in these agricultural areas should be checked up for further monitoring.

Key word : Cadmium and Lead, Sanitary landfill

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

Student : Miss Daphawan Khamcha

Project advisor : Asst. Prof. Dr. Acharaporn Pagdee

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

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

Key word : Bird Food Plants

Species diversity of birds on Khon Kaen University Campus.

Student : Mr.Tiwa Ong-in

Project advisor : Asst. Prof. Samang Homchuen

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

A survey of species diversity of birds on Khon Kaen University Campus was observed by walking through different habitats as following : natural forest, plantation, wetland, waste water treatment ponds, constructed wetland, agriculture (open area) and residential area.The objectives of the survey was to account a number of species of birds present and record the distribution species of birds in each habitat.The birds survey was carried out during July to September 2004. The survey had done in 21 times and each time was started from 06.00-08.30 am. A total of 35 families 69 species were recorded, which 26 species was seen/heard at natural forest, 27 species was seen/heard at plantation, 38 species was seen/heard at wetland, 44 species was seen/heard at waste water treatment ponds, 18 species was seen/heard at constructed wetland, 42 species was seen/heard at agriculture(open area) and 37 species was seen/heard at residential area. Family *Ardiedae* and Family *Sylviidae* were the most found and Spotted Dove, Zebra Dove, Greater Coucal, Streak-eared Bulbul, Common Tailorbird, Oriental Magpie-Robin, Pied Fantail and Scaly-breasted Munia were found all habitats, 51 species were resident,14 species were non-breeding winter visitor, 3 species were resident and non-breeding winter visitor, and 1 species was passage migrant.The species diversity index (Shannon-wiener species diversity index) was 1.34.

Key word : Birds

Study of glutinous rice quality used in the community distilled alcohol.

Student : Miss Nutjira Thongpak

Project advisor : Dr. Lamyai Neeratanaphan

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

The small industrail enterprise such as One Tumbon One Product (OTOP) seemed to over spend unnecessarily high budget of production . As the result of using wrong choice of raw material and high cost of processing method. By suggesting the use of Cleaner Technology (CT) could improve more processing method and also reducing the waste product that may be harmful to the environment, have reducing the cost of production .

The study will focus on the choice and quality of glutinous rice use in the fermentation of distilled alcohol in the Donhun's Community Cooperative, Amphur Banphang, Khon Kaen province . This community is well recognized in the production of "Inseethong" distilled alcohol by using Kor Kho's .6 glutinous rice . Analysis of alcohol contented from using Kor Kho's. 6 glutinous rice, mixed glutinous rice, Mix of Kor Kho's.6 and mixed glutinous rice and Plaey Khao (broken rice) as raw material revealed 52.8%, 50%, 47.2% and 40% respectively . Aroma and degree of alcohol on distilled alcohol produced from four recipies of mixed glutinous rice revealed no statistic significant efficient ($P>0.05$) . Taste and Tasters's appreciation showed to have statistic significant ($P<0.05$) on the products . Therefore , by suggesting the alternative raw material to be used in the fermentation process by replacing glutinous rice Kor Kho's .6 with mixed glutinous rice for better Cleaner Technology showed lower cost of production with equally good quality distilled alcohol.

Key word : glutinous rice

Study of Comprehension and Participation of Solid Waste separate of Student in Dormitory at Khon kaen University.

Student : Miss Suda Boonyongchaisawad

Project advisor : Asst. Prof. Dr. Pisit Chareonsudjai

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

Study of awareness, comprehension and participation of solid waste separate of student in dormitory at Khon Kaen University. For level of awareness, comprehension and participation of management by random.

The result is first year student from 15 faculty during 17-19 year old mostly know about recycle material center (68.6%) has leave plastic or foam (42.2%) every 3-4 days. Level of awareness and comprehension are well and intermediate. In statistic it difference in women has awareness and comprehension more than men but intermediate and a little participation. Opinion of mostly student is should be used informative advertisement at most (29.1%) and should have separate garbage in everywhere (46.3%) and buying service in dormitory (30.7%) in order.

Key word : Solid waste

The Relationship Between Species Diversity of Birds and the Structure of Dry Dipterocarp Forest : Phu Wiang National Park and Khaonoi-Napang Community Forest , Khon Kaen Province

Student : Miss Phetprakhai Wonkson

Project advisor : Assitant Professor Samang Homchuen

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

This study examines the relationship between species diversity of birds and the forest structure in dry Dipterocarp forest. Ten circular plots were conducted for forest structure analysis on each study site: Phu Wiang National Park and Khaonoi-Napang community forest. Bird species were also observed on each site using Mackinnon list technique. Point count technique was used to determine bird density. Forest structure for both sites is considered open-like canopy. At Phu Wiang National Park site, 44 species of dry Dipterocarp forest were identified of which (*Shorea siamensis* Miq.) and (*Terminalia alata* Heyne ex Roth.) have the highest frequency (100%), (*Shorea siamensis* Miq.) has the highest density (0.04) and dominance (0.00073), ans (*Shorea siamensis* Miq.) also presents the highest importance value (114.74). sventy-six species were found at Khaonoi-Napang community forest. (*Canarium subulatum* Guill.) (100%), (*Gluta usitata* (Wall) Ding Hou) (100%) and (*Memecylon edule* Roxb.) (100%) obtain the highest frequency. (*Memecylon edule* Roxb.) has the highest density (0.0192), while (*shorea obtusa* Wall.) presents the highest dominance (0.00012) and importance value (32.3234). According to Shannon Index, species diversity indices in Phu Wiang National Park and Khaonoi-Napang community forest are 0.9808 and 1.4144 respectively. Sorensen's similarity index between the two forest communities is 0.55. Twenty-seven species of birds (19 families) were observed on the site at Phu Wiang National Park, while 28 species (24 families) were identified at Khaonoi-Napang community forest. Species diversity indices of birds according to Shannon index in Phu Wiang National Park and Khaonoi-Napang community forest are 1.2765 and 1.000 respectively. Soresen's similarity index of birds between the two communities is 0.4. In Phu Wiang National Park, Red Junglefowl presents the highest density (0.06369) while Khaonoi-Napang community forest, Scarlet-backed Flowerpecker has the highest density (0.12653). This study indicates that forest structure relates to a number of bird species observed. Mean while, the forest obtaining high species diversity tends to have large number of birds.

Key word : Dipterocarp Forest

Variation in the wastewater treatment efficiency of KKU constructed wetlands.

Student : Miss Patcharaporn Namtrakulpatthana

Project advisor : Associate Professor Kitti Akamphon

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

Variation of KKU constructed wetlands efficiency in the treatment of wastewater from KKU dormitories was investigated during July and August 2004. The results indicated that effluent DO was increased 62.26 %, Effluent pH from the constructed wetlands was lowered 7.13 – 7.76 and nearer to pH 7 , Temperature of influent and effluent were different. The constructed wetlands had the efficiency to remove 72.69 and 51.43% of BOD and COD respectively. All measured parameters met the effluent standards for industry and industrial complex.

Key word : Constructed wetlands