2nd IDRC-SEARCA Fellowship Plus Conference-Workshop

7-10 January 2015 · Chiang Mai, Thailand

CONFERENCE REPORT

IDRC | CRDI
International Development Research Centre
Centre de recherches pour le développement international

Canada

SEAMEO SEARCA

The Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) is one of the regional research and training centers of the Southeast Asian Ministers of Education Organization (SEAMEO), an intergovernment body founded in 1965 to promote cooperation among Southeast Asian nations through activities in education, science, and culture. SEARCA's programs are designed to accelerate sustainable agriculture and rural development through human resource development, research, technology transfer, and information dissemination. It is hosted by the Philippine Government on the campus of the University of the Philippines Los Baños, Laguna, Philippines. It is supported by donations from SEAMEO member and associate member states, other governments, and various international agencies.

Published by SEARCA, College, Los Baños, Laguna 4031, Philippines
Email: post@searca.org
Website: www.searca.org

2nd IDRC-SEARCA Annual Fellowship Plus Conference-Workshop: Conference Report

First printing, July 2015

Editors:

Maria Cristeta N. Cuaresma
Jesselle S. Laranas

Compilation and Layout by:
Eriza C. Asilo

The publication contains the abstracts and other activities of IDRC scholars during the international conference held on 7-10 January 2015 in Chiang Mai, Thailand. The opinions expressed herein are those of the authors and do not necessarily reflect a consensus of views within SEARCA.

2nd IDRC-SEARCA Fellowship Plus Conference-Workshop

7-10 January 2015 · Chiang Mai, Thailand

CONFERENCE REPORT

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The 2nd IDRC-SEARCA Annual Fellowship Plus Conference-Workshop was the second in a series of three annual fellowship plus conference-workshops under The Southeast Asian Upland Agriculture Fellowship, a five-year (2012-2017) collaborative project of the International Development Research Centre (IDRC) of Canada and the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). The project aims to establish a critical mass of high-quality human resources in Cambodia, Lao PDR, Myanmar, and Vietnam (CLMV) who will serve as catalysts for developing sustainable agriculture programs for upland communities that are generally vulnerable to food insecurity. The annual fellowship conference/workshops intends to foster the fellows' knowledge through information-sharing and learning from high caliber resource persons and by providing firsthand experience in the uplands through site visits.

The first three days of this year's Annual Fellowship Plus Conference-Workshop was merged with the 1st International Conference on Asian Highland Natural Resources Management (AsiaHiLand, see http://www.asiahiland2014.agri.cmu.ac.th/) and was hosted by Chiang Mai University. It was held at the Empress Convention Center, Chiang Mai, Thailand, from 7-9 January 2015. With more than 80 experts from 16 countries who gave presentations on topics that emphasized mountain development in Asia, the Conference highlighted scientific knowledge and innovations that contribute to the development in the uplands.

Dr. Annie Wesley, Senior Program Specialist of IDRC, delivered a keynote address on the "Role of Research and Impact Pathways for Improved Nutrition and Food Security in the Uplands," where she emphasized the need to understand the linkages between food security and nutrition.

Thirty-six IDRC-SEARCA scholars from CLMV, 11 of whom were oral presenters while 7 were poster presenters, participated in the 15 parallel sessions along the following thematic areas: 1) biodiversity and resource management in highland communities, 2) small-holder farmers, cooperatives and networking, 3) food security in highland communities, 4) land use assessment and soil science, 5) water resources and watershed interactions, 6) highland community development, 7) management, market access and commercialization in the highlands, 8) freshwater fish production and animal health, 9) impact of climate change and weather variability on highland agriculture, 10) renewable energy use in mountainous areas, 11) fruit production for international markets, 12) small scale pig and chicken production in highland communities, 13) cereal production in the highlands, 14) ruminant and pastures in highland areas, and 15) post-harvest management of highland products.

The Conference also featured a field tour to the Nong Hoi Royal Project Development Center in Mae Rim, Chiang Mai, which is the flagship project of the Thailand's King noted for its successful efforts in encouraging hill tribe villagers to shift away from growing opium poppies to alternative crops.

On 10 January 2015, the fourth day of the conference, a special session was held where another nine (9) IDRC-SEARCA fellowship grantees presented their thesis proposals before the Project Advisory Committee. Serving as resource person for the special session is former SEARCA Director and now SEARCA Senior Fellow, Dr. Percy E. Sajise.

ORAL PRESENTATIONS

Role of Research and Impact Pathways for Improved Nutrition and Food Security in the Uplands

Dr. Annie S. Wesley

Senior Program Specialist, Agriculture and Food Security
International Development Research Centre (IDRC) of Canada

Keynote

Once abundant in food, many of the upland area are now being known as 'food insecure' with high levels of malnutrition. Communities living in these areas, especially ethnic minorities and poor, are more prone to negative consequences of food insecurity due to the rapidly changing dynamics in land use and agricultural production patterns. Maintaining a diversity of food production and consuming a balanced diet are essential to reduce the risk of food shortages and to ensure food security. At the same time it is important to consider the underlying causes of malnutrition and the multiple pathway to achieve better nutritional status, especially for women and children who are more vulnerable. Priority areas for research emphasize attention to smallholder farming systems, practical business models, integration of gender, and multidisciplinary research that is sensitive to nutritional outcomes. International Development Research Centre has been supporting research to identify local, practical, and affordable agriculture solutions to improve food security and nutrition among smallholder farmers in upland communities. In addition, innovative approaches are being used to enhance local research capacity to develop the next generation of academics, researchers, planners, and policymakers. Improved partnerships and collaboration between researchers, farmers and decision-makers can accelerate food and nutritional security in the uplands and mountainous regions.

THEMATIC SESSION: FOOD SECURITY IN HIGHLAND COMMUNITIES

Food and Nutrition Security of Farming Households with 2-5 Year-Old Children as Influenced by Selected Governance Factors in Chet Borei District, Kratie Province, Cambodia

Mr. Eng Chheanghong
MS Applied Nutrition, University of the Philippines Los Baños

This study determined the food and nutrition security situation in upland area of Chet Borei district, Kratie province, Cambodia, as influenced by governance factors (structure and process). It described the socio-demographic and economic characteristics of household participants, characterized the diet of the farming households and their children (2-5 years old) and classified the children's nutritional status. The primary caregivers of the children were interviewed using a structured survey questionnaire. Diet diversity scores were determined for both household and the children using the 24-hour food recall method. Using the weight-for-age, height-for-age, and weight-for-height indices, the prevalence rates of malnutrition were calculated. In addition, the health status and governance perspective of respondents and key informants were identified.

There were 226 households included in the study. Anthropometric measurements were conducted among 137 children. These samples were selected from 3 clusters of 9 villages with two stages stratified random sampling methods (village and household level). Descriptive statistics were applied to the data collected. The relationship among governance factors, food dietary diversity, nutritional status, socio-demographic and economic characteristics of children from 2 to 5 years old were analyzed using Spearman's correlation coefficients and Cramer's V coefficient based on Chi-square.

Results of the study revealed that only 27.01 percent are underweight, 35.04 percent stunted, 9 percent wasted, and 3 percent severely wasted. While majority of the children were found to be malnourished, individual dietary diversity of the children showed a good result with most children (70.07%) having medium dietary diversity, while 22.63 percent have high dietary diversity, and only 7.30 percent have low food dietary diversity. With respect to household dietary diversity, majority (76.19%) belong to the medium dietary diversity tertile while 14.29 percent and 9.52 percent belong to the high dietary diversity, and lowest dietary diversity tertiles, respectively.

Keywords*: Food and Nutrition Security, Individual Dietary Diversity, Household Dietary Diversity*

THEMATIC SESSION: MANAGEMENT, MARKET ACCESS AND COMMERCIALIZATION IN THE HIGHLANDS

Determinants of Profit Inefficiency among Hybrid Rice Farmers in Central Vietnam

Mr. Ho Trong Phuc
MS Agricultural and Resource Economics, Kasetsart University

Owing to its high yield, hybrid rice can contribute significantly to hunger eradication, poverty reduction, and national food security, especially in Central Vietnam where productive conditions are poor, and cultivated farmland is small and fragmented. However, the rate of hybrid rice adoption is declining in recent years, partly due to its unprofitability. The objectives of this study were to determine the profit efficiency of hybrid rice production and to identify determinants of profit inefficiency using farm-level data. The data was collected from 328 rice farmers in Central Vietnam in the winter-spring season of 2012/2013 by a three-stage stratified random sampling method. Based on profit maximization assumptions, a translog profit function was assumed. The results showed that the average profit efficiency of farmers' hybrid rice production in Central Vietnam was 0.63, indicating the existence of inefficiency. The research found that age, educational level, rice-cultivated area, irrigation, share of rice income, share of hybrid rice area, frequency of training on hybrid rice production, hands-on experience on hybrid rice production, and the topography of farm are robust determinants of profit inefficiency of hybrid rice production among farmers. To enhance households' profit efficiency from hybrid rice production in Central Vietnam, policies to improve educational level, increase training about hybrid rice production, improve irrigation system, and promote high-quality hybrid rice intensive production should be reinforced, especially in the upland areas.

Keywords*: Determinants, profit inefficiency, hybrid rice, Central Vietnam*

Spatial Linkage of Regional Rice Markets in the Philippines

Ms. Nguyen Thi Bich Thuy
MS Agricultural Economics, University of the Philippines Los Baños

The study examined the extent, pattern, and degree of the vertical and spatial integration of regional rice markets in the Philippines. Dynamic time series data of monthly rice prices at three levels: farmgate, wholesale and retail in nine regions from January 1990 to June 2013 were used. A number of econometric techniques were employed to empirically test the integration of pair markets to determine whether the law of one price holds across geographically separated markets and marketing levels. The study had the following objectives: (i) Provide an overview of the rice market in the Philippines; (ii) Investigate the performance of the Philippine rice markets, by a) empirically testing for market co-integration and price transmission between markets across nine selected regions in the Philippines, b) determining the extent, pattern and degree of market co-integration and price transmission, and c) examining the role of Metro Manila in rice arbitrage process; and (iii) Establish the state of rice price information signals among investigating levels as a useful tool into making the correct decision in consumption, production and marketing for all participants of the value chain across regions of the country.

Keywords*: Market integration, co-integration, spatial linkage, price transmission*

Livelihood of Farm Households after Land Revocation: A Case Study in Song Khe Commune, Bac Giang City, Bac Giang Province, Vietnam

Ms. Nguyen Thi Ngoc Thuong
Master of Rural Development Management, Khon Kaen University

This study was conducted in the Song Khe commune where the agrarian households had to cope with a sudden shock of land revocation caused by rural industrialization and urbanization. The cultivated land was transformed into factories, infrastructure and residential areas. The aims of this research were to study changes of farm household assets after the land revocation and to investigate farm-households' coping strategies in order to maintain their livelihoods after the land revocation.

The study was conducted using qualitative methodology. Key informant interview and household survey were implemented. Sample households were purposively selected based on age of household heads. It appeared that percentage land lost for the older households were less than the younger households. Moreover, the selection was also based on farmers' time availability and their willingness to answer the questions. There were 20 households selected for the interview which included 10 household respondents less than 60 years old and another 10 household respondents over 60 years old.

The study revealed that land revocation created changes in household livelihood assets of both groups. Financial and physical assets, as well as education of the household member, increased while land asset and social aspect reduced after land revocation. For all households, after land revocation, people had higher education and skills, better financial status and higher life quality but intra-household and inter-household communication reduced considerably. The priority for using compensation of interviewed households were to save money in bank due to high interest, to invest in children's education, and vocational training. A few families used their compensation as working capital, to build a new house and purchase furniture. However, farmers especially the older farmers did not focus on rice production after land revocation. This was because income from interest earnings were enough to provide additional cash to purchase rice for a small family size. In addition, a few farmers who still planted rice faced pest problems which often damaged their crop. Some farmers started planting herbs to compensate for the rice losses. Results of this research showed that non-farm strategies offered higher incomes than farm strategies. From farming, the households converted to waged work, small business, handicraft, and setting-up rooms for rent. Overall, the livelihood of farm households improved and almost all people were satisfied with the land revocation.

Keywords: *Livelihood, farm household, land revocation*

THEMATIC SESSION: FRESHWATER FISH PRODUCTION AND ANIMAL HEALTH

Apparent Digestibility Coefficients of Selected Feed Ingredients for Black Carp (*Mylopharyngodon piceus*)

Mr. Tran Quang Hung
MS Animal Science, Chiang Mai University

Up to now, little is known about digestibility of nutrients in ingredients used in diets of economically important freshwater-cultured fish, the black carp, in Northern Vietnam. This information is especially needed to improve least-cost diet formulations and to allow effective substitution of feedstuffs. Apparent digestibility coefficients (ADCs) of dry matter, crude protein, lipid, ash and gross energy in fish meal (FM), meat bone meal (MBM), soybean meal (SBM), corn meal (CM), and brewer yeast, *Saccharomyces Cerevisiae* (BY) were determined for black carp *Mylopharyngodon piceus*, at the aquaculture laboratory of the Vietnam National University of Agriculture, using indirect method with chromic oxide (1.0%) as the inert marker. Test diets contained 70 percent reference diet and 30 percent of the feed ingredient. The fish, averaging 10.0 g, were held in 500-L tanks at a density of 10 fish per tank; and feces were collected by manual extrusion. The results indicated that except for ADC of ash, all other ADC of nutrients of the test ingredients differed statistically ($P < 0.05$). ADC values (%) were: 92.62, 79.07, 85.82, 71.17, and 86.82 for crude protein; 80.90, 60.00, 72.77, 54.13, and 70.27 for gross energy; 86.95, 75.20, 84.36, 65.96, and 75.03 for crude lipid; 90.15, 78.42, 82.95, 88.34, and 82.38 for dry matter; 52.61, 56.98, 57.12, 61.85, and 54.45 for ash for FM, MBM, SBM, CM, and BY, respectively. The results of the study can provide useful data for feed formulation.

Keywords*: Black Carp, apparent digestibility, ingredients*

THEMATIC SESSION: IMPACT OF CLIMATE CHANGE AND WEATHER VARIABILITY ON HIGHLAND AGRICULTURE

Impact of Seasonal Weather Variability on Rice Production in Central Highland of Vietnam

Ms. Nguyen Thi Chung
MS Agricultural Systems Management, Chiang Mai University

This study aims to determine the impact of seasonal weather variability on rice production in Nam Dong district, central highland Vietnam. The ordinary least square models were applied to estimate the relationship between three weather factors (including average maximum temperature, average minimum temperature, and average rainfall) and rice yields in two different seasons (winter-summer season and summer-autumn season). Time series data of these variables for the 1986 to 2012 period at district level were taken from the meteorological station and district statistical office. Focus group forums were also conducted to understand rice farmer's perceptions and experiences about the impact of climate variability on their rice production by using timeline trend PRA tool.

It was found that the seasonal rainfall, maximum temperature and minimum temperature at aggregate-level time series had significant effect on rice yields. While seasonal rainfall factor was found to have a positive relationship with rice yields, the seasonal maximum temperature was found to have adverse impacts. The rice yield in the summer-autumn season had no apparent relationship to the seasonal minimum temperature; but this weather variable had a positive impact on the winter-spring rice yield at a statistically significant level. On the other hand, participants in focus group forums belied that many weather events were irregular and unpredictable as indigenous experiences, particularly with droughts tending to occur more frequently which is a disadvantage on rice production. The results of this research may provide local governments information in improving their rural socioeconomic development plans to better assist farmers in reducing weather impacts. It would also help meteorological stations, agricultural and extension units to better communicate the weather information to farmers.

Keywords*: Climate change, weather variability, rice production, rice farmers*

Farmers' Evaluation of Adaptation Options to Climate Pressure on Highland Robusta Coffee Production, Daklak Province, Vietnam

Ms. Pham Thi Thuyen
MS Agricultural Systems Management, Chiang Mai University

Adaptation to changes in temperature and rainfall is a two-stage process, which initially hinges on the farmers' perception of climate variability and then their adaptation strategies. Adaptation evaluation is considered part of a carefully crafted policy based on consciously planned, primarily anticipatory adaptation initiatives, undertaken by individual farmers. It starts with the identification and characterization of adaptation approaches and move towards evaluation of adaptation option's relative merit, superiority or practicability. Evaluative criteria include principally economic dimension, but also relate to different considerations. The objectives of this study were: (1) Evaluate the levels of adaptation options of coffee farms through their effectiveness, economic efficiency, flexibility, farmer implement-ability and independent benefits; (2) Analyze the determining factors impacting the farmers' adaptation level; and (3) Estimate coffee yield and the profitability of farmer groups with different adaptation capacity levels. The study used data from structured interviews with 176 coffee farmers in Ea H'leo District, Daklak Province, Vietnam. The multiple criteria evaluation, unity based normalization and weighted sum methods were employed to assess the farmers' adaptation options. The ordered logit model was used to estimate the relationship between the farmers' adaptation level and their demographic and socio-economic characteristics. For the last objective, the profitability of farmers with different levels of adaptation option for climate pressure were calculated using gross margin analysis. The result of the multiple criteria evaluation indicated that amongst the five evaluative criteria the economic efficiency and effectiveness were assessed to have the highest importance levels. The weighted sum of adaptation options revealed that the level of adaptation is not positively related with the number of adaptation options used by the coffee farmers to adopt to climate pressure. Rather, it depends on multiple considerations. In addition, the findings of the regression model also explained that factors like education, coffee growing experience, coffee farming size, coffee income, non-coffee income, access to credit, access to climate information, access to extension services and irrigation option have statistically significant impacts to choosing adaptation options. Age and gender of the household head were insignificant to adaptation levels. Gross margin analysis reveals that the group with high adaptation level obtained the highest profitability with average of gross margin 74.51 million VND per hectare per year per household by selling coffee at a higher price, adapting efficient irrigation techniques and high knowledge for applying appropriate adaptation strategies for their coffee gardens. The low and moderate adaptation groups gained lower average of gross margins of 24.63 and 68.65 million VND per hectare per year per household, respectively.

Keywords*: Climate change, adaptation evaluation, robusta coffee, Vietnam*

Factors that Impact on Farmers' Adaptation to Drought in Maize Production in Dakrong District, Quang Tri Province, Vietnam

Mr. Uy Tran Cao
MS Agricultural Systems Management, Chiang Mai University

This study assessed maize farmers' adaptation, and the factors that impact on adaptation, to drought in Dakrong district – a highland area of Quang Tri province, Vietnam. The study involved 180 farmers in three communes representing three different topographic and demographic characteristics of the district. Among the most remarkable characteristics of farmers in these areas were high poverty rate, low educational attainment, and low standard of living, with majority (82%) of the total population belonging to an ethnic minority group. In these areas, almost all households depend on maize for human and livestock food and income. However, in recent years, households' maize productivity has been decreasing significantly, with farmers losing over 50 percent of productivity, due to drought. Farmers' adaptation practices to drought were divided in three separate groups, namely: (1) reducing cultivation area; (2) improving cultivation techniques; and (3) combining the two adaptation practices. The percentage of farmers who adapted these measures differed across communes and across ethnic, age, and gender groups. A significant number of farmers (around 25%) did not adapt any coping measure. The analysis of factors affecting maize farmers' adaptation to drought indicated that the years in experience of the household's head, the number of available climate information sources, the access to loans and the drought perception level had positive and significant impact on all of three adaptation option types (P value < 0.05). Whilst, the quantity of agricultural labor and maize productivity in drought years had negative and significant impact on these above adaptation options (P value < 0.05). Other factors such as age and education of household's head, household type and maize productivity in the normal years showed significant and different impacts on each of adaptation measure in the selected households.

Keywords: *Highland area, maize farmer, drought, impact, adaptation*

THEMATIC SESSION: RENEWABLE ENERGY USE IN MOUNTAINOUS AREAS

Socio-Economic Factors Affecting on Jatropha Biofuel Production Adoption on Smallholder Farmers in Upland Area, North Lao PDR

Mr. Khambai Phunthavongsa
MS Agriculture, Khon Kaen University

Since 2006, the government of Lao PDR (Lao People's Democratic Republic) has been vigorously promoting the cultivation of Jatropha, especially in northern area, for biodiesel production and to save on fuel imports. This study aims to assess the socio-economics factors that influence farmers' adoption of Jatropha production. The study used data from 256 Jatropha farmers in Xiengnguen district, Lao PDR. The results indicated that 75 percent of Jatropha farmers have discontinued cultivation of Jatropha mainly because it was not able to provide them with reasonable income. This were attributed to problems in the production coupled with inefficiencies in the government's implementation of the Jatropha program. The farmers experienced lack of support from certain authorities. It was also observed that farmers who have continued Jatropha cultivation were those who had alternative sources of income to maintain non-profitable plantations. With the unsuccessful implementation of the Jatropha program in the upland area of Lao PDR, the expected positive environmental and socio-economic impacts were not realized.

Keywords*: biofuel, Jatropha, socio-economic, adoption and non-adoption, Lao PDR*

THEMATIC SESSION: FRUIT PRODUCTION FOR INTERNATIONAL MARKETS

Banana Farmers' Sustainable Agriculture Behaviors in the Vietnam Uplands: The Case of Quang Tri Province

Mr. Nguyen Van Thanh
MS Sustainable Agriculture, Kasetsart University

The main purpose of this study was to assess the banana farmers' behaviors and to define effective factors that can influence their behaviors towards sustainable agriculture in the Vietnam uplands based on a case study of Quang Tri Province. Multiple sample technique was used to randomly select 300 respondents from two upland districts of the province. A structured questionnaire was used to gather primary data. The results showed that 65 percent of the sustainable practices were not adopted, or adopted on a limited level due to their perceived impracticability. These practices were related to the use of inputs, quality management and commercialization of products, linkage in product consumption, production cooperation, and establishment of a product label. On the other hand, it was observed that 35 percent of the practices had a high rate of adoption because of their perceived feasibility. These practices were related to harvest, product management, indigenous knowledge application, cattle management in fields, crop rotation and weed control without chemicals. The study also revealed a positive correlation between education, economic status, ethnic group, farm size, participation in extension courses, watching agricultural TV programs, credit use, and opinion on feasibility of adopting practices with the sustainable agriculture behaviors.

Keywords*: banana, behavior, upland, sustainable agriculture*

Input and Output Commercialization of Poor and Non-Poor Lychee Farmers in Luc Ngan District, Bac Giang Province, Vietnam

Ms. Bui Hong Quy
MS Agricultural Economics, University of the Philippines Los Baños

The study analyzed the extent of input and output commercialization of poor and non-poor lychee farmers in Luc Ngan District, Bac Giang province, Vietnam. Results showed that both poor and non-poor farmers participated in the input and output markets. Poor households have lower degree of input commercialization than non-poor households, with commercialization index of 25.42 percent and 46.39percent, respectively. Factors that positively influence the degree of input commercialization are sex, age, educational attainment and farming experience of household head, farm size, access to credit and extension services. The price of input and family labor have a negative effect. Non-poor farmers are more market-oriented than poor farmers with output commercialization index of 86.70 percent and 89.2 percent, respectively. Crop yield and price of lychee have positive influence on output commercialization. Household size and distance to output market have negative effect.

Non-poor farmers have higher crop yield than poor farmers, with 11,205 kg/ha and 9,352 kg/ha, respectively. Their farm profit is also higher than that of poor farmers.

The study recommends that poor farmers should be assisted in term of credit services, extension services, upgrading road and information system, and crop insurance support.

Keywords*: Lychee farmers, lychee production, commercialization, lychee marketing, Vietnam*

POSTER PRESENTATIONS

Growth and Productivity of Corn and Peanut Intercrops under Varying Water Management and Plant Spacings

Mr. Nouyang
MS Agronomy, University of the Philippines Los Baños

A field study will be conducted from December 2014 to April 2015 at the University of Philippines Los Baños, Philippines to evaluate productivity and profitability of corn-peanut intercropping under different water management and plant spacings. The study will identify the suitability of cropping levels and the most appropriate intercropping system that can improve productivity and profitability of the given land area. The study will involve two variables, namely: 1) watering schedule (once a week, twice a week; once a week for one month and twice a week thereafter until grain fill period); and 2) corn and peanut spacings (75 cm monocrop corn, 75 cm corn-peanut intercrop, 100 cm corn-peanut intercrop, 125 cm corn-peanut intercrop and 50 cm monocrop peanut). The experiment will be laid-out in strip plot arrangement, with 1) watering schedule to be assigned to the horizontal plots, and 2) corn spacing in vertical plots. Treatment will be distributed in a randomized complete block design with three replications. Corn and peanut plant spacings are 25 cm between hills. According to the crop requirement, the recommended fertilizer application to the experiment design shall be 200 kgha-1 of complete fertilizer (14-14-14) for basal and 100 kgha-1 urea for side dressing. The study will determine the optimal plant spacing and water management in intercropped corn and peanut during dry season cropping.

Keywords: *corn and peanut intercrops, growth and productivity, intercropping systems*

Changes in Soil Properties During 20 Years of Application of Contrasting Quality Organic Residues

Mr. Sisavanh Xayavong
MS Agriculture, Khon Kaen University

This study aimed to assess the effect of 20 years continuous application of contrasting quality organic residues waste on soil chemical property in sandy soil; and to compare the sensitivity of soil chemical parameters to function as indicators of soil quality in terms of reflecting changes in soil properties. The evaluation was conducted at a research station of the office of Agriculture and Cooperatives, Tha Phra sub-district of Khon Kaen, Thailand. A randomized complete block design (RCBD) with three replications were employed. There were five treatments including 1) control (CT), 2) rice straw (RS), 3) groundnut Stover (GN), 4) dipterocarp leaf little (DP) and 5) tamarind leaf + petiole little (TM). Manual weed control was practiced at approximately monthly intervals. Chemical composition parameters of the plant residues used were determined. Ground nut was considered to have a high quality residue with high N and low lignin (L) and polyphenols (Pp) contents. On the other hand, dipterocarp was deemed low quality with its contents of three key chemical compositions in contrast to the groundnut. Meanwhile, tamarind had intermediate quality with its contents of N, L and Pp in a middle range between the groundnut and dipterocarp. Rice straw was considered in a category of its own with low N, L and Pp contents, but it had highest cellulose content. To establish the soil properties, parameters such as the Soil organic carbon (SOC), exchangeable basic cation, soil infiltration rate, soil bulk density (0-15 cm depth), and mean weight diameter (MWD) of water stable aggregates were all determined. Plant residue analyses, consisting of total C and total N by dry combustion (CN analyzer), lignin by acid detergent lignin method (Van Soest and Wine, 1968) and polyphenol (ratio of plant to 50% methanol was 1:50) by the recommended method in the Tropical Soil Biology and Fertility Handbook was also performed. Analysis of variance was employed under RCBD, while mean comparisons of different treatments were done by least significant difference (LSD). Correlation analysis was conducted to study relationships between various factors.

Keywords: *Plant residue analysis, soil chemical property, organic residues, Khon Kaen, Thailand*

Drought Tolerance and Nitrogen Use Efficiency of Upland Rice (*Oryza sativa* L.) Genotypes Grown Under Varying Water and Nitrogen Regimes

Mr. Raby Nget
MS Agronomy, University of the Philippines Los Baños

The objectives of the study are: (i) determine the drought tolerance of upland rice genotypes to drought imposition based on growth and yield parameters; (ii) evaluate the N uptake and use efficiency of upland rice genotypes under varying levels of N application; and (iii) characterize the responses of tolerant rice genotypes to varying water and N regimes based on growth, dry matter partitioning, and yield-determining parameters. Six upland rice genotypes will be used in the experiment to be conducted in a screenhouse at the Crop Science Cluster of the University of the Philippines Los Baños, College, Laguna, Philippines. There will be three experimental variables in this experiment, namely: 1) 6 rice genotypes identified in Experiment I; 2) Three water regimes (FC, 50% FC and 75% FC; and 3) Three N levels (0 kg ha-1 , 60 kg ha-1and 120 kg ha-1). The experiment will be laid out in 3-factorial RCBD with three replications. Six pre-germinated seeds will be sown per pot (1kg soil), and will be thinned out to three seedlings at 14 days after sowing (DAS). Fertilizer rates and watering will be based on treatment schedules, or recommended rate if not available. The data gathered will be analyzed using the computer software Statistical Analysis System (SAS version 6.12). Treatment means comparisons will be done using Turkey's Test at 1% and 5% level of significance. Correlation and regression analyses will be done on selected parameters.

Keywords: *rice genotypes, drought imposition, nitrogen use efficiency and pre-germinate*

Effects of Lactation Period on the Nutrient Content of Milk from Cows Fed with Concentrate-Supplemented Ration

Ms. Pisey Vong
MS Animal Science, University of the Philippines Los Baños

The objective of the research is to determine: (i) the fat and protein content, and amino acid and lipid profile during the progress of lactation; (ii) relationship between milk yield, milk components and body score condition. The research is conducted at the dairy farm of the Dairy Training and Research Institute (DTRI), the University of the Philippines Los Baños, for 305 days of lactation (0-100, 101-201, and 202-305 days). To determine the effect of lactation period on the nutrient content of milk from cows fed with concentrate-supplemented ration, six (6) Holstein Friesian-Sahiwal crosses were used for milk samples collection. The milk samples collection were conducted 14 days after calving for the first recording, and 28 days interval for succeeding recording dates according to the Test Interval Method (Sargent, 1968), a reference method approved by International Committee of Animal Records (ICAR) 2012. Milk samples were collected from both morning and afternoon milking and stored at -80degrees Celsius for the analysis of protein content (Kjeldahl method), Fat content (Gerber method), Amino Acid profile (Pico-tag method) and Fatty acid profile (Gas Chromatography). Furthermore, milk yield, body condition score (BCS), and dry matter intake have also been recorded and determined at each time of sample collections. Fatty and amino acid profile will be calculated as gram and mole per liter of milk while protein and fat content as percentage, respectively. Data result will be analyzed using descriptive statistics, correlation and regression analysis in order to determine if there are significant relationships between one parameter to another.

Keywords: *dairy cows, lactation period, nutrient content, amino acid, fatty acid*

Effects of Concentrate Level Supplementation with the Paper Mulberry as Roughage Source on Growth Performance and Response to Synchronization of Estrus in Lao Native Goats under Upland Area

Mr. Bounthiem Bouasavanh
MS Animal Science, Chiang Mai University

This study aims to evaluate the effect of different concentration levels of paper mulberry as roughage source on the growth performance of Lao native goats. The effect of the different paper mulberry concentrations will also be evaluated with respect to their response to synchronization of estrus in Lao native goats in upland areas.

In the first experiment, 32 female native goats between 1 to 3 years of age and body weight 30±0.5 kg will be randomly assigned to four dietary treatments, namely T1: control (paper mulberry leaves ad libitum); T2: Control with concentrate supplementation 200g/head/day; T3: Control with concentrate supplementation 300g/head/day; and T4: Control with concentrate supplementation 400g/head/day. Goats will be fed two times per day, at 8:30 am and 4: 30 pm. Chemical analysis of paper mulberry leaves and concentrate will be analyzed. Total feed intake, average daily gain (ADG) and digestibility of native goats will be recorded.

The second experiment will focus on the response to synchronization of estrus in Lao native goats. Estrous cycle of does will be synchronized by treating with controlled intravaginal drug release (CIDR) 0.3 g progesterone, for 12 days prior to the start of the nutritional treatments. Estrous behavior will be monitored in the presence of two vasectomized bucks at 08:00 and 18:00 for five days following removal of CIDR devices. Thirty two does will be observed in estrus during five days observation period and will be selected. The goats will be divided into four groups of eight goats per group, by following different levels of concentrate like the first experiment. Weight of does and amount of estrus will be recorded while body condition scores will be assigned (scoring 1–5). Blood samples will be collected for analysis of concentrations of plasma glucose, plasma insulin, plasma protein and hormones progesterone P4, Estradiol E2 concentrate.

Data will be arranged using the randomized complete block design (RCBD) and presented as mean ± SEM. Body weight (BW) and dry matter intake (DMI), ADG digestibility, as well as interval to onset of estrus, and duration of estrus will be evaluated using the analysis of variance (ANOVA). Plasma glucose and insulin, serum P4, and E2 concentrations, and estrous rates will be analyzed. Differences with $P \leq 0.05$ will be considered significant.

Keywords: *Paper mulberry, reproduction, estrous cycle, Lao native goat, estrus synchronization*

Disease Survey of Rice in Lao PDR and Study on Control of Important Diseases

Ms. Pinkham Vongphachanh
MS Plant Pathology, Khon Kaen University

Rice is the most important crop in Laos, being grown on more than 80 percent of the cultivated area. Total annual rice production in 2011 was reported to be 2,525,445 tons during wet season and 540,315 tons during the dry season. The most popular rice varieties are waxy rice glutinous variety, Thasano1 (TSN1) and Thadokkham 1 (TDK1) planted in low land area; and Kai Noy Leuang (KNL) in upland area.

Rice disease is a factor that limits rice yield in Lao PDR. Many diseases were reported in the country both in lowland and upland areas. In the lowland areas, blast (*Pyricularia oryzae*), bacterial leaf blight (*Xanthomonas campestris*), Bakanae disease (*Fusarium moniliforme*), brown spot (*Helminthosporium oryzae*), false smut (*Usitilaginoidea viens*), foot rot (*Erwinia chrysanthemi*), narrow brown leaf spot (*Cercospora oryzae*), sheath blight (*Rhizoctonia solani*), sheath rot (*Sarocladium oryzae*), and stem rot (*Helminthosporium sigmoideum*) were most prevalent. For upland rice, bacterial leaf blight and sheath blight, have also been recorded aside from blast, brown spot, narrow brown leaf spot, sheath rot and stem rot. The most important diseases are rice blast, brown spot and bacterial leaf blight. However, there is no study focused intensively on the control of those diseases in Lao PDR. Therefore, the objectives of this study are: (1) to survey and collect samples of rice plants with diseases in Lao PDR; (2) identify the causal agents of the rice disease; and (3) study the effective methods for controlling the important rice diseases.

The rice diseases are to be surveyed and collected in six provinces. The disease samples will be diagnosed and causal agents will be identified microscopically and isolated for pure cultures. The effective control methods will be tested on the selected pathogens, i.e. biological control, induced disease resistant by using antagonistic microorganisms, resistant variety and also chemical control. This project will provide the appropriate methods for improving rice production in Lao PDR.

Keywords: *Rice variety, diseases of rice, control, important diseases*

Agronomic and Yield Response of Three Upland Rice Varieties to Varying Bio-N and Inorganic Nitrogen Fertilizer Combination in Ratanakiri Province, Cambodia

Mr. Sophal Var
MS Agronomy, University of the Philippines Los Baños

Rice is the major crop and staple food of rural upland and resource-poor farmers of Cambodia. However, the National Committee for Sub-national Democratic Development reported a decreasing trend in rice production in the area, despite the relatively constant hectarage planted to rice. This study is conducted with the objectives of understanding the present upland rice production practices in Ratanakiri province, identify sources of yield gaps and to study different production options for increasing upland rice productivity and income.

To identify yield gaps, 90 farmers from Lum Chaor commune, Ou Ya Dav district were randomly selected and individually interviewed about their production practices. Given the preliminary results that the farmers' general practice was to save a portion of their previous seasons' harvest for planting in the succeeding cropping season, and doing this continuously over the years, we tested the quality (purity, germination, and seedling vigour) of seed stocks from 10 farmer respondents at the seed technology laboratory of UPLB. Results indicate about 50 percent of the seeds tested had lower than 80 percent germination and none of those have above seed vigorous standard (70-80% medium and 81% or above for high vigorous), suggesting that poor quality of seeds contribute to low and further declining yields.

On farm trials to test the agronomic and yield response of three upland rice varieties (most dominant farmers' variety and two improved upland varieties) were grown under five fertilizer combination treatments (using no N fertilization, Bio-N alone and in combination with inorganic fertilization and the recommended inorganic fertilizer). A result of these trials is expected to provide farmers technology-based production options that could potentially improve their current yield and income levels.

Keywords: *Upland rice, Bio-N, inorganic nitrogen, yield, Ratanakiri*

SPECIAL SESSION

Effects of Birth Weight and Colostrum Intake on Mortality and Growth Performance of Piglets in Cross Breed and Thai Native Pigs

Ms. Chanhmany Souphannavong
MS Animal Science, Chiang Mai University

Intake of colostrum after birth is essential to stimulate intestinal growth and function, and to provide systemic immunological protection via absorption of Immunoglobulin G (IgG). The objective of this study is to evaluate the effect of colostrum intake on mortality and growth performance of piglets until 35 days of age in cross breed and Thai native pigs, taking into account the birth weight. Colostrum intake from birth to 24 hours after birth will be estimated in 200 piglets. The birth weight piglets will be divided in three groups namely high birth weight (HBW), medium birth weight (MBW), and low birth weight (LBW) and piglets will be weighed again 24 hours after farrowing, and at 7, 14, 20, 28 and 35 days of age. Colostrum yield by the sow will be calculated as the sum of intakes from each piglet within a litter during the 24 hours following the onset of parturition. Colostrum sample will be collected manually from each sow across all teats at TO, T6, Tl 2, Tl8, T24 and T48. The blood samples from sows will be collected after the end of farrowing (6 hours after farrowing onset). Blood samples of the piglets will be obtained at three time points: 23:30 hours after birth (before cross-fostering), at 10 and 20 days of age. The concentration of serum immunoglobulin G (IgG) will be determined in the sows after the end of farrowing and in piglets before cross-fostering (24 hours after farrowing), at 10 and 20 days of age.

Keywords: *Colostrum, piglet growth and development, mortality, growth performance*

Effect of Varying Levels of Dietary Fiber Fractions on Energy Value of Feeds, Nutrient Digestibility and Growth Performance in Broilers and Pigs

Mr. Putheany Ung
MS Animal Science, University of the Philippines Los Baños

This research aims to determine the effect of varying levels of dietary fiber fractions on energy value of feeds, nutrient digestibility and growth performance in broilers (Study 1) and growing pigs (Study 2). In Study 1, the objective will be to determine the apparent total tract digestibilities (% ATTD) of dietary fiber in cassava meal (CM) and tapioca pellet residue (TPR) and to determine the relationship of these values to their apparent metabolizable energy (AMEn) in broilers. A total of 60 day-old male (Cobb 500) broilers will be group-brooded and fed a common diet for 12 days. On day 13, birds will be placed in metabolic cages and then randomly allotted to one of five dietary treatments (corn-SBM, 100% TPR, 25% CM:75% TPR, 75% CM:25%TPR, and 100% CM) using a completely randomized design. There will be 12 replicate cages per treatment with 1 bird each cage. The experimental period will consist of 7-day adaptation and 3-day collection. Total collection of excreta will be performed every 24 hours for 3 days, and then pooled within a cage, weighed, and stored at -20 degrees Celsius for subsequent analyses. In Study 2, the objective will be to determine the effect of diet lignocellulose on ATTD of nutrients, fecal quality scores, caloric efficiency and growth performance in growing pigs. A total of 72 and 6 growing pigs (initial BW: 25 kg, Duroc-Pietrain × Landrace-Yorkshire) will be used in a 21 day growth assay (Exp. 1) and digestibility experiment (Exp. 2), respectively. In Experiment 1, pigs will be blocked by initial weight and gender and randomly allotted to 1 of 3 dietary treatments (negative control [NC], NC + 0.5% Lignocellulose, and NC + 1.0% Lignocellulose). There will be six replicate pens per treatment with four pigs per pen. Initial and final weight of pigs and daily feed allotment will be recorded to calculate for ADG, ADFI, and G:F. Fecal quality scores will be collected for each pen in the last week of the study. In Experiment 2, pigs will be individually-penned and arranged using a replicated 3 × 3 Latin square design. The same diets in Experiment 1 will be used except that 0.35 percent chromic oxide will be added as an inert marker. Each experimental period will consist of 3-day adaptation and 3-day collection. Grab samples of fresh feces from each pig will be collected daily during the collection period. Diet and fecal samples will be analyzed for proximate, GE, NDF, and ADF to calculate for ATTD. Data will be analyzed using the MIXED procedure of SAS for both Study 1 and 2.

Keywords: *Dietary fiber fractions, swine nutrition, swine production*

Sustainable Source of Food from Upland Slash and Burn Farming in Northern Lao PDR

Ms. Sonemany Pathumphone
MS Agronomy, Khon Kaen University

Population has been growing continuously in many remote areas in Lao PDR, and the government's land allocation policies that limit the upland slash and burn farming have caused problems to the farmers' livelihood and food security. Despite the negative perception about slash and burn farming, local upland communities have adopted sustainable agricultural practices including fallow improvement, weed management and using traditional upland varieties with stable yields. In this system, which is part of the local knowledge and practices, upland rice is planted as the major crop while maize and job's tears were intercropped with sesame, corn, millet, sorghum, and other vegetables (cucumbers, chili, pumpkin, eggplant). At the same time forest fallows such as wild vegetables, tubers, herbal, mushrooms, bamboo shoots, aquatic animals, wild mammals were also harvested by the upland people for food. The study evaluated non-timber forest products (NTFP) and integrated farming in the Soiuy (Vienxay) village, and their significance in attaining food security in the uplands.

Crops production activity in upland slash and burn farming system has influenced non-cultivation or NTFPs as it provides about 47 percent of cultivated food and income and about 53 percent of non-timber forest product to the respondents. Slash and burn agriculture created the diversity of landscape to the mosaic of secondary forest. By increasing the diversity in the forest ecosystem, a diversity of free food sources is created from the forest Moreover, local communities have also developed an "intermediate" forest management system.

This study has shown that the forest landscape diversity affects the main sources of food income and household nutrition.

Keywords: *Slash and burn agriculture, non-timber forest products, wild food, nutrition, biodiversity, food security, sustainable upland agriculture*

The Study on Marketing System of Cassava in Sala Krau District, Pailin Province, Cambodia

Ms. Chheun Sreyneang
MS Agricultural Economics, University of the Philippines Los Baños

Cassava is an important upland crop in Cambodia's farming system grown after rice and before maize. The cassava commodity market is growing and productions are significantly expanding in many provinces. Pailin is an upland part of Cambodia which has a good potential for growing cassava as main livelihood for small farmers. However, the present marketing system of cassava is still inefficient characterized by limited marketing infrastructure such as transportation, storages and processing facilities. With this, cassava producers are forced to sell their produce at lower prices to avoid future losses resulting to lower income. This study therefore aims to describe the socio-economics of cassava marketing players and the marketing channels of cassava; to analyze the marketing cost and margin of different players in the cassava marketing; to determine efficiency of cassava marketing and identify problems and/or constraints affecting the marketing of cassava; and to recommend improvements in cassava marketing in Sala Krau district, Pailin province. The primary data will be collected through a marketing channel survey, group discussion and structured questionnaires. A total of 80 cassava farmer's respondents will be randomly selected from Sala Krau district, Pailin province, while other participants will be traced from the production level up to consumption level. The analytical procedure included descriptive analysis, cost and return analysis, marketing margin analysis and marketing efficiency. The expected outcomes of the study is essential to explore the marketing channels and recommend policies to reducing the marketing cost and simultaneously increase farm gate price received by farmers.

Keywords: *Cassava production, marketing, small holder farmers, Pailin province*

Economic Analysis of Land Use of Small Holder Farmers: Case Study in Tuen Commune, Koun Mom District, Ratanakiri Province, Cambodia

Ms. Thoung Sodany
Master of Rural Development Management, Khon Kaen University

In northeastern Cambodia, concerns over struggle for land are becoming increasingly serious due to the hasty and unplanned economic land concession being granted to foreign investors. While the state is trying to remedy the situation, local farmers are currently seeking possible ways of farming, in the form of land certification. Recently, the growing indigenous population, coupled by an inflow of migrant laborers working for foreign investors' plantations, have caused the household land sizes to shrink disproportionately. These issues prompt a qualitatively-based research to be conducted, with the aim of exploring the diversity of land use by small holder farmers, analyzing costs and benefits of land use by small holder farmers, and determining potentials and constraints on farm land use. This research will be carried out in Tuen Commune, Koun Mom District, Ratanakiri Province, by interviewing 60 farmers classified into three groups of 20 households each, based on varied land use and farming practices. Semi-structured interviews and focus group discussion will be conducted to properly evaluate land use effectiveness.

Keywords: *Northeastern Cambodia, land certification, farming system approach, constraints*

Impact of Flash Flooding on Agricultural Livelihoods and Food Security in Upland Areas: A Case Study of Rice Production in Kasi District, Northern Laos

Mr. Phomma Thammavong
Master of Rural Development Management, Khon Kaen University

In Laos, rice production has been a main livelihood in the rural area for several centuries now. Rice production, whether lowland or upland, depend very much on natural conditions, such as rain. While nature brings much benefits to rice production, it can also bring obstacles, as with farmers experiencing consequences of natural disasters such as drought and flooding. In particular, farmers in Northern provinces are extremely vulnerable from flash flooding since most lowland rice production are located along the rivers, between mountains and valleys. This has a direct impact in the livelihood and food security in area.

This research has four main objectives, namely: (i) to describe the impacts of flash flooding on rice production in upland areas of Laos; (ii) to explore how consequences of flash flooding on rice production has been affecting the livelihoods and food security of the population; (iii) to compare the impacts of flash flooding on rice production on livelihoods and food security of different groups of affected households; and (iv) to understand how affected populations cope with the consequences of flash flooding.

The study will be conducted in the Kasi district of Vientiane province, northern Laos and field data collection will be conducted in a lowland rice production village that has experienced flash flooding in the last rainy season. The combined quantitative and qualitative approach will be applied in this study: a semi-structured household questionnaire will be administered to 40 affected households and 15 households will be selected for an in-depth interview. Key informant interview with relevant government agencies, chief of the village and development organizations (NGOs) will likewise be conducted.

Keywords: *Flash flooding, agricultural livelihoods, food security, upland areas, Kasi*

Applying Precision Agriculture (Variable Rate Technology) in Paddy Terrace Farming System

Mr. Zaw Zaw Htet
MS Agricultural Engineering, University of the Philippines Los Baños

In the twenty-first century, the prime objective of agricultural sector is not only to attain the targeted yields but also to preserve the environment and natural resources. The production of quality agricultural products is also important to ensure that food is safe to consume. Developing countries - including Myanmar - should also start adopting precision farming in their agribusiness because it aims at maximum production efficiency with minimum environmental impact. Rice is the staple food and major crop not only in Myanmar but also in other Southeast Asia countries. Therefore, this study, intended for upland farmers, will undertake site-specific crop management instead of whole-field management to use inputs efficiently and timely, and eventually maximize the profits and minimize the waste in paddy cultivation. The study will optimize field-level management with regard to crop science (by matching farming practices more closely to crop needs), environmental protection (by reducing environmental risks and footprint of farming), and economics (by boosting competitiveness through more efficient practices). The general objective of this study is to improve agro-informatics with management and analysis of collected agricultural data and to set-up a sustainable rice production system for upland communities of Myanmar and Southeast Asia.

To achieve its objectives, the study aims to collect data for soil texture, structure, organic matter, depth to constraints, water holding capacity, pH, electric conductivity (EC) and nutrients using DGPS to help locate the exact position in paddy field and to implement soil mapping system and elevation mapping for paddy field; gather crop information with crop growth measuring device (Crop Eye); and apply inputs such as fertilizer and pesticides precisely according to crop growth, soil fertility, crop disease and pests with the adoption of variable rate applicator.

Keywords: *Precision agriculture, sustainable agriculture, rice production, Myanmar*

Ethanol Fuel Production from Waste of Sugarcane

Ms. Khine Myat Swe
MS Agricultural Engineering, University of the Philippines Los Baños

Ethanol fuel is a renewable source of energy and is a cleaner alternative to fossil fuels. Production of ethanol is growing day by day at a great extent for its versatile application and demand. During recent years, production of ethanol by fermentation on a large scale has been of considerable interest to meet increased demand.

Fermentation is a biological process in which sugars such as glucose, fructose, and sucrose are converted into cellular energy and thereby produce ethanol and carbon dioxide as metabolic waste products. It has long been recognized that molasses from sugarcane or sugar provides suitable substrates for ethanol production. Production of ethanol by fermentation of molasses is simulated for this research.

Ethanol is obtained by the fermentation process where the sugar content in juices and honey of crops are transformed into alcohol using yeast. Though ethanol can be produced by different process fermentation is mostly feasible for countries like Brazil where sugar cane is produced at a large extent. Ethanol production can largely be increased if fermentation process is updated.

The objective of the present study is to produce ethanol from final sugarcane molasses and to evaluate its quality. Urea will be used as nitrogen source and will be added at different concentrations to the molasses mash. Experiments will be conducted using four treatments depending upon molasses sugar concentration which is calculated as percentages 10, 15, 20 and 25 (w/v).

Keywords: *Ethanol fuel, renewable energy, sugar cane molasses*

Impacts of Rubber Farming on Farmers' Food Insecurity and Coping Strategies, Oudomxay Province, Lao PDR

Mr. Xayasinh Sommany
MS Agriculture Systems Management, Chiang Mai University

Traditional upland agricultural practices and shifting cultivation play important roles in food security and social welfare for many households in the Northern part of Lao PDR. Nowadays, more and more agricultural areas have been transformed into rubber plantations. While this has reduced shifting cultivation and increased income, it also resulted to a decrease in agricultural land for food crop production such as upland rice, thereby affecting food security for many households. Hence, the objectives of this study are: a) To assess impacts of cropping system changes on food insecurity; and b) To identify the coping strategies for food security. This study employed participatory rural approach (PRA) method to investigate and assess the impact of the shift to rubber plantation on livelihood and food insecurity at the household level. Focus group discussion and key-informant interviews were conducted to find out the location of farm, district socio mapping, key indicators of food insecurity, and the number of farmers for each farm types. Criterion-based sampling method was used to select the sampling size of 60 households in each farm type. Results from this study revealed that the decline in land area for upland rice, paddy rice field, maize, job's tear, wild vegetables and livestock raising affected food security, household welfare and loss in diversity of wild vegetables for long term utilization in this region.

Keywords: *Upland rice, rubber, food security*

FIELD TOUR
&
SPECIAL SESSION

FIELD TOUR

The participants visited the Nong Hoi Royal Development Center located in Nong Hoi Kao village in Mae Raem during the 3rd day of the Conference.

Also known as The Royal Project, it is an initiative of Thailand's King noted for its successful efforts in encouraging hill tribe villagers to shift away from growing opium poppies to alternative crops. Among the royal development centers under the Royal Project, the Nong Hoi Royal Development Center in Chiang Mai province has become one of the largest Royal Project sites. It began its operation in August 1984 and focuses on research and development of technology aimed at enhancing the well-being and self-sufficiency of the communities in the highlands.

The Royal Project held the distinction of receiving the Ramon Magsaysay Award for International Understanding in 1988 and the Colombo Plan Award for distinguished service in efforts to combat the drug problem in the Asia Pacific region in 2003 among others. Fruit trees and other plants grown in this area include Japanese apricot, peach, plum, avocado, strawberries, grapes, passion fruit, and coffee. Among the decorative plants are pansies, hydrangea, and dusty miller.

SPECIAL SESSION

A one-day special session was devoted to scholars who were not able to present during the Conference. Nine IDRC-SEARCA scholars presented their research proposal before the project Advisory Committee members namely Dr. Vo-Tong Xuan of Vietnam, Dr. Mom Seng of Cambodia and Dr. Prasit Wangpakapattanawong of Thailand. Dr. Annie Wesley represented IDRC while former SEARCA Director and now SEARCA Senior Fellow Dr. Percy E. Sajise served as resource person. Facilitating the special session is Dr. Maria Cristeta N. Cuaresma, Project Leader for The Southeast Asian Uplands Agriculture Fellowships.

Devoting a one-day special session to scholars who were not able to present at the Conference proved beneficial since the scholars were able to get feedback from the project's Advisory Committee regarding their research work. As resource person, Dr. Sajise gave insights on improving the scholars' presentation skills.

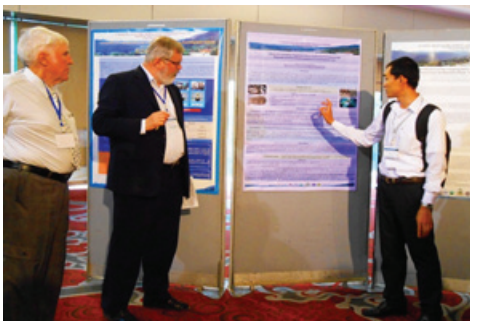
Dr. Vo Tong-Xuan urged the scholars to take advantage of the opportunities to collaborate and do research that will impact their own communities. Dr. Seng expressed her enthusiasm in working with the scholars in future projects and seeing their individual contributions in their chosen sector, whereas Dr. Sajise advised the scholars to use every window of opportunity not only for their professional growth but also in helping others who may need it. Dr. Prasit noted a lot of improvements from the ongoing scholars based on how they present themselves and the look of determination from the new ones.

Chosen as a representative of his fellow scholars, Mr. Eng Chheanghong, one of the first batch of awardees from Cambodia, urged his colleagues to foster the existing network of the IDRC-SEARCA community and to impart their knowledge and skills to their own communities as a graduate of upland agriculture. As a parting message, Dr. Wesley extended her gratitude and encouraged the scholars to serve as catalysts of change in their home countries.

PICTURES

Conference Day 1

Conference Day 2



Field Trip

Special Session

ANNEXES

ANNEX A. CONFERENCE PROGRAM

Conference Program

January 7th, 2015

08:00 Registration

09:00 Opening Ceremony, chaired by Prince Peesadej Ratchanee

09:30 Keynote by Prince Peesadej Ratchanee, President of Royal Project Foundation or representative: "The Royal Project Foundation: The Starting Point of Highland Development in Thailand."

10:00 Keynote by Prof. Dr. John Lindsay Falvey, Melbourne University, Australia: "Sustainable Development in the Thai Highlands; the experience of the Thai-Australian Development Project."

10:30 Group photo

10:45 Coffee break

11:00 Keynote by Prof. Dr. Pongsak Angkasith, Former President of Chiang Mai University: "Role of Faculty of Agriculture and Chiang Mai University in Highland Agricultural Development"

11:30 Keynote by Prof. Dr. Joachim Müller, University of Hohenheim, Germany: "Technological innovations in tropical highlands"

12:00 Lunch break

13:00 Thematic session part 1 (4 parallel sessions)

15:00 Break

15:30 Thematic session part 2 (4 parallel sessions)

17:30 Break

18:30 Conference dinner

January 8th, 2015

08:00 Registration

09:00 Keynote by **Dr. Annie Wesley** International Development Research Centre, Canada: "Role of Research and Impact Pathways for Improved Nutrition and Food Security in Uplands"

09:30 Keynote by **Dr. Siripong Hungspreug**, Director of Highland Research and Development Institute

10:00 Coffee break

10:30 Poster session

11:30 Lunch break

13:00 *Thematic session part 3* (4 parallel sessions)

14:40 Break

15:10 *Thematic session part 4* (3 parallel sessions)

17:30 Closing Ceremony

January 9th, 2015: Conference excursion

08.30 Departure from the Empress Hotel

10:00 Visit to Nong Hoi Royal Project Development Center

12:30 Lunch

13:30 Visit to Mon Cham Mountain View Point

15:30 Back to the Empress Hotel

Thematic session 1: Wednesday, 7th of January 2015

1.1 Biodiversity and resource management in highland communities

13:00:00	1	**Shinji Fukuda**	Data-driven modelling for agricultural sciences
13:20:00	2	Peter Hoare	Community networking for improved highland fire management
13:40:00	3	Renezita Sales-Come	Community-Based Forest Management and Biodiversity Conservation Strategies in Dipterocarp Forests in Silago, Southern Leyte, Philippines
14:00:00	4	Jarunee Pliumwong	Local Biodiversity Restoration for Food Bank in the Highland Community
14:20:00	5	Taparat Seeloy-ounkeaw	Carbon Storage Potentials in Highland Community Forests, Northern Thailand
14:40:00	6	Korawan Sringarm	An overview of medicinal and aromatic plants from Northern Thai Highland areas with potential for greenhouse cultivation

1.2 Small-holder farmers, cooperatives and networking

13:00:00	7	**Horst Weyerhäuser**	Adaptation strategies of farming communities in Central Asian mountains
13:20:00	8	Anthony Walker	As it Used to Be: Farming Strategies in a Lahu Village Half a Century Ago
13:40:00	9	Joshua Ringer	Small-Holder Farmer Experience and Strategies Rebuilding Food Production Ability in Resource-Poor Post-Conflict Upland Farming Communities in Myanmar
14:00:00	10	Huyen Le Thi Thanh	Motivation for cooperative group membership of local pig producers in the northern mountains of Vietnam and their response to market changes
14:20:00	11	Nathitakarn Pinthukas	Farmers' Perception and Adaptation in Organic Vegetable Production for Sustainable Livelihood in Chiang Mai Province
14:40:00	12	Kazuo Ando	An Agro-networking society in the eastern Himalayan Highland: A case of Monpa Model of Arunachal Pradesh, India

1.3 Food security in highland communities

13:00:00	13	**Jochen Weiss**	Novel approaches to structure agricultural raw materials to create value-added food products
13:20:00	14	Panomsak Promburom	Multi-level Assessment of Food Insecurity in Chiang Mai Province
13:40:00	15	Budsara Umniranikul	Building Local Capacities in Natural Resources Management for Food Security in Highland of Northern Thailand
14:00:00	16	Budsara Umniranikul	Community Participation in Developing and Assessing Household Food Security in the Highlands of Northern Thailand
14:20:00	17	Prasit Wangpakapattanawong	Agroecology, food security, and nutrition in the highland of northern Thailand
14:40:00	18	Chheanghong Eng	Food and Nutrition Security of Farming Households with 2-5 Years Old Children as Influenced by Selected Governance Factors in Chet Borei District, Kratie Province, Cambodia

1.4 Land use assessment and soil science

13:00:00	19	**Karl Stahr**	A new detailed soil map of northwestern Thailand as an important source for planning sustainable landuse
13:20:00	20	Melvin Lippe	An integrated assessment to simulate the potential **future impact of** land-use change on above-ground carbon in Moun**tainous Northern** Thailand
14:20:00	21	Chalermpol Samranpong	Assessment of THEOS and Landsat 5 TM Satellite **Images on** Highland Agricultural Land Use Monitoring
14:00:00	22	Benchaphun Ekasingh	Scenario analysis for multiple goal achievement of **sustainable** agricultural land use in Northern Thailand
13:40:00	23	Suwimon Wicharuk	Influence of local agricultural practices on soil pro**perties under different land use types in Northern Thai Highlands**
14:40:00	24	**Randa Shirigachi**	**Effect of hot water soil sterilization on soil physical properties of aggregated volcanic ash soils.**

Thematic session 2: Wednesday, 7th of January 2015

2.1 Water resources and watershed interactions

15:30:00	25	Wolfram Spreer	Irrigation in highland areas
15:50:00	26	Shinya Takeda	Changing Land Use and Water Management in a Ladakhi Village of Northern India
16:10:00	27	Soontorn Khamyong	Roles of Agroforest Ecosystems on Water Storages in Highland Watershed, Northern Thailand
16:30:00	28	Chanchai Sangchyoswat	Evaluation of Water Use Efficiency in Highland Watershed Area
16:50:00	29	Yutaka Matsuno	Water Environment of Agricultural Reservoirs in Nara Basin, Japan
17:10:00	30	Taweesak Viyachai	Development of cut chrysanthemum production in two soilless systems

2.2 Highland community development

15:30:00	31	Pepijn Schreinemachers	Too much to handle? Pesticide exposure in commercialized upland agriculture in Southeast Asia
15:50:00	32	Nobumasa Hatcho	Establishment of sustainable water management through the participation of local resource users
16:10:00	33	Patrick Artur Groetz	Rural Innovations and Their Impact in Southeast Asian Mountains - the Case of the Nabanhe National Nature Reserve in Yunnan, Southwest-China
16:30:00	34	Vera Tekken	Impacts of societal transformation on land management in traditional mountainous rice landscapes in Vietnam and the Philippines
16:50:00	35	Joan Bastide	Vulnerability assessment of mountain communities in Lao PDR: towards a framework for action
17:10:00	36	Tinnarat Pitakpongjaroen	Optimal Production Systems in Highland Community in Chiang Mai Province

2.3 Management, market access and commercialization in the highlands

15:30:00	37	Benchaphun Ekasingh	Recognition of Highlanders' Diversity as a Strategy for Sustainable Highland Development
15:50:00	38	Azamat Azarov	Improved management potential for small-scale farming systems in the Tien Shan Mountains of Kyrgyzstan
16:10:00	39	Trong Phuc Ho	Determinants of Profit Inefficiency Among Hybrid Rice Farmers in Central Vietnam
16:30:00	40	Thuy Nguyen	Spatial linkage of regional rice markets in the Philippines
16:50:00	41	Panitpim Sittisak	Trade-offs between the Economic, Social and Environment Objectives in Optimal Resource Management in the Fang Watershed, Chiang Mai Province, Thailand
17:10:00	41a	Nguyen Thi Ngoc Thuong	Livelihood of farm households after land revocation: A case study in Song Khe commune, Bac Giang city, Bac Giang province, Vietnam

2.4 Freshwater fish production and animal health

15:30:00	42	Chanagun Chitmanat	Upland Aquaculture in Thailand
15:50:00	43	Worawit Maneepitaksanti	First record of ectoparasite for Siamese bat catfish (*Oreoglanis siamensis*, Smith, 1933) from the Inthanon Mountain, Chiang Mai, Thailand
16:10:00	44	Warren Come	Ethno-veterinary practices in marginal upland areas in Inopacan Leyte, Eastern Visayas, Philippines
16:30:00	45	Intira Intarak	Effects of Slaughter Weight on Carcass and Meat Characteristics of Punga Fish (*Pangasius bocourti* Sauvage)
16:50:00	46	Autchara Kayan	Effects of Slaughter Weight on Carcass and Meat Quality of Nile Tilapia (*Oreochromis niloticus*)
17:10:00	46a	Tran Quang Hung	Apparent Digestibility of Selected Feed Ingredients for Black Carp, *Mylopharyngodon piceus*

Thematic session 3: Thursday, 8th of January 2015

3.1 Impact of climate change and weather variability on highland agriculture

13:00:00	47	Attachai Jintrawet	Climate variability and seasonal crop yield forecast in Thailand
13:20:00	48	Kanita Ueangsawat	Fate of ENSO phase on Upper Northern Thailand, a case study in Chiang Mai
13:40:00	49	Chung Nguyen Thi	Impact of seasonal weather variability on rice production in central highland of Vietnam.
14:00:00	50	Thuyen Pham Thi	Farmers' Evaluation of Adaptation Options To Climate Pressure On Highland Robusta Coffee Production, Daklak Province, Vietnam
14:20:00	51	Uy Tran Cao	Factors Impact on Farmers' Adaptation to Drought in Maize Production in Dakrong District, Quang Tri Province, Vietnam

3.2 Renewable energy use in mountainous areas

13:00:00	52	Xiongkui He	Status of new energy crop planting in China
13:20:00	53	Khambai Phunthavongsa	Socio-economic factors affecting on Jatropha biofuel production adoption on smallholder farmers in upland area, North Lao PDR
13:40:00	54	Melvin Lippe	Using a life-cycle assessment approach to examine the potential of rubber seeds as new biodiesel feed stock source
14:00:00	55	Matthias Inthachot	Use of hydraulic ram pumps for irrigation in remote highland areas
14:20:00	56	Wolfram Spreer	Properties of bio-char from different feedstock produced in a low cost kiln

3.3 Fruit production for international markets

13:00:00	57	Daruni Naphrom	Improvement of Coffee Production of Small-scale Farmer on Highland, Om-koi District, Chiang Mai Province, Thailand
13:20:00	58	Nudee Charoenkit	Modeling the relationship between hormone dynamics and off-season flowering of litchi by using Random Forests
13:40:00	59	Van Thanh Nguyen	Banana farmers' sustainable agriculture behaviors in the Vietnam uplands: the case of Quang Tri Province
14:00:00	60	Marcus Nagle	Research and development of sorting technologies for mango fruit
14:20:00	61	Quy Bui Hong	Input and Output Commercialization of Poor and Non-Poor Lychee Farmers in Luc Ngan District, Bac Giang Province, Vietnam

3.4 Small scale pig and chicken production in highland communities

13:00:00	62	Sanchai Jaturasitha	Native Chicken as a Potential Protein Source in the Highland of Thailand
13:20:00	63	Jinda Gilnoubol	Effects of Crossbred on the Carcass and Meat Quality of Thai Native or Duroc with Pietrain Pigs
13:40:00	64	Kerstin Schoell	The influence of intervention projects on pig production marketing groups in Vietnam
14:00:00	65	Philipp Muth	Carcass grading for local Vietnamese Ban pigs and its potential for a quality feedback system in a short food supply chain
14:20:00	66	Watchara Laenoi	Phenotypic Characterization and Farm Management of Indigenous Chicken Reared in Highland Region of Phayao Province

Thematic session 4: Thursday, 8th of January 2015

4.1 Cereal production in the highlands

15:10:00	67	Chanakan Prom-u-Thai	Variation of grain nutritional quality among Thai purple rice genotypes grown at different locations
15:30:00	68	Janjira Rungcharoen	Rice Research and Development in Highland Communities
15:50:00	69	Nobutaka Ito	Rice is a Strategic Key Resource for ASEAN Economic Community
16:10:00	70	Shinji Fukuda	Application of Random Forests for modelling rice yield from monthly weather data in Ibague, Colombia
16:30:00	71	Sanginboy Sanginov	Wheat based double cropping system in various vertical belts of mountainous Tajikistan
16:50:00	72	Adirek Punyalue	Reduce burning in maize production by relay cropping with legumes

4.2 Ruminant and pastures in highland areas

15:10:00	73	Boonlom Cheva-Isarakul	session keynote
15:30:00	74	Trevor Gibson	Faculty Agriculture, CMU and Highland Pasture Agronomy
15:50:00	75	Kittipong Samootkwam	Effect of Improving Lamphun Cattle with Black Angus on Carcass and Meat Quality
16:10:00	76	Takafumi Gotoh	Impacts of feeding patterns with concentrate and/or roughage on body weight and intramuscular fat content at slaughter in Wagyu and Holstein steers
16:30:00	77	Elsaid Oudah	Productive and Reproductive performance of Imported French Alpine Goats under Subtropical Conditions in Egypt
16:50:00	78	Tossapol Moonmanee	Relationships among feed intake, blood metabolites, follicle size, and progesterone concentration in ewes exhibiting or not exhibiting estrus after estrous synchronization in the tropics

4.3 Post-harvest management of highland products

15:10:00	79	Eriko Yasunaga	Distribution Condition and Physiological Change in Mango Fruits Transported from Thailand to Japan
15:30:00	80	Pichaya Poonlarp	Research and Development on Increasing Efficiency of Vegetables Postharvest Management in the Royal Project
15:50:00	81	Sangtiwa Suriyong	Influence of storage conditions on change of hemp seed quality
16:10:00	82	Suchada Vearasilp	Radio Frequency Heating on Lipid Peroxidation, Decreasing Oxidative Stress and Aflatoxin B1 Reduction in Perilla frutescens L. Highland Oil Seed
16:30:00	83	Suchada Vearasilp	Vertical Operating Prototype Development Supported Radio Frequency Heating System in Controlling Rice Weevil in Milled Rice

4.4

ANNEX B. SPECIAL SESSION PROGRAM

IDRC CRDI Canada

SEAMEO SEARCA

2nd IDRC-SEARCA Annual Fellowship Plus Conference-Workshop
10 January 2015 • Star Hotel Chiang Mai, Chiang Mai, Thailand

8:30-9:00 - Registration

9:00-9:20 - **OPENING PROGRAM**

- Message, Introduction of Participants and rationale and mechanics of the activity
  - Dr. Maria Cristeta N. Cuaresma
    Program Head, SEARCA Graduate Education and Institutional Development

- Group Photo

Presentation of Scholars' Thesis Research Proposals

9:20-10:00 - Presentation of Research Proposals

- Ms. Chanhmany Souphannavong, MS Animal Science, CMU

"Effect of Birth Weight and Colostrums Intake on Mortality and Growth Performance of Piglets in Cross Breed and Thai Native pigs"

- Mr. Ung Putheany, MS Animal Science, UPLB

"Effect of Varying Levels of Dietary Fiber Fractions on Energy Value of Feeds, Nutrient Digestibility and Growth Performance in Broilers and Pigs"

10:00-10:20 - **REFRESHMENTS**

10:20-12:00 - Continuation of Presentation of Research Proposals

- Ms. Sonemany Pathumphone, MS Agronomy, KKU

"Food Security the food source from upland slash and burn farming systems of northern, Laos PDR"

- Ms. Chheun Sreyneang, MS Agricultural Economics, UPLB

"The Cassava Marketing System in Sala Krau District, Pailin Province, Cambodia"

IDRC CRDI Canada SEARCA

2nd IDRC-SEARCA Annual Fellowship Plus Conference-Workshop
10 January 2015 • Star Hotel Chiang Mai, Chiang Mai, Thailand

- Ms. Thoung Sodany, MS Rural Development and Management, KKU

"Economic Analysis of Land Use of Small-holder Farmers Case Study in Tuen Commune, Koun Mom District, RatanakKiri Province, Cambodia"

- Mr. Phomma Thammavong, MS Rural Development and Management, KKU

"Impact of Flash Flooding on Agricultural Livelihoods and Food Security in Upland Areas: A case study of rice production in Kasi district, northern Laos"

12:00-1:20 - **LUNCH**

1:20-2:00 - **Continuation of Presentation of Research Proposals**

- Mr. Zaw Zaw Htet, MS Agricultural Engineering, UPLB

"Applying Precision Agriculture (Variable Rate Technology) in Paddy Terrace Farming System"

- Ms. Khine Myat Swe, MS Agricultural Engineering, UPLB

"Ethanol Fuel Production from Waste of Sugarcane"

- Mr. Xayasinh Sommany, MS Agricultural Systems Management, CMU

"Impacts of Rubber Farming on Farmers' Food Insecurity and Coping Strategies, Oudomxay Province, Lao PDR"

2:00- 3:00 - **OPEN FORUM**
- Learnings from the Conference, impressions/remarks by scholars
- Discussion of issues regarding their scholarships

3:00-3:20 - **CLOSING PROGRAM**
- Closing Remarks
  - Dr. Annie Wesley, IDRC
    Senior Program Specialist
    International Development Research Centre (IDRC) of Canada

3:15-3:30 - **REFRESHMENTS**

2

ANNEX C. DIRECTORY OF PARTICIPANTS

PARTICIPANTS

Chiang Mai University

MR. XAYASINH SOMMANY
MS Agricultural Systems Management
Mobile: +0856 20 559 06658
Office: +856-210-360377
Email: sommany.xayansinh@googlemail.c

MS. NGUYEN THI CHUNG
MS Agricultural Systems Management
Mobile: +84 987233225
Office: +84 0543 52 845
Email: chungknptnt.huaf@gmail.com

MS. PHAM THI THUYEN
MS Agricultural Systems Management
Mobile: +0932198892
Office: +848 38966780
Email: phamthuyen@hcmuaf.edu.vn

MR. TRAN CAO UY
MS Agricultural Systems Management
Mobile:+84 973720365
Office: +84543523845
Email: trancaouy@gmail.com

MR. TRAN QUANG HUNG
MS Animal Science
Mobile: +84 975625686
Office: +84 438682574
Email: tranquanghungts@gmail.com

MR. BOUAVONH BIACHAMPAH
MS Agricultural Systems Management
Phone: +856 20 22487575
Office: +856 21 480510
Email: bouavonh@gmail.com

MR. VUA XIONGSIYEE
MS Agronomy
Office: +856 71 412002
Email: vuaxiongsiyee@yahoo.com

MR. BOUNTHIEM BOUASAVANH
MS Animal Science
Office: +856 71 412002
Email: bounthiem9@gmail.com

MS. OUDTANIVANH LUANGDUANGSITTHIDETH
MS Agricultural Systems Management
Office: +856 21 480510
Email: l.oudtanivanh@gmail.com

MS. CHANHMANY SOUPHANNAVONG
MS Animal Science
Office: +856 71 412002
Email: schanhmany@yahoo.com

MR. LYFONG YALAO
MS Animal Science
Chiang Mai University
Phone: +856 20 5488049
Office: +856 71 412002
Email: zajkublauj@yahoo.com

Kasetsart University

MR. HO TRONG PHUC
MS Agricultural and Resource Economics
Kasetsart University
Mobile: +84 54 353 8332
Office: +84 987699784
Email: hotrongphuc@gmail.com

MR. NGUYEN VAN THANH
MS Sustainable Agriculture
Kasetsart University
Mobile: 0975 128 988
Office: 0543 529 749
Email: nguyenthanhk36@gmail.com

Khon Kaen University

MR. SISAVANH XAYAVONG
MS Agriculture
Office: +856 41 212811
Email: sisavanh_xyv@hotmail.com

MS. NGUYEN THI NGOC THUONG
Master of Rural Development Management
Office: +84 4 62 617 592
Email: ngocthuong285@gmail.com

MS. PINKHAM VONGPHACHANH
MS Plant Pathology
Office: +856 20 773 121 98
Email: pinkhamvpc@gmail.com

MR. PHOMMA THAMMAVONG
Master of Rural Development Management
Office: +856 21 870048
Email: phomma.thammavong@nuol.edu.la

MR. KHAMBAI PHUNTHAVONGSA
MS Agriculture
Office: +856 21 480510
Email: pkhambai@yahoo.com

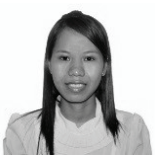
MS. PATHUMPONE SONEMANY
MS Agronomy
Office: +856 20 5611 3535
Email: sonemanyph@gmail.com

MR. THOUNG SODANY
Master of Rural Development Management
Office: +855 23 219 829
Email: dany.thoung@gmail.com

University of the Philippines

MR. ENG CHHEANGHONG
MS Applied Nutrition
University of the Philippines Los Baños
Mobile: +855 12 727 230
Office: +855 23 726 036
Email: chheanghong.eng@gmail.com

MS. CHHEUN SREYNEANG
MS Agricultural Economics
University of the Philippines Los Baños
Phone: +855 10 656 109
Office: +855 23 219 735
Email: chheunsreyneang@yahoo.com



MR. NGET RABY
MS Agronomy
University of the Philippines Los Baños
Phone: +855 92 356 376
Office: +855 23 219 753
Email: ngetraby@gmail.com

MS. CHIN HUNLAY
MS Animal Science
University of the Philippines Los Baños
Phone: +855 12 390 632
Office: +855 97 270 3366
Email:chinhunlay@yahoo.com

MR. UNG PUTHEANY
MS Animal Science
University of the Philippines Los Baños
Phone: +855 16 500 201
Office: +855 23 219 753
Email: vet_theany@yahoo.com

MR. VAR SOPHAL
MS Agronomy
University of the Philippines Los Baños
Mobile: (855)-92-667-578
Email: var.sophal@gmail.com

MS. NGUYEN THI BICH THUY
MS Agricultural Economics
University of the Philippines Los Baños
Mobile: 0983 336 101
Office: +84 983 336 101
Email: bichthuy3010@gmail.com
bichthuy30102000@yahoo.com.vn

MS. BUI HONG QUY
MS Agricultural Economics
University of the Philippines Los Baños
Mobile: +84 2413846398
Office: +84 4 38276 522
Email: buihongquy162@gmail.com

MS. VONG PISEY
MS Animal Science
Office: +855 23 219 753
Email: vong.pisey@yahoo.com

MR. NOUYANG
MS Agronomy
Office: +856 2023340840
Email: nouyang19@gmail.com

MS. SENGSAVANG SISOURAJ
MS Agricultural Economics
Office: +856 309 694394
Email: sisourajsengsavang@gmail.com

MS. TRAN DUYEN NHAT LAM
MS Agricultural Economics
Office: +848 38966780
Email: lamduyen@hcmuaf.edu.vn

MS. KHINE MYAT SWE
MS Agricultural Engineering
Office: +95 67 410009
Email: khinemyatswe135@gmail.com

MS. CHANHTHAVY BOUNMITHANH
MS Forestry
Office: +856 21 480510
Email: thavy95@yahoo.com

MR. ZAW ZAW HTET
MS Agricultural Engineering
Office: +95 67 431215
Email: kzawhtet@gmail.com

MR. YOTH VANHNASIN
MS Forestry
Office: +856 41 253 286
Email: yothvanhnasin@yahoo.com

PROJECT ADVISORY COMMITTEE

DR. PRASIT WANGPAKAPATTANAWONG
Assistant Professor Forest Restoration
Research Unit
Faculty of Science
Chiang Mai University, Thailand
Email: prasitwang@yahoo.com

DR. VO TONG XUAN
Rector
Nam Can Tho University
Can Tho, Vietnam
Email: xuanagu@gmail.com

DR. MOM SENG
Vice Rector for International Relations
Royal University of Agriculture
Phnom Penh, Cambodia
Email: mseng@rua.edu.kh

RESOURCE PERSONS

DR. ANNIE S. WESLEY
Senior Program Specialist
Agriculture and Food Security
IDRC, Ottawa, Canada
Email: awesley@idrc.ca

DR. PERCY E. SAJISE
SEARCA Senior Fellow
and Former Regional Director
Bioversity Malaysia
Email: p.sajise@cgiar.org

CONFERENCE MANAGEMENT GROUP

DR. MARIA CRISTETA N. CUARESMA
Program Head
Graduate Education and Institutional
Development Department
SEARCA, College
Laguna 4031, Philippines
Tel: +63 49 5362365 to 67 loc. 164
Fax: +63 49 5367164
Email: mcnc@searca.org

MS. ERIZA C. ASILO
Project Associate
Graduate Education and Institutional
Development Department
SEARCA, College
Laguna 4031, Philippines
Tel: +63 49 5362365 to 67 loc. 134
Fax: +63 49 5367164
Email: eca@searca.org