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AGRICULTURE IS A BUSINESS

ABSTRACTS OF PAPERS

PLENARY SESSION

**SAFE VEGETABLES SECTOR OF VIETNAM UNDER THE CONTEXT OF
INTERNATIONAL INTEGRATION: CURRENT STATUS AND PROSPECTIVE**

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Under the context of the background of recent free trade agreements and market liberalization, there is increasing competition at national and international markets. Domestic demand for vegetables is being increased by consumers in terms of quantitative growth, quality and safety, especially in the urban centers of Vietnam. The formal programs of safe vegetable were introduced in Vietnam since 1995 to solve those problems concerning on production and marketing for safe vegetables, however, until now safe vegetables provided at maximum of 30% in the urban markets approximately. The study based on different data sources including secondary and primary data to present current status of Vietnamese safe vegetables as well as proposing measures regarding to technical, technological, economical, institutional and organizational aspects.

**CONVERTING AGRICULTURE PARTICULARLY BANANA COMMODITY,
INTO A SUCCESSFUL BUSINESS VENTURE IN MALAYSIA**

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Agriculture remains an important sector of Malaysia's economy beside manufacturing and services. On Ninth Malaysia Plan (RMK-9), this sector focus to increase its value added to the economy. New approach such as large scale commercial farming, extensive use of modern technology and involving farming entrepreneur will be implemented to boost our agricultural sector. By taking advantage of the tropical climate, politic stability and seldom experiences natural calamities, banana business can be a good business to venture into as there are huge potential for fresh and by-product for local and international markets. The potential downstream activities are not limited to food industry alone but also in manufacturing industry. The best way to start venturing into this promising banana business is through Synergy Farm Franchise Farming Program as it offers a complete package from consultation, transfer technology, training and marketing for agro-entrepreneur. Funding facilities are in placed and support from state governments and Ministry of Agriculture in providing land for the program. All we need now is a dedicated genuine agro-entrepreneur to joint and venture

into this business and most importantly is a support from the government and its related bodies in realizing a vision to commercialize banana commodity in Malaysia.

TROPICAL FRUIT CULTIVATION AS A SUCCESSFUL BUSINESS IN THAILAND

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Situated in the tropics between the latitude of 5° to 20° N., Thailand has climatic conditions and geography that are suitable for fruit crops. An estimated 1,000 varieties of wild and cultivated tropical and sub-tropical fruits are found growing in the country under various systems including natural growth in the forests and cultivated growth in home gardens and commercial plantations. More than 100 varieties are commercially cultivated for local uses and export. Of these, mango has the largest production areas of more than three hundred thousand hectares throughout the country followed by longan, durian, pineapple, citrus, rambutan, mangosteen, lychee, banana and others. Most of tropical fruits are consumed domestically and approximately 5 % are exported. In the world market, Thailand is the largest exporter of canned pineapple, longan, durian and mangosteen. Tropical fruit cultivation is considered a successful business in Thailand and the production areas have been expanded gradually. In this presentation, various components along the supply chain of Thai tropical fruit business including geographic location, fruit cultivars, appropriated cultivation technologies and marketing will be discussed in relation to both domestic and international trade. Certain fruit crops such as durian, mangosteen, rambutan and mango can be cultivated in different regions with different climate and topography to expand their harvesting season and market window. Unique fruit cultivars of Thailand with high quality enhance their competitiveness in the world market despite the perishable and short shelf life nature. Flower induction technology by chemicals such as the use of paclobutrazol for mango and the use of potassium chlorate for longan has been successfully practiced leading to a year round production of mango and significant expansion of longan production areas from the northern region to other regions where climatic conditions are sub-optimum for natural flowering. Good Agricultural Practice (GAP) guidelines have been developed by the Department of Agriculture to ensure production safety, environmental safety, productivity, quality and production sustainability of major fruit crops. For the export market, fruit production, harvesting and post-harvest handling must strictly follow the protocol under a close monitor by an export company and government agency to meet the international standard. In addition to the conventional marketing systems where many middlemen are involved and growers have the lowest power in the supply chain, contract farming has an important role in the marketing component and currently enhances the success of Thai tropical fruit business. An example of successful contract farming for tropical fruits will be elaborated. Standard tropical fruit products including fruit juice, concentrate, puree, canned fruits, oven-dried, freeze-dried and different forms of preservation are on high demand for both domestic and international markets. New products such as prepared fruits (ready to eat) in a nice package has a bright future as a niche that fits well with the current lifestyle of consumers.

The free trade agreement (FTA) with China, Japan and Australia and more opened international trade policy of the United States increase the export value of Thai tropical fruits but at the same time a significant increase in apples and pears from China in the domestic markets following FTA has a considerable impact on Thai fruits. An improvement in orchard management to reduce production cost and better marketing system are of importance to secure the success of Thai tropical fruit business.

**STATUS OF ORGANIC AGRICULTURE AND ITS AGRIBUSINESS
POTENTIALS IN THE PHILIPPINES**

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The official revival of Organic Agriculture (OA) in the Philippines can be traced back to the issuance of the Philippine National Standards for Organic Agriculture and processing by the Bureau of Agriculture and Fishery Standards in October 2003. This was followed by the issuance of Executive Order No. 481 in 2005 by President Hon. Gloria Macapagal Arroyo mandating the Promotion and Development of Organic Agriculture in the Philippines.

The major reasons for the conversion to organic farming are: 1) high cost of production in chemical-based farming resulting in low farm net income; 2) health reasons on the part of the producers and consumers; and 3) environmental reasons in response to the deteriorating agro-ecological balance.

The status of the organic agriculture industry in the Philippines can be evaluated using the “value chain model”. A recent national survey (Colting, 2007) on the number of organic practitioners, kind of organic products produced, and the area (hectares) devoted to organic agriculture showed an increase in all parameters compared to a survey in 2004. It can be noted also that concerted efforts to address the issues raised from the value chain analysis in the Pearl2 project Technical Paper No. 1 particularly on human resource management, technology development, procurement, organic production and organic processing at the levels of inbound logistics, operations, outbound logistics, marketing and sales, and services, have been provided by both the NGO’s (non-government organizations) and GO’s (government organizations) including some universities.

In terms of its agribusiness potentials, the organic agriculture industry in the Philippines has tremendous potential for growth considering the proven assurance of higher farm income than conventional agriculture (chemical-based farming), strong policy support from the government, increasing segment of the Philippine population shifting to a more healthy lifestyle, and increasing awareness on the irreversible ill-effects of chemical-based agriculture on the environment

ABSTRACTS OF PAPERS

SCIENTIFIC SESSIONS: SESSION 1A : BIOLOGICAL CONTROL

SELECTION AND CHARACTERIZATION OF THE ENDOPHYTIC BACTERIA AS THE BIOCONTROL AGENTS OF BANANA BLOOD DISEASE

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Blood disease caused by Blood Disease Bacterium is one of the important diseases of banana plantations in Indonesia. Disease control using resistant varieties was difficult to be practiced because the pathogen can attack all varieties of banana. Sanitation and eradication has been done by the farmers but the disease still happens in the field with high incidence. Application of some rhizosphere bacteria to control the disease in the field was not yet given good results. The other alternative to control the disease is using endophytic bacteria having the same niche with the niche of pathogen. This experiment was conducted to isolate one or more endofitic bacteria from banana plants as a candidate biocontrol agent, to investigate the potential suppression of the biocontrol agents to the Blood Disease Bacterium in vitro, and to the disease incidence in plants. The endofitic bacteria were isolated from banana stem of the healthy plant from an infected banana field. The ability of the bacteria isolates to suppress Blood Disease Bacterium were tested using antibiosis mechanism in King's B agar and their competitiveness in King's B broth. CA8 isolate produced inhibition zone and while isolates CA8 and PK5 suppressed the population of Blood Disease Bacterium relatively higher than other isolates. The inhibition zone diameter produced by CA8 was 10 mm. The population of Blood Disease Bacterium at 24 h after the application of isolate CA8 and PK5 was 4×10^6 cfu/ml and 7×10^6 cfu/ml respectively, while in control (sterilized distilled water) the population was 9×10^{10} cfu/ml. Data of the experiment in plants shows that endophytic bacteria CA8 and PK5 isolated from banana plant were able to suppress blood disease incidence higher than the banana rhizosphere bacteria and endophytic bacteria from Graminae. Based on the physiological characteristics, the CA8 and PK5 isolates were *Bacillus* and *Pseudomonas*.

INSECTICIDAL ACTIVITY OF EXTRACT MIXTURE OF FOUR PLANT SPECIES AGAINST *CROCIDOLOMIA PAVONANA* (F.) (LEPIDOPTERA: PYRALIDAE) LARVAE

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Vegetable farmers in Indonesia commonly use synthetic insecticides as main strategy to control insect pests due to lack of practical and safer technology. Therefore, it should search for novel and safer insecticides to conserve our agricultural ecosystem. Previously, botanical insecticide research was focused on screening and bioassay of plant extracts and making botanical insecticide formulations containing single plant extract. Unfortunately for mass production, however, source of plants sometimes is very limited. So, one of the strategies to overcome the limitation of plant sources is by using extract mixtures. The aim of this study is to find out the effective extract mixtures of four plant extracts and to search for alternatives in cabbage insect pest control by using botanical insecticides. Four plant species, *A. odorata*, *S. mahogani*, *P. retrofractum*, and *A. squamosa* were

extracted. Each two extracts were combined at the comparisons of 3:7, 1:1 and 7:3 (w/w). Each combination was bioassayed against *Crocidolomia pavonana* (F.) (Lepidoptera: Pyralidae) larvae by leaf dipping method. The extract mixtures that resulted in high mortality activity on *C. pavonana* at 0.05% were *S. mahogani* and *A. squamosa* (3:7), *A. odorata* and *A. squamosa* (3:7 and 1:1), and *P. retrofractum* and *A. squamosa* (3:7,1:1, and 7:3).

PLANT EXTRACTS TO CONTROL COCOA BLACK POD DISEASE CAUSED BY *PHYTOPHTHORA PALMIVORA*

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Cocoa black pod disease caused by *Phytophthora palmivora*, is one of the most destructive disease on cocoa in Bali, especially during rainy season. Study done by Suprpta *et al.*, 2006 indicated that the disease incidence during January to April 2006 in three main cocoa growing areas in Bali was relatively high, ranging from 78.72% to 87.68%. Two control methods are commonly implemented by the Bali cocoa farmers to control the disease namely, the use of synthetic fungicides and sanitation. However, these two methods could not significantly reduce the disease incidence.

Forty plant species were tested for their antifungal activity against *Phytophthora palmivora* on potato dextrose agar (PDA) medium. Of these, two plant species, *Eugenia aromatica* and *Piper betle* showed strong fungicidal activity against *P. palmivora* at concentration as low as 0.05% and 0.1% (w/v) respectively, while, three plant species namely *Pometia pinnata*, *Alpinia galanga*, and *Sphaeranthus indicus* inhibited the growth of *P. palmivora* on PDA at concentration 0.3% (w/v). Application of plant extract formulation to control cocoa black pod disease in the the field was conducted at two experimental sites at the main cocoa growing areas in Bali. Field experiments were conducted from February to August, 2007 simultaneously at two experimental sites.

Results of the study revealed that a formulation (F7) containing the flower extract of *Eugenia aromatica* and leaf extract of *Piper betle* at 0.05% (w/v) significantly ($P<0.05$) suppressed the cocoa black pod disease. The percentage of infected pods of this treatment were only 9.45% and 10.56%, in the two sites while the percentage of infected pods of control (without fungicide application) were 26.67% and 33.33%. Percentage of infected pods with F7 treatment did not significantly differ from treatment with synthetic fungicide (Dithane M-45), suggesting the use F7 was comparable to the Dithane M-45 and can be considered as an alternative for the control of cocoa black pod disease.

ITURIN A PRODUCTION OF *BACILLUS SUBTILIS* NB22 WITH ORGANIC MATTER AND IT'S BIOCONTROL ACTIVITY FOR *FUSARIUM* YELLOWS OF TAASAI.

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Several *Bacillus* spp. produce antifungal lipopolypeptide, Iturin A and its related compounds. Iturin A shows antifungal activity for many kinds of plant pathogenic fungi. *B. subtilis* NB22 (NB22) is an Iturin A producing bacteria, which was isolated from compost by Dr. Shoda in Tokyo Institute of Technology.

In this study, we used 5 kinds of organic matters, soybean cake, soybean curd residue, wheat bran, rapeseed cake, and wheat spent and hop, as media for solid state culture of NB22 to compare for Iturin A production and for biocontrol activity on *Fusarium* yellows of Taasai (*Brassica rapa* L. var. *narinosa* (Bailey) Kitam). NB22 were grown from 10^6 cells g^{-1} FW to 10^9 to 10^{10} cells g^{-1} FW in 5 days incubation at 25 °C, but not for wheat spent and hop. For Iturin A productivity of NB22, soybean cake was most effective among the organic matters evaluated.

Biocontrol activity of solid state cultures of NB22 for *Fusarium* yellows of Taasai were carried out in a growth chamber. Solid state cultures of NB22 were amended to soil at 1 % (w/v). Solid state cultures of NB22 showed suppressive effect for *Fusarium* Yellows of Taasai at dependent manners of Iturin A productivity. Further studies on Iturin A production by NB22 in liquid media, differentiation of raw materials of polypepton in No.3 media (1 % polypepton, 1 % glucose, 0.1 % KH_2PO_4 , and 0.05 % $MgSO_4 \cdot 7H_2O$) had influence on Iturin A productivity.

Our data shows, for enhancement of biocontrol activity of *Bacillus* spp. for soil borne disease, the combination of organic matter with antagonist is one of the critical factors to enhance its potential.

SESSION 1B: AGRICULTURE PRODUCTION SYSTEM

ASSESSING DUCK EGG PRODUCTION IN THE PHILIPPINES: RESULTS FROM FARM SURVEY

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Ducks have traditionally been raised in the backyard in the Philippines by rural households to provide low-cost animal protein. Unlike other duck producing countries, the Philippine duck industry specialises in egg production for making balut (an embryonated egg of 16-18 days old). In recent years, the share of commercial duck farms (with more than 100 heads) has increased from about 10% in 1991 to about 24% in 2005. The significant growth in the commercial duck sector in recent years has been attributed to the introduction of commercial duck feeds and more advanced production technology. This trend is expected to continue. This means that about 75% of ducks are still raised as backyard (less than 100 heads). Research has shown that in general there are economies of scale in livestock production that is, the larger the farm, the lower the cost of production and the higher the returns. However, it is not clear whether this is also the case for duck farming in the Philippines. The objectives of this study are to compare financial performance across farm sizes, as well as identify production and marketing issues facing duck producers and make appropriate policy recommendations to improve farm performance.

Survey data were collected from two hundred and fifty duck producers in Iloilo, Nueva Ecija, Pampanga and Quezon provinces in the Philippines in 2003. In the survey, farmers were asked about their socio-demographic and farm characteristics and their inputs and outputs associated with duck production, as well as problems which they had encountered in the production and marketing of duck eggs. Preliminary results show that 18%, 41%, 22% and 19% of farms surveyed were classified as backyard (1-99), small (100-499), medium (500-999), and large (1000 and above), respectively. However, farm size matters in terms of flock performance, record-keeping, access to capital and product proposal, but not financial returns.

**SOME LAND USE TYPES OF SUSTAINABLE COMMERCIAL AGRICULTURAL
PRODUCTION IN VIETNAM:
CASE STUDY IN GIALOC DISTRICT, HAIDUONG PROVINCE**

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The study analyzed the nature of sustainability and commercialization of agricultural production in response to globalization and its contributions to socio-economic development of the Gialoc District. Proportional random sampling was used to select 300 respondents from three communes in Haiduong District, Vietnam. Data were gathered through individual face-to-face and in-depth interviews and from secondary sources. Data were analyzed using Analysis of Variance and Spearman Rank Correlation Coefficients.

Commercial agricultural production in Gialoc began long ago but farmers still had problems with production contract, marketing, and management. Two best popular models were recognized by local farmers were commercial vegetable and fruit_fish_pig_domestic fowls. Respondents perceived a high level of these new models of the commercial agricultural production in terms of economic and social aspects, and moderate level of those in terms of environment aspect. They also perceived that these models contributed to development of the community as they enhanced social capital, and economic viability. However environment quality is still critical issue. The study showed that commercial agricultural production is a key factor in increasing the ability of community systems to create positive and desirable change towards international market.

Land evaluation, production contracts, and output exportation potential were critical factors in commercial agricultural production in Gialoc.

**COMPARISON OF SEVERAL ORGANIC MATTER SOURCES ON GROWTH,
DEVELOPMENT AND YIELD OF
ORGANIC RICE (*ORYZA SATIVA* L.) VAR. KDML 105**

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Organic production method has been gradually expanded due to an increase of domestic demand in organic produces, especially among health conscious and food safety concerned people. In Thailand, 3,428.57 ha of organic agricultural farms are accredited. Most of organic agricultural products are primary products, especially rice, vegetables and fruits. This organic research was undertaken at University farm of Kasetsart University, Kamphangsaen campus in Nakhon Pathom province, Thailand. Treatment conditions were from four organic matter sources, two of green manure, *Sesbania rostrata* (sesbania), *Vigna radiata* var. Chai-Nard 60 (mung bean), and other two of farm manure as chicken manure compared with cow manure on *Oryza sativa* L. var. Khao Dawk Mali 105 (KDML 105), Thailand's high-quality rice for export, by transplanting at 25x25 cm. plant-spacing. The experiment was designed in Completely Randomized with 12 replications and was employed under organic paddy field condition to investigate the relative growth, development, and their yield to produce organic rice during rainy season. Green manure increasingly affected the plant height between 45-120 days significantly (at 120.50–123.23 cm.). In addition, it increased the number of tiller/hill (up to 14.66-14.95 tiller/hill) significantly and produced more 17.05 panicles/hill in

KDML 105 rice. All organic treatments induced their flowering percentage (flowered tiller) more than 92%, which was significantly higher than that of conventional procedure. Organic rice applied by farm manure showed higher yield than that of green manure significantly. Nevertheless, by organic treatments, the yield was significantly higher 20.65 to 24.76 % (3.83-4.24 metric tons/ha), compared with the yield gained from conventional practice. Farm manure, yielding about 4.07-4.24 tons/ha gave higher produce than that of green manure, 3.83-4.02 tons/ha significantly. The flag leaf of organic culms was expanded in leaf length (33.04-48.35 cm.), compared with 20.20 cm. of common leaf length, as a source-sink relationship of organic grain. In organic field, grain numbers per panicle were set significantly higher than the conventional significantly, up to 235.08 grains of totally 242.85 grains. Ear length and weight of 100 grains did not differ among organic treatments with their ordinary characteristics. Maturation stage of organic produce was significantly found in green manure more rapid than farm manure for 10 days. The consistent element in leaf, stem, and soil chemicals were also analyzed throughout their growth and development.

HIGHLAND SWEETPOTATO 'BENGUETA' FOR PROCESSING

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The Northern Philippines Root Crops Research and Training Center, Benguet State University had come up with a processing type sweet potato suitable for candy, juice, wine, etc.

Tagalog, a highland cultivar was officially approved as a variety with recommended name 'Bengueta'. It has yellow flesh (carotene-rich), light pink and elliptic to round-shape roots. Mature leaves are colored green with purple immature leaves. The variety is moderately resistant to sweetpotato foliage and stem scab. Based from the experiments conducted across locations for two dry and wet season from 2001 to 2004, it out yielded the check variety PSBSp-17. Tagalog with yields of 13.55 t/ha the check variety yielded 8.89 t/ha. It had high yield, resistant to pest and diseases with high dry matter content, good eating quality and possess processing quality. This variety was evaluated to its suitability to various processed products such as cookies, candies, puto, juice, wine and was found to be acceptable.

To disseminate this technology, trainings can be conducted, distribution of planting materials, publications and through radio programs like the BSU school on the air program. Participation during trade fairs and food fairs.

SESSION 1C: FARMING SYSTEM

INTERCROPPING SWEET CORN WITH DIFFERENT LEGUMES

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The study was conducted at a farmer's field in Danuman West, Sta. Maria, Ilocos Sur to determine the yield performance of sweet corn as affected by the intercropping of different legumes and to determine the highest net returns of legumes as intercrops of corn.

The legumes used as intercrops were: mungbean, rice bean, cowpea {Black cowpea}, and peanut {Spanish Red}. T₁-sweet corn intercropped with mungbean, T₂-sweet corn intercropped with rice bean, T₃- sweet corn intercropped with cowpea and T₄-sweet corn intercropped with peanut and a

control {T₀- unintercropped corn plants. All the treatments were laid in a Randomized Complete Block Design {RCBD} with three {3} replications.

Sweet corn plant farmers in the locality are strict practitioners of monoculture system of growing crops. Taking into consideration the cultural management practices for sweet corn, the planting of each crop like mungbean, rice bean, cowpea and peanut might fit well. Thus, they derive their farm income mainly from corn. The use of intercrops in corn farming will in a way maximize the economic use of corn farms. This means an increase in farm income derived from the economic yield of intercrops; thus, increasing farm income through additional crop yields from the same piece of land.

Results showed no effect of legume intercrops on sweet corn plant and yield performance. Although the highest actual sweet corn yield was recorded in the intercropped sweet corn plants with 7.3 kg/plot, the yield performance of the farmland can be increased by intercropping different legumes with sweet corn. T₄ {sweet corn intercropped with peanut} had a corn yield of 6.9 kg/plot and 28.0 kg/plot of peanuts. Intercropping gives a possibility of increasing the economic yield of the sweet corn lands with little modifications on the sweet corn farming techniques and practices at the farmer's level.

CHANGING STRUCTURE OF FARM HOUSEHOLD INCOME IN A RICE-GROWING VILLAGE IN SEBRANG PRAI, MALAYSIA

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In response to rapid industrialization and urbanization in Sebrang Prai from the 1980s, mechanization and other labour-saving technologies were adopted in rice farming. This was largely responsible to the increased farm expenditure among small farms, in spite of the increased productivity. There is a clear trend for the farmers to look for an off-farm employment in order to supplement their rice income, thus resulting in the predominance of part-time farming. It is considered that the role of rice farming has been extremely weakened and seems to assume a position of supplementary income source in the farm household economy

This paper aims (1) to examine the nature of changes in rice expenditure, and (2) to clarify the current structure of farm household income including agricultural and off-farm income for part-time farm households. Data were collected from the questionnaire survey conducted in 2006 in a typical rice growing village in Sebrang Prai.

FACTORS AFFECTING FARMERS IN ADOPTING ORGANIC RICE FARMING SYSTEM IN SITUGEDE VILLAGE, CITY OF BOGOR, WEST JAVA, INDONESIA

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Organic farming system has been introduced in Indonesia since 1970s to produce vegetable and rice under an environmentally friendly situation. Though demands for both organic rice and vegetables are still limited, these exist, then the farmers should produce them. In Indonesia, organic rice and vegetable production are mostly in West Java, Central Java, East Java, and Bali. In the city

of Bogor, West Java, organic rice farming system has been introduced under the City Agribusiness program. This is in accordance with Go Organic 2010 program declared by the Ministry of Agriculture. Rice farmers in the Situgede village, city of Bogor, have tried to practice organic rice farming system since 2002. However, the number of the farmers have been fluctuating because of the following reasons: (1) they believe that organic farming system resulted in a lower productivity than that of conventional, (2) demand for organic rice is limited and relatively difficult to be accessed, since its marketing system is “different” than that of conventional one, (3) there was no price difference between the two rice, and (4) they faced the problem of unavailability of manure to make organic fertilizer (bokashi).

Objectives of this research are: (1) to compare the difference in productivity and income between organic and conventional rice farming systems, (2) to assess the factors that affecting the farmers in adopting organic farming, and (3) to formulate programs to spread out organic rice farming system in Situgede village, city of Bogor, West Java.

A survey to 30 rice farmers in the village, which consisted of 9 organic rice farmers and 21 conventional rice farmers, indicated that organic rice can be planted up to three times a year, while conventional rice only twice a year. The reason for this is because most of organic farmers are located close to the irrigation channels. In term of productivity, organic rice results in lower yields than that of conventional one, since most of the adopters are still in the early stage of adoption. However, in term of total production, organic rice results in higher production than that of conventional one, 10.99 ton compared to 10.35 ton per year. In addition, farmers’ income from organic rice is 31% higher that of conventional one.

Analysis of adoption using the Analytical Hierarchy Process (AHP) indicated that the main objectives of the farmers in adopting organic farming system are to increase income levels, produce healthy foods, reduce environmental pollution, and increase rice productivity. The main factors determining farmers in adopting organic farming system are personal characteristics, external conditions, information on farming-technology, and farming conditions.

Some programs are suggested to increase organic rice production, improve adoption conditions, and increase farmers’ incomes in the Situgede village: (1) the farmers’ group should develop marketing contracts with some potential traders and/or institutions (eg. supermarkets) specialized with organic products, (2) increase farmers’ group activities in production and distribution of bokashi, (3) increase sales of bokashi to outsiders, and (4) intensify extension programs to all farmers in the village areas.

ON ENSURING SUFFICIENT YIELD AND HIGH-QUALITY RICE THROUGH THE RICE-DUCK FARMING SYSTEM

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The rice-duck farming system is an organic agriculture system currently carried out by about 10,000 rice farmers in Japan. In this system, rice-ducks are left in a paddy field for about 2 months (beginning 2-weeks after transplanting to several days before heading). Rice-ducks are effective in weed and insect pest control resulting in a stable yield without the need for using herbicides and insecticides. One of the fluctuating elements of this system is that the rice tends to have a high protein content and a low palatability compared with commonly cultivated rice. It is possible for rice-duck feces to stimulate nitrogen absorption of rice plants and affect the palatability of rice. In our study, we clarified the role of rice-duck feces as a nitrogen source and examined suitable fertilization methods for high-quality rice production in the rice-duck farming system. Inverse correlation was observed between palatability and soil nitrogen content at harvest. This suggests that the supply of feces from rice-ducks increases soil nitrogen and causes low rice palatability. Standard application of basal

fertilizer with rice-ducks left excess nitrogen in the soil. Since loss of soil nitrogen by denitrification was limited in the paddy field during fallowing (from winter to spring), residual nitrogen was available for rice production the following year. We obtained a sufficient yield and a high quality of rice in the rice-duck farming system using a standard bi-annual application of basal fertilizer.

PROSPECTS FOR RAISING NATIVE CHICKEN IN THE PHILIPPINES

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Native chicken or what is referred to as village or local chicken in other countries is an important source of protein food and extra income for rural farmers despite the growing popularity of imported commercial hybrid chickens. This is because of their ability to produce and reproduce even under the most marginal of environmental conditions and management. However, the business of growing native chicken is beset by a number of concerns related to production and marketing. The issues related to production of native chicken include breeding and selection, seasonality of feedstuff, disease prevention and control while the market related problems include lack of product standards and low market prices, lack of market information, lack of sources of upgraded chicken and lack or absence of government programs to promote market native chickens and egg products as delicacies. The recommendations provided include extension delivery, technical and financial assistance to native chicken raisers.

SESSION 2A : BIOLOGICAL CONTROL

SEED STORAGE COATED WITH PGPR FOR SEEDLING VIGOR AND DOWNY MILDEW REDUCTION OF SWEET CORN

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Research was initiated on seedling vigor and induced systemic resistance against downy mildew infection using plant growth promoting rhizobacteria (PGPR) strain *Bacillus amyloliquefaciens* KPS46 to coat and store seeds of sweet corn (*Zea mays*) cv. Insee2. Seeds were surface sterilized with 10% clorox and dripped in KPS46 suspension (10^5 cfu/ml and 20 ml / 1 kg seeds) for 15 min and dried overnight at room temperature. The KPS46 seed coating was compared with those seeds treated with chemical (metalaxyl), KPS46 + metalaxyl and conventionalism (metalaxyl + carbendazim). After these were preserved at 10 or 28°C (room temperature), seed germination and seedling vigor (root length and shoot height) were determined every 30 days using blotter technique under laboratory investigation. At 150 days storage, these were also tested for enhanced resistance against downy mildew which the coated seeds were sown in mini plot (3x3 m plot size and 3 replications with RCBD design) and the 7-day old seedlings were inoculated with pathogenic *Peronosclerospora sorghi* (10^6 spores/ml) using a backpack sprayer under field conditions. In room temperature and 10°C stored for 90 days, treatments KPS46 and KPS46 + metalaxyl exhibited highest efficacy in seed germination, seedling vigor and fresh weight, but 10% seed germination decreased in both treatments stored at room temperature was found at 120-day incubation. However, these two treatments stored at 10°C were observed that all parameters were still

highest measurement with over 90% seed germination at either 120- or 150- day preservation. When 150-day storage seeds at 10°C were sown and inoculated with downy mildew pathogen at National Corn and Sorghum Research Center, Nakhon Ratchasima, the induction of plant resistance was achieved by coating seeds with KPS46+metalaxyl resulted 72 % reduction of downy mildew incidence over the nontreated control, followed by metalaxyl, KPS46 and conventional coating respectively. A present study indicates that temperature influences storage time and ability of PGPR strain in enhanced seed quality. The PGPR strain KPS46 combined metalaxyl have the ability to increase reliable seed germination, seedling vigor and plant resistance against disease which were more consistent than the individual coated seeds alone after a long storage time.

INTEGRATING BACTERIAL ANTAGONIST AND PLANT EXTRACT FOR MANAGING DISEASE AND INSECT OF CHINESE KALE

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The loss of quantity and quality due to disease and insect and pesticide residues is one of the important problems in vegetable crop production. Pest infestation including bacterial black rot (caused by *Xanthomonas campestris* pv. *campestris*), fungal leaf spot (*Alternaria brassicae*) and diamondback moth (*Plutella xylostella*) significantly reduced profits for brassicaceae and Chinese kale in Thailand resulting in increased pesticide use. Biological control is therefore, needed to augment pesticides upon which pest control is often dependent. Two bacterial antagonists, *Pseudomonas fluorescens* SP007s and *Bacillus* sp. SP009s and the crude extract of Non-tai-yak plants (*Stermona tuberosa*) were combined to evaluate IPM program in which some pesticides were eliminated. The 15-treatment systems using bacterial antagonists with seed treatment and foliar spray, varying different kinds of biofertilizer spray, and spraying *S. tuberosa* extract (20 ml / 10 L H₂O) when the population of diamondback moth reached the action thresholds (10 insects / plant), were evaluated in RCBD experiment at Chinese kale (cv. Hybrid – SroonDang) production in Suphanburi during June to September, 2007. The IPM program, the disease and insect management with bacterial antagonists SP009s seed treatment (10⁶ cfu/ml, 250 ml / 1 kg seeds), 3-times SP007s (10⁸ cfu/ml, 250 ml / 20 L H₂O), plus algae extract (Goemar BM80 : 20 ml / 20 L H₂O) and silicic acid fertilizer (Silicic Acid : 20 ml / 20 L H₂O) application at 14, 28 and 42-day old plant sprays, and spraying *S. tuberosa* extract considered insect pest incidence to prompt the first application (4-*S. tuberosa* spray intervals in this program), including recommended cultural practices (application of alachlor and 6.25 t / ha compost before planting) provided the best results in terms of increasing yield of both quantity and quality and reducing pesticide application when compared to those of conventional measured (alachlor, 6.25 t / ha compost, 8-time swine placement extract plus EM sprays, and 4-abamectin sprays).

Yields obtained from the successful program was 2-fold higher than the conventional and disease and insect epidemics were also in accordance with yield obtained. Integrating biocontrol agents of disease and insect in this study not only increase yields of Chinese kale but also reduce the use of synthetic pesticides which automatically reduce pesticide residues. The founded validation of pest management obtained can be further developed and transferred to growers for large scale production of vegetable crops in the country.

KAKAWATE (*GLIRICIDIA SEPIUM*) JACQ. KUNTH EX WALPH. COUMARIN AS ANTITERMITIC AND ANTIMICROBIAL COMPOUND

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Kakawate (*Gliricidia sepium*) Jacq. Kunth ex Walph. is a medium sized tree belonging to the family Leguminosae, which has a variety of uses and are planted as a fence, livestock feed and fuelwood. They cover the mountains of Ilocos and the remaining vegetation during the dry months of the year, from January to May. Leaves were chopped and soaked separately in water and petroleum ether. A compound was isolated by TLC with a melting point at 64^o C. The compound was identified as coumarin. Bioassay against termites (*Macrocerotermes losbanosensis*) manifested 95% mortality (4 hrs) and 100% (8 hrs) using 0.02 g/mL impregnated in filter paper in a Petri dish. However, the bioassay of crude water-soluble *Gliricidia* extract showed 75% mortality (24 hrs). The pure compound was tested on three microorganisms, *Escherichia coli*, *Staphylococcus aureus* and *Trichophyton mentagrophytes*. *T. mentagrophytes* showed an average antimicrobial index (AI) of 1.45. Clotrimazole showed inhibitions of AI at 2.0. The other two micro-organisms were not inhibited.

SIMPLE TECHNIQUE FOR MASS PROPAGATION OF *BEUVERIA BASSIANA* FOR MICROBIAL CONTROL IN THAILAND

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A number of media for culturing and mass propagation of the enthomopathogenic fungus, *Bueaveria bassiana* strain NBCRS01 were screened under laboratory condition. At 25 – 30°C the artificial media, Sabouraud Dextrose Agar (SDA) and Malt Extract Agar (MEA) were the most suitable ones. They promoted highest mycelium growth rate and sporulation averaging 0.33 ± 1.24 cm. per day and 7.38 ± 1.07x10⁸ spores per ml respectively. Likewise steamed sorghum seed was the most suitable medium for its mass propagation. It could promote within a 14 day period averaging 100 %, 99.33 ± 1.54 % and 1.2 ± 1.1x10¹⁰ spores/ml respectively for hyphal colonization, proportion of sporulation area on the media, and spore concentration. The results from this preliminary study could be further applied for the utilization of *B. bassiana* as a microbial control agent of several insect pest species adopting this simple method for mass propagation by the small farmers.

EFFECT OF SYNTHETIC SEX PHEROMONE TRAPS ON THE CABBAGE CLUSTER CATERPILLAR, *CROCIDOLOMIA PAVONANA* AND ITS HOST PREFERENCE IN THE VEGETABLE FIELD OF INDONESIA

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The attractiveness of synthetic sex pheromone traps for the cabbage cluster caterpillar, *Crocidolomia pavonana* (Fabricius)(Syn. *C. binotalis*)(Lepidoptera: Crambidae) was tested for the first time in the field at the three sites in Java and Bali, Indonesia. In the test with sticky traps, the lure containing a 10:1 mixture of (Z)-11-hexadecenyl acetate (Z11-16:Ac, 500 g) and (Z)-9-tetradecenyl acetate (Z9-14:Ac, 50 g) attracted significantly more males than those containing the respective single components (500 g) and blank control in Bali and Bogor. This is consistent with the result of the experiment on the same species in a wind tunnel conducted by Usui et al. (*Agric. Biol. Chem.* 51: 2191-2195, 1987). In Bali, more males were captured by the traps in the broccoli, *Brassica oleracea* var. *italica* field than in the cabbage, *B. oleracea* var. *capitata* field. In the cabbage field planted with the cauliflower as a border crop, significantly lower population of *C. pavonana* was observed than in those with the Chinese celery, *Apium graveolens* and the mint, *Mentha* sp. as border crops and than in the field without border crop. A two-choice cage assay suggested that the reduction of the pests on the cabbage accompanied with cauliflower might be due to the females' oviposition preference for cauliflower to cabbage. In the present paper, an integrated pest management strategy for *C. pavonana* with trap crops, based on the pest population monitoring using the synthetic pheromone traps will be discussed.

SOIL-BORNE DISEASES IN NORTH VIETNAM AND BIOLOGICAL CONTROL

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The surveys of the soil-borne diseases on crops grown in North Vietnam were found diseases caused by diverse group of plant pathogens such as fungi, bacteria, and nematode. Most important were fungal pathogens including *Rhizoctonia solani*, *Sclerotium rolfsii*, *Fusarium* spp., *Pythium* sp., *Sclerotinia* sp. These pathogens were difficult to control because they can survive in the soil with wide host range and caused decay of stem, collar and root of peanut, soybean, tomato, bean, cucurbits. The yield losses were from 10-20%. Biological control using *Trichoderma* spp. and *Bacillus subtilis* as bio-agents were effective to control those soilborne diseases and increase development of plant.

SESSION 2B: AGRICULTURE PRODUCTION SYSTEM

INFLUENCE OF ROOT EXUDATE CARBON COMPOUNDS ON SPECIFIC DIAZOTROPHIC ASSOCIATION WITH DIFFERENT RICE GENOTYPES

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Root exudate play an important role in the microbial colonization. An experiment was conducted in axenic condition to study the root exudate carbon sugar and amino acids of three different rice varieties and their influence on *Corynebacterium* and *Rhizobium sp* populations. A total of 17 amino acids and 7 carbohydrate sugars were determined in the Mashuri, Mayang Sagumpal and MR219 rice varieties. The amount of root exudate carbon sugar and amino acids significantly differ with rice genotypes. Plant produced different amount of sugar and amino acids in the presence of diazotrophs compared to control. In Mashuri and Mayang Sagumpal the highest total root exudate carbohydrate sugars were produced at 6 days after transplanting (DAT). Where as, in MR219 the highest total sugars were found in the culture solution at 12 DAT. Glucose, mannose, sucrose, arabinose, galactose, xylose and fructose were the main carbohydrate sugars detected in root exudates of the three rice varieties. Aspartic, serine, glutamine, glycine, threonine, and isoleucine were the major common amino acids found in all three rice varieties. Mashuri variety produced the highest amount of (259.41 $\mu\text{mol g}^{-1}$ root dry weight) amino acids at 3 DAT. Mayang Sagumpal and MR219 rice varieties produced the highest of (43.60 and 104 $\mu\text{mol g}^{-1}$ root dry weights) amino acids respectively at the 12 DAT. Different sugar and amino acids were consumed at different rate by the isolates.

There was a significant relationship between diazotrophic populations and sugar and amino acids consumption of the culture solutions of the three rice varieties. Mayang Sagumpal and MR219 colonized by *Corynebacterium sp.* increased plant biomass by 80% and 63.3% respectively compared to non inoculated control plants. The highest leaf nitrogen was observed in MR219 rice variety inoculated with *Corynebacterium sp.* The importance of identifying the most consumed carbon sugars and its application may increase the root colonization and subsequently N fixation in the rice plants.

VEGETATIVE RESPONSE OF *JATROPHA CURCAS* L. TO NPK FERTILIZATION

Virginia M. Padilla, Danilo M. Mendoza and Hiyasmin Rose L. Benzon

An experiment was established to identify the nutritional requirements of *Jatropha curcas* for nitrogen (N), phosphorus (P), and potassium (K) under field conditions. *Jatropha curcas* showed positive response to N or P but not to K fertilization alone on a Lipa clay loam soil. Plants fertilized with combinations of P and K or N, P and K also showed better vegetative growth than those of the control plants. The response of the plants to NPK fertilization will be continuously monitored until maturity for seed production.

BIO-TECH ORCHID: WEALTH CREATION AND ENTREPRENEURIAL DEVELOPMENT

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Their unique shapes and colors, their exotic and inaccessible habitat in the tropical forests and mountains had made orchids the darlings of wealthy collectors of Victorian era. They were insistently hunted by collectors across the globe who gave their lives in pursuit of very rare varieties that even today can easily fetched thousands of dollars.

In recent years, floriculture, specifically orchid has emerged as a profitable agri-business option the world over, particularly in the developing nations. These days commercial orchid business commands a staggering US 2 billion value annually and its still growing. In Thailand for example, the past 40 years, ever since 1965, the industry has been developing its orchid breeding incessantly and rapidly. The value of its orchid export rose from merely 80,000 US dollars during the early ears to 100 million US dollars today. Malaysia is currently the 2nd biggest cut orchid exporter in the world after Thailand.

In 2003, Malaysia export RM11.3 million worth of cut orchids to Singapore . Other big export markets were Japan (RM410,000), Australia (RM290,000) and the Netherlands (RM180,000). In 2005, the Malaysia cut orchid exports stood at RM36 million with Johor contributing nearly 90% of the output. Presently, Taiwan, Singapore, Hawaii and the South Americas are fast becoming cut orchid producers. Taiwan and Thailand are also into exporting orchid in pots and it has since become more significant. Compare to the traditional method (exporting orchid plant minus the medium), they now not only can export bigger plant, took lesser time to mature but they also fetched better prices.

Given the emphasis of developing the floriculture industry for export as envisaged in the third National Agriculture Policy, this paper discusses details and strategies in which the industry and Malaysian government can partake in order to claim a bigger portion of the lucrative international orchid market. There is indeed a tremendous growth potential for local orchid industry given the innovative model and the modus operandi on how to operate and execute the whole business cycle of the enterprise as presented in this paper. The tripartite production and marketing arrangement initiatives would benefit the newly created entrepreneurs, the private sector and the government as well as promoting wealth creation as in the national agenda.

ECONOMIC AND ECOLOGICAL ASSESSMENT OF RICE AND VEGETABLE PRODUCTION IN VAN NOI COMMUNE, HANOI, VIETNAM

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Although rice has been a traditional crop produced by Vietnamese farmers, commercial vegetable farming in Red River Delta started in the 1980s. Moreover, the government introduced safe vegetable production in the 1990s. In 2000, the government identified 20 communes in Hanoi for growing clean vegetables, of which Van Noi commune accounts for 60 ha planted by approximately 500 farmers.

As part of the Academic Frontier Research Project, a total of 100 farms were intensively studied and ten farmer's plots were monitored for three years (2001-2003) in Van Noi Commune. The monitoring survey gathered data regarding production practices in a specified plot with an average of 0.9 sao (324 sq.m.). It has been hypothesized that although vegetable farming is known to be more profitable than rice farming, continuous vegetable rotation will lead to environmental stress and

purchasing of rice which was traditionally produced and home consumed. Thus, our ultimate goal is to determine the suitable crop combinations towards economically sound and ecologically friendly farming.

This paper presents the clarification of cropping patterns, common cultivation practices, nitrogen inputs, cost and return of major crops, farm business analysis and suitable crop combinations.

ECONOMICAL PRODUCTION OF CARROT (*DAUCUS CAROTA* L) IN STRAW RECYCLED SACKS

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Carrot (*Daucus carota* Linn) is one of the most nutritional vegetables of the family Umbelliferae. It is commonly grown in places where the climate is cool. It is a short season cash crop and can be grown any time of the year. The crop was produced or contained in recycled straw sacks filled with mixture of different soil media and harvested after 90 days from sowing.

The study showed that to produce a kilogram of carrots planted in recycled/used straw sacks filled $\frac{3}{4}$ of the mixture of loam soil, rice hull, sand at equal parts and decomposed chicken manure as fertilizer was amounted to twenty seven pesos and eighteen centavos (PhP27.18/US\$0.58) with a profit of ten pesos and fifty five centavos per kilogram (PhP10.55/US\$0.22). The return of investment, ROI, is thirty eight point eight percent (38.8%)

The result of the study provides benefits to the following: Everybody, because of its nutritious content like protein, vitamins and minerals and rich in beta-carotene; Businessmen, because it gives 38.8% ROI; Family households with a very limited planting space especially in the urban areas; Farmers, who can plant near his residence even after his farm work; Housewives, who have minimal budget for food; Professionals, where they can spend their free time planting carrots even in their terraces or available space within their perimeter; Anybody, who has an aesthetic values for its ornamental view. It can also be an additional income to anyone who is interested to raise carrots in straw recycled/used sacks. Health conscious individuals can take advantage of its therapeutic nature and it being free from insecticidal/or chemical effect. Environmentalists can recycle the used straw sacks which start to decay after six months of use.

SESSION 2C: FARMING SYSTEM

**FISH AND VEGETABLES DIVERSIFICATION IN IRRIGATED RICE FIELDS IN
SUMATRA, INDONESIA: A STUDY OF TWO VILLAGES IN KOMERING
IRRIGATION AREA**

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Diversification has become one of the government policies in Indonesia since the late 1980s, however, it seemed that diversification was still not practiced by most farmers. Based on questionnaire survey conducted in Komering Irrigation area, this paper aims to identify the existing cropping patterns and examine the factors affecting diversification in Karang Sari and Tambak Boyo villages.

In Karang Sari, besides planting rice, some farmers raised carp (ikan mas) at their rice fields. The existing patterns of rice-fish production in Karang Sari were Rice-Rice-Fish, Rice-Fish-Rice-Fish, Rice-Fish-Rice and Rice-Rice. In Tambak Boyo, there were some farmers who planted vegetables and raised fish in their rice fields. There were two farmers who raised fish together with rice which known as "Mina Padi". The existing patterns of rice-vegetables production were (Rice+Vegetables)-Rice that was the most common practiced pattern, followed by Rice-(Rice+Vegetables), (Rice+Vegetables)-Vegetables-Rice, Rice-Vegetable-Rice and Rice-Rice-Vegetables. Logit analysis for fish diversification in Karang Sari showed that education had positive relationship, whereas distance from road and other job had negative relationship in which the three factors were significant at the 5% level. Logit analysis for vegetables diversification in Tambak Boyo failed to identify the factors affecting farmers to choose vegetables diversification. It seemed that farmers in Tambak Boyo cultivated vegetables as tradition. It revealed that fish and vegetables production have provided more employment and made a positive contribution to household economy.

**CURRENT SITUATION OF THE SOME FEATURES OF FARM MANAGEMENT
ENTREPRENEURSHIP OF ADVANCED FARMERS IN SUB-URBAN AREAS
IN MYANMAR**

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Since the transfer to market-oriented economy in Myanmar in 1988, agriculture has been getting sensitive to market prices, while increasing the production of regimes for export and horticultural products for local use in companies with the sizable domestic market. In addition to this movement, focusing on the site nearby central city like Yangon, it can be shown that some of commercialized farmers try to carry out the newly developed farm management, meeting the activated handling of agricultural products with the change of consumer's behavior.

The purpose of this study is to identify the process and factors of income difference among farmers in the surveyed area, putting emphasis on the existence of farmer's entrepreneurship. In the rural area nearby big city, farmers have good access to market, transportation and information.

However, it should be noted that farmers can be polarized into two groups; farmer's group with market oriented attitude and the farmer's group with traditional and semi-subsistence farming style at this present time.

In comparison with the advanced farmers and the conventional ones, it will be expectedly clarified what are the crucial factors in income difference between two farmer's groups, in particular which may occur by the existence of entrepreneurship.

CROSSING THE THRESHOLD OF POVERTY TO PROSPERITY: A SHIFT FROM SUBSISTENCE FARMING TO COMMERCIAL FARMING

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This paper discusses the learning insights in exploring livelihood options for upland farmers in a watershed area in the Philippines. Of interest and focus is the experience of pre-operating activities in putting up an ethanol plant that is envisioned to be. This was also an inquiry of possible opportunities for farmers in a paradigm shift that is hoped to be: *of crossing the threshold of poverty to prosperity by a shift from subsistence farming to commercial farming.*

Further, this paper identifies determining factors for possible actualization of an ethanol plant that shall be fed energy crops particularly of cassava (*Manihot utilisima*) and Sweet Potato (*Ipomea batatas*). Such a project idea of an ethanol plant offers farmers an opportunity to increase volume of production, thus, an increase in farm income and an improvement in their quality of life.

However, the success of the business of commercial farming in cluster farming approach is beyond the realities of the farmer and farming family; further beyond the land and the technology. The government support must come into play together with the industry and investment sector.

The question of which should come first: "the ethanol plant that provides a stable market or the regular production of the raw materials at the required volume?" is also discussed in this paper. The learning insights, overall, is hoped to guide possible investment in an ethanol plant or similar industrial activity that will provide a stable market to make possible the paradigm shift for farmers: *of crossing the threshold of poverty to prosperity by a shift from subsistence farming to commercial farming.*

DETERMINANTS OF ALTERNATIVE TECHNOLOGY ADOPTION AMONG RICE FARMERS IN CENTRAL THAILAND

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Rice farming is still an important industry in Thailand. In around 2002, some farmers started introducing low-input rice farming system. Actually, a group of rice farmers in Suphan Buri, which is the main granary of Central Thailand, developed an alternative technology, known as bio-rice farming system (BRFT). This low-input rice farming system is characterized by the reduction in synthetic chemical inputs and the use of bio-extract. This new technology was considered good for the farmers' health and environment. Net income of low-input rice farmers also appeared to be higher than under conventional farming.

This study attempts to clarify technical level, productivity and profit of low-input rice farming in comparison with the conventional rice farming system. In particular, the determinants of the adoption of this low-input technology among rice farmers in the study area will be clarified by

logit analysis. Data were obtained from a questionnaire survey of 94 rice farmers in Suphan Buri province in 2005.

IMPROVING THE COMPETITIVENESS OF THE PHILIPPINES' ABACA INDUSTRY: AN APPLICATION OF THE SUPPLY CHAIN MANAGEMENT APPROACH

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The Philippines accounts for 83.7% of the total world production of abaca fiber. The bulk of production comes from Eastern Visayas, Bicol, and Southern Mindanao which account for 36%, 30%, and 18%, respectively. It is one of the top 10 agricultural export commodities of the country in 2004 but its overall export contribution has declined at the rate of 2.8% per annum during the last 10 years (NSCB, 2005). Surprisingly, the Philippines still imports small amount of fibers from Ecuador to fill up the deficiency in the supply of specific grades, meet buyers' specifications, and for testing purposes.

If the problems of the abaca industry are not properly addressed, the country could lose its competitive edge over Ecuador, which is the second leading abaca producer and Indonesia, given its agro-climatic environment similar to the Philippines and aggressive effort to develop its abaca production thru massive plantations. This paper suggests that issues besetting the abaca industry may be examined from a supply chain management (SCM) approach. The approach has been used in the manufacturing sector and in large agribusiness companies to improve the production, distribution, and marketing processes so as to meet the consumers' requirements on quantity, quality, and price of the products.

This paper shall provide an initial analysis of the issues besetting the abaca industry in the Philippines from the SCM perspective. As a backdrop, the paper shall provide an overview of the abaca industry, giving particular attention to the major players in the supply chain. The core concepts in SCM shall also be discussed briefly to provide a common understanding of the main topic of this paper.

CONSUMER'S PERCEPTION OF MUTTON CONSUMPTION IN PENINSULAR MALAYSIA

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Consumption patterns for different meats have changed considerably in Malaysia over the last few decades. This development shows that the total amount of meat per capita consumed has grown 57.3% from 1990 to 2003. The highest growths are seen in poultry, mutton and beef, which have increased 99.2%, 78.6% and 57.1% from 1990 to 2003 respectively, while the consumption of pork declines by 22.3 %. Among the factors cited for this meat consumption growth are the effects of changing relative prices and rising income, associated changes in dietary patterns, taste and preferences in the country as well as the improvement of the marketing system and the distribution channels. Religion and ethnic background of the population are also important factors influencing meat consumption. Islam, the main religion in Malaysia, prohibits pork consumption, while Indians do not take beef. There is no religion taboo with mutton as it can be consumed by all Malaysians. However, most Malaysian have some reservation in consuming mutton, as it has been associated

several health risks, largely due to the saturated fat content and high blood pressures. Consumers also have some problem in getting mutton in the market and its price is high compare with other red meats. A clear understanding of consumer's needs is important to help the meat industry to be proactive in providing households with a reliable and safe source of protein. Mutton marketers need to know whether consumers hold favorable or unfavorable attitudes toward mutton, and they have to understand the reasons behind these attitudes.

The objectives of the research are to analyze consumers' perceptions and attitudes towards mutton consumption and to provide information which is suitable for decision making. The data used in this study were collected using primary data through a structured questionnaire, taste test and observation test from various states in Peninsular Malaysia. The number of respondents involved in this study was 525 people. The results of this study imply that the market potential for mutton is bright, but we must view this with caution. The study shows that consumers are more concerned about health issues and nutritional value. They have negative perception towards mutton due to lack of knowledge and the special quality of mutton. Hence, mutton is not as a preferred meat compare to other meats as beef and chicken. This perceptions and attitude become major barrier in mutton consumption and leading to a slow development of mutton industry. Factors such as availability and high price also hinder the majority of the consumers from consuming mutton. Thus, the consumption of mutton is still low and unsatisfactory. The continuous promotion campaign is important to highlight the nutritional value and quality of mutton and to change consumer's negative perception towards mutton with regarding health issues.

SESSION 3A: PEST AND DISEASE

THE RELATIONSHIPS BETWEEN HOVERFLY *SYRPHUS RIBESII* LINNE (SYRPHIDAE : DIPTERA) AND APHIDS IN SOME CROPS AT GIA LAM-HANOI

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The relationship between *Syrphus ribesii* Linne and aphids was studied on vegetables and other crops in 2005 – 2006 at Gialam, Hanoi. *Syrphus ribessi* Linne is one of the most effective and widespread of predatory flies belonging to Syrphidae at Gialam, Hanoi. These probably have a wide host (prey) range. *Syrphus ribessi* Linne is a very important natural enemy of aphids attacking vegetables and other crops, such as: *Aphis gosypii* Glover, *Myzus persicae* Sulzer, *Rhopalosiphum maidis* Fitch, and *Lipaphis erysimi* Kaltenbach. It appeared on vegetables growing in the winter season and reduced aphids populations which moved from vegetables and other crops growing in spring and summer season. These consume aphids in vegetables in Gialam, Hanoi

BEHAVIORAL RESPONSE OF *OSTRINIA FURNACALIS* AND ITS NATURAL ENEMIES TO SELECTED PLANTS AND WEEDS CLOSELY ASSOCIATED WITH CORN

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Companion planting and diversified planting utilize volatile plant chemicals which affect insect behavior. Companion planting is a cultural practice that uses plants with some insect-repellent interspersed with other plants. Plant chemistry is a very important source of information for insects which determine its oviposition behavior and its choice of a host plant. Acceptance or rejection of a

plant is determined by the overall effect of the opposing positive and negative semiochemical cues that the insect receives from the environment. The identification of plants (crops or weeds) that provide semiochemicals beneficial to crops, such as repellents for the insect pests and/or attractants to parasitoids, is important for pest management in field. These plants could be grown as intercrops or companion plants, thus reducing the need for chemical control.

Bioassays were conducted to determine suitable companion plants for corn that will enhance repellency for the corn borer or attractancy for natural enemies closely associated with corn. Results from bioassays conducted on corn borer and the natural enemies *Trichogramma* and earwigs for oviposition, predatory and olfactory response show indications that oregano, lemon grass and roselle would be good companion plants for corn. These plant may serve as oviposition sites for corn borer but do not support larval growth. The effect of these plants were also evaluated against natural enemies found in corn. Results show attractiveness of the extract to *Trichogramma evanescens* thus increasing the apparency of its host, corn borer larvae, and increasing the probability of parasitization. Earwigs were not repelled by the chemicals found in oregano and lemon grass, among others.

PHYTONEMATODES INFESTING PINEAPPLE PLANTS IN INDONESIA AND ITS RELATIONS WITH PINEAPPLE MEALYBUG WILT DISEASE

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Phytonematodes extracted from root and soil samples collected from different growth stages of pineapple plants showing and not showing symptom of pineapple mealybug wilt disease (MWD) in Indonesia were evaluated. By using identification key: *Plant Parasitic Nematodes - A Pictorial Key to Genera* (May *et al.* 1996), the phytonematodes found colonized the pineapple roots and the soil around the root were *Criconeoides*, *Dithylenchus*, *Helicotylenchus*, *Haplolaimus*, *Meloidogyne*, *Pratylenchus*, and *Rotylenchulus*. In line with its intrinsic characters, *Pratylenchus* was likely a genus dominating the population among phytonematodes live in the pineapple root, whereas *Rotylenchulus* dominated the population in the soil. The numbers of *Pratylenchus* and *Rotylenchulus* in the roots and soil, respectively, collected from the MWD symptomatic pineapple plants were not significantly different from those of the MWD asymptomatic (healthy) plants. Apparently, the infestation of *Pratylenchus* and or *Rotylenchulus* in pineapple roots and soil is not related to the symptom induction of MWD.

TOMATO YELLOW LEAF CURL VIRUS- LIKE DISEASE AND MANAGEMENT

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Tomato yellow leaf curl disease is widely recognized as a seriously constrain to tomato production in north Vietnam. The disease is caused by at least two viruses belonging to the genus *Begomovirus* with ss DNA, Tomato leaf curl Vietnam virus (ToLCVV, AF264063) and Tomato yellow leaf curl Vietnam virus (TYLCVNV) and they are found in tomato leaf samples with yellow leaf curl symptom by PCR using specific primers for ToLCVV (ToLCVV-sp-F2 & ToLCVV-sp-R2) and TYLCVNV (TYLCVNV-sp-F1 & TYLCVNV-sp-R1). Management of the disease by vector control using yellow traps, a bio product "Somec 2 SL(0.15%)" and a pesticide "Actara 25WG (

0.01%” showed effective to decrease the population of the virus vector *Bemisia tabaci* and the occurrence of the disease in the fields.

SESSION 3B: TECHNOLOGY IN CROP PRODUCTION

THE CHANGE OF *NEC1* GENE COPY NUMBER DETECTED IN SOIL IN POTATO SEEDLING TRANSPLANT CULTIVATION FIELD

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We examined to know the control effect on potato scab of the transplant cultivation of potato seedling. The scab severity of seed tuber plot was recognized at head of July and that scab severity became 57.9 at the end of July. However, after the head of August, the rapidly increase of scab severity was not recognized. On the other hand, the scab severity of potato seedling plots was first recognized at the head of August. Afterward, the scab severity became 30.6 by the middle of August and continued to increase until the head of October which potato are harvested. From these results, we found out that the scab severity is lower than the scab severity of seed tuber, in the early stages of the tuber forming of potato seedling. Moreover, we investigated about the change of the number of the *necl* genes in soil in both the potato seedling plot and the seed tuber plot. The *necl* gene is gene that forms part of a pathogenicity island in common scab potato pathogen. The quantity of *necl* gene of seed tuber plot increased rapidly from the end of June to the end of July. Though the quantity of *necl* was decline tendency during August, that quantity increased on September again. On the other hand, the quantity of *necl* gene of potato seedling plot was low at the end of July. During the middle of August from the end of July when tuber of potato seedling plot initiate growth, the quantity of *necl* of that plot decreased. And, on September, the quantity of *necl* of potato seedling plot increased again similar to seed tuber plot. These results suggested that the activity period of potato scab pathogen in potato seedling plot soil was different from the seed tuber plot.

LOCATIONAL AND TECHNOLOGY DIFFERENCES AFFECTING THE COMPARATIVE AND COMPETITIVE ADVANTAGE OF THE ABACA FIBER INDUSTRY IN THE PHILIPPINES

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The study assessed the competitive and comparative advantage of the abaca fiber industry in the Philippines using farm survey data gathered from 200 abaca farmers from four major abaca fiber-producing provinces in the Philippines, namely, Leyte, Southern Leyte, Davao Oriental and Catanduanes and from published abaca industry statistics..

Results of the export and cost competitiveness analyses showed a declining revealed comparative advantage (RCA) and that regardless of locations and stripping technology options, the Philippine abaca industry has a comparative advantage. However, machine-stripping technology has a higher comparative advantage than hand-stripping technology across locations, which means that the former is more efficient in the use of domestic resources than the latter. Moreover, the study found that machine stripping technology has a competitive advantage, but hand-stripping technology has no

competitive advantage across production locations because the latter is less efficient than machine-stripping technology. Abaca fiber yield and fiber price influenced the behavior of the competitive advantage of the Philippine abaca fiber industry. The estimated elasticity coefficients of domestic resource cost (DRC) showed that across technology options, DRC was most sensitive to changes in market price and yield of abaca fiber and that it is inversely related to these parameters.

Considering that the Philippines is importing high quality abaca fibers from Ecuador to meet a portion of its domestic demand, enhancing the adoption of machine-stripping technology would also increase the production of high quality fiber and save on foreign exchange from importation.

Machine stripping adopters in Leyte, Southern Leyte and Davao Oriental preferred to use the fixed-type over the portable type of stripping machine due to convenience, cost of stripping and efficiency considerations. These criteria should be given due emphasis for future research and development on abaca stripping machines.

EFFECT OF BIO-FERTILIZER ON FRUIT YIELD AND QUALITY OF EGGPLANT, *SOLANUM MELOGENA L.*

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An experiment was conducted in 2007 spring cropping season to investigate the response of eggplant to bio-fertilizer (completely organic, containing 0.037% N, 0.95% P and 1.8% K) in comparison with semi-organic fertilization and traditional practice of fertilizer application (completely inorganic) in terms of growth and fruit yield and quality traits. Bio-fertilizer was obtained from microbial composting of organic agricultural and domestic wastes. It was found that bio-fertilizer application for eggplant appeared to be superior to chemical fertilizers in terms of vegetative growth, fruit yield and quality attributes. Bio-fertilizer slightly shortened the days from planting to flowering, reduced pest incidence, and improved the yield components and total marketable fruit yield in most of the cultivars investigated. Fruit dry matter content was higher and the taste better in organic treatment in all cultivars, particularly of local cultivar. Organic fertilizer can be recommended as full substitute for chemical fertilizers in eggplant production.

ACCOMPLISHMENT OF MODIFIED BIO-EXTRACT FOR INCREASING PRODUCTION OF *LITOPENAEUS VANAMEI*: CASE OF BANGPAKONG DISTRICT, CHACHEONGSAO PROVINCE, THAILAND

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Development of farmers' knowledge for increasing *Litopenaeus vannamei* production was performed in cultured ponds. The stocking density was 70 postlarva/m³, culture period was 17 weeks during November 2006 - February 2007. Two bio-extracts, namely, traditional and modified bio-extract were applied throughout this study at the rate of 25 ml/ m³. Completely Randomized Design was used in the three experimental ponds consisting of control ponds, traditional bio-extract treated ponds and modified bio-extract treated ponds with three replications each. The average shrimp production of the ponds treated with modified bio-extract was the highest at 9969 kg/ha with an average weight of 14.22 g and 83.3 % survival rate, whereas, the average production of the ponds with traditional bio-extract and control ponds were 8850 and 7869 kg/ha, 13.11 and 13.97 g average

weight, and 80.5 and 67.7 % survival rate, respectively. Use of modified bio-extract and traditional bio-extract gave significant differences in ammonia and nitrite reduction efficiency at a 95% confidence level at which the modified bio-extract resulted in reducing ammonia and nitrite better than the others. An average cost of materials used for formulating modified bio-extract, and traditional bio-extract were found as 1.39 and 1.11 Baht, respectively. The results indicate the effectiveness of using bio-extract for controlling ammonia and nitrite resulting in higher survival rate and shrimp production than without using bio-extract.

FERTILIZER POTENTIAL OF EFFLUENT FROM ANAEROBIC DIGESTION OF ANIMAL WASTE

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The sustainability issues have become important in the world. Many countries have started stimulating biomass power generation supply chain systems as sustainable and green resource of energy. Closed-system anaerobic digestion has the potential to eliminate most of the lagoon emissions while conserving more nutrients, while producing a renewable energy source as an additional benefit. In addition, the anaerobic digestion process creates potentially valuable by-products, such as the solids fraction - fiber, and liquid with available nutrients. The anaerobic digested slurry (ADS) has a fertilizer potential. It is necessary to assess the environmental effects such as groundwater contamination, soil contamination and the crop quality for promoting organic waste recycling of wastes and utilization before their application to field.

This study sought to investigate the effects of applying ADG on groundwater quality, soil, and feed crop yield and quality. Two feed crops; orchard grass (*Dactylis glomerata* L.) and tall fescue (*Festuca arundinacea* Schreb.) were grown. Feed crop field plots (1a turf-type) had been treated 2 years with dairy manure ADG, swine manure ADG, and chemical fertilizer included no added fertilizer as a control for each crop. Fertilizer application amounts 100 kgN/ha/year was determined by equalizing the ammonium nitrogen contained within the recommended commercial fertilizer with the ADG for each. Fertilizers were applied three times per year, 1/2 in spring and 1/4 in the summer and fall after harvesting. Soil samples were taken from upper layer (30cm in depth from the surface), middle layer (30~60cm in depth), and lower layer (60~90cm in depth). Groundwater samples were taken from 100cm in depth to earthenware cups by vacuumed pump device every two weeks.

The result of yield, hey quality analysis and groundwater analysis showed the ADG of animal waste could be an environment-friendly alternative fertilizer.

SESSION 3C: AGRIBUSINESS

MICROCREDIT IN DEVELOPING AGRO-ENTREPRENEURS FOOD PRODUCTION IN RURAL AREAS

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Amanah Ikhtiar Malaysia (AIM) is one of the NGOs in the country which plays an important role in developing agro-entrepreneurs among the poor in the rural area. Established in 1987, the objective of AIM is to uplift the economic well-being of the poor by providing micro credit loan and non-financial assistance to increase their income through income generating program such as agricultural food production activities. Five hundred and sixty-seven agro-entrepreneurs who took loans from AIM were interviewed via structured questionnaire to gather information on their view of microcredit in uplifting or otherwise in their standard of living. The factor analysis was applied to evaluate the possible factors that contributed to the success of borrowers in improving their livelihood. The analysis has induced six factors that positively contributed in developing agro-entrepreneurs among the rural poor. These factors were skills and knowledge development, self-esteem, cooperation, independent, asset accumulation and well-being. Thus, microcredit contributes to the empowerment of agro-entrepreneurs among the rural poor. Given the positive impact of microcredit in empowering the rural poor engaging in agricultural activities, multi-pronged efforts on increasing agricultural productivity by providing technical and managerial support should be enhanced by the relevant government agencies in lieu of the microcredit loan.

UNCOVERING FACTORS DRIVING CONSUMERS' CONFIDENCE ON HALAL LOGOS ON FOOD PRODUCTS IN MALAYSIA

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All foods consumed by Muslims must meet the Islamic dietary code called Halal. Halal is an [Arabic](#) term meaning "permissible" and Muslim consumers are found to be very concerned about the Halalness of the foods they consume. They believe that the Halal issue is the total quality control measures involved in monitoring the slaughtering process, handling, storage and ingredients used during food processing. Thus Halal logo also is a way to inform and to reassure Muslims that food products and all the ingredients are Halal and the products are processed based on the Halalness requirement by Islamic laws. The aim of this endorsement is to indicate that their products meet the Islamic standards. However several food-related lawsuits have made media headlines recently. The High 5¹ stated that its bakery products were cooked in 100% Halal oil when in fact it was from Israel or Germany, which is doubtful about being Halal (The Malay Mail, 14.Sep.2006). The Dinding² poultry also was sued for not ensuring that its products were Halal, and this suit was settled for

¹ High 5 is a local bread manufacturer in Malaysia.

² Dinding is a local poultry farm in Malaysia.

RM100 million (New Straits Times, 20. January 2006). The lack of enforcement and monitoring in the usage of certified Halal logo has caused the public to question the validity of Halal logo on some of the products or services. Therefore the aim of this study is to acquire information about how trustworthy the Halal logo might be, and how confident the consumers are with the Halal logo which is displayed on manufacturing food product.

A survey was conducted in Klang Valley, where 600 Muslim respondents were interviewed via structured questionnaires to gather information regarding their level of confidence towards Halal logo on food products. The factor analysis was used to determine the factors which influenced consumers' confidence towards Halal logo. Confidence factors related to safety, as well as, government involvement, advertisement and manufacturing practice seemed to be the main determinants of consumers' confidence on halal logo. However the lack of trustworthiness on international Halal logos was one of the factors which reduced the confidence level among those consumers.

CONSUMERS' PREFERENCE TOWARDS SELECTED ATTRIBUTES OF MANUFACTURED FOOD USING CONJOINT ANALYSIS

Mohd Ghazali Mohayidin, Ismail bin Abd Latiff, Zainal Abidin bin Mohamed, Yaacob bin Che Man, Amin Mahir bin Abdullah and Salman bin Selamat

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One of the most important keys to success in business is an accurate understanding of the customer. Many factors have been considered to explain consumer behaviour. Religion, which affects the social and cultural environment in which customers reside and conduct their individuals' behaviour and manners, is very often ignored. All religions around the globe have set of laws that affect everyday purchases and habits. However, the degree in which individual members adhere to their religious convention often varies.

Marketing of products in Muslim countries presents a very challenging task to manufactured food producers or exporters due to the political, economy and socio-cultural aspects. With almost 20% of the world population, and expected to increase to 30% by 2025, the importance aspect to be considered whenever exporting to Muslim countries is fulfilling the "halal" requirements. Halal covers the aspects of slaughtering, storage, display, preparation, hygiene and sanitation as well as the ingredients used in producing products that should originated from the halal sources. Halal which represent an emerging market force exert a powerful influence on the food market in a manner that has not yet been fully anticipated. While in marketing the halal label could give great impact on consumer buying decision.

MEAT PRODUCTS CONSUMPTION PATTERNS IN URBAN AND RURAL MALAYSIA

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With sustained income growth and urbanization, Malaysia has been experiencing major shift from rice to higher value meat products. This objective of this paper is to estimate the demand elasticities for the various meat products. A multi-stage demand system is constructed by utilising the

data from Household Expenditure Survey 2004/2005 produced by Department of Statistics, Malaysia. The multi-stage demand system estimates a demand function for food in the first stage, a demand function for meat in the second stage and a set individual demand functions for meat type in the third stage. The results suggest that Malaysian consumers will continue to increase their consumption of meat products. More specifically, there is preference towards higher value meats, namely beef and mutton over poultry meat in response of income growth.

SESSION 4A: PEST AND DISEASE

OCCURRENCE OF SUGARCANE STREAK MOSAIC VIRUS IN INDONESIA

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Recently, we found a streak mosaic disease infecting sugarcane in 50 sugarcane plantations in Central and East Java, Indonesia. The causal of the disease was suggested as a virus that different *Sugarcane Mosaic Virus* (SCMV) that previously reported and was suspected as exotic virus in Indonesia. The infected plants showed mild streak mosaic on leaves, and the symptom more pronounce on the younger leaves than elder one. Almost all commercial sugarcane clones were infected by the virus with incidence approximately was 1-62% and predominantly infected sugarcane clone PS 864 in all plantations. Total RNA extracted from infected sugarcane and constructed the cDNA with poly d(T), then amplified the cDNA by RT-PCR using a pair of specific primer to the CP 3'-terminal of *Sugarcane Streak Mosaic Virus* (SCSMV-AP3) and the central region of CP gene (SCSMV-547F). The primers was successfully amplified the DNA sized approximately 500 bp, suggested the positive identity of SCSMV. The partial nucleotide sequences and its biological characters are now under progress.

THE FLOWER BUG TRIBE ORIINI (HETEROPTERA, ANTHOCORIDAE) IN INDONESIA

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The flower bug tribe Oriini Carayon, 1958, belonging to the heteroptran family Anthocoridae (sensu stricto), is represented by approximately 100 species in about 15 genera from the world, and has been considered to include natural enemies against agricultural pests such as thrips. In order to use these insects in biological control, it is necessary to inventory species of the tribe. However, there is no sufficient taxonomic study of the Oriini in Indonesia.

Our recent continuous surveys of the Oriini in Indonesia has resulted in recognition of three species of the genus *Orius* Wolff, 1811 (including one undescribed species) and three species of the genus *Montandoniolla* Poppius, 1909 (including two undescribed species). In this presentation we introduce the Indonesian representatives of the Oriini from the taxonomic viewpoint, with information on their biology such as habitat and food.

DISEASE RESISTANCE INDUCTION IN CUCUMBER PLANT BY THE TREATMENT WITH MACERATED CUCUMBER LEAVES INOCULATED WITH *COLLETOTRICUM LAGENARIUM*, THE CAUSAL AGENT OF CUCUMBER ANTHRACNOSE

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It had been reported that the upper leaves of the cucumber plant that was previously inoculated by *Colletotricum lagenarium*, the causal agent of cucumber anthracnose, were to be immunized against following inoculation by the same pathogen. The leaves of immunized plant showed no or less anthracnose lesion compared with the non-immunized plant. The inoculated cucumber leaves bearing many lesions were sampled, frozen at -70C° and macerated to make sap solution. The cucumber seedling was sprayed by supernatant of the solution, incubated in glass house and sprayed with spore suspension of *C. lagenarium* on the upper leaves 2 days later. The leaves of the treated seedling showed almost no or very mild symptom while so many lesions were seen on the leaves of the control seedling treated by sterile water. Relatively small number of lesion was seen on the cucumber seedling sprayed with even the supernatant of the healthy cucumber leaf sap solution. The spore of *C. lagenarium* could germinate and grow evenly both in the supernatant and sterile water but the appressorium seemed to be formed only in sterile water.

SESSION 4B: TECHNOLOGY IN CROP PRODUCTION

APPLICATION OF ZEOLITES AS SLOW RELEASE AGENT OF NITROGEN FERTILIZER

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Zeolites are aluminosilicate minerals having unique cation-exchange properties, molecular sieving, and adsorption make these minerals attractive to industrial, environmental, and agricultural utilization. Zeolites have capability to capture ammonium ion (NH₄⁺) so they are possible used as slow-release agent of nitrogen fertilizer. Indonesia has many zeolite deposits spreading in Sumatera, Java, Nusa Tenggara, and Maluku. Therefore, zeolites are possible used in large scale for agricultural utilization in Indonesia. Nitrogen is the most important nutrient element and the key to increase plant production. However, the efficiency of this element is very low due to ammonia volatilization and denitrification. Pot and field experiments were conducted to evaluate the possibility of zeolites for slow release agent of nitrogen fertilizer as well as how the technical application in the fields. The results showed that addition of zeolites with the ratio of 1:1 increased slightly the grain weight of rice due to increasing panicle number. The increase of rice yield become 17% when the mixture of zeolite and urea was pelletized.

**GROWTH OF *VOLVARIELLA VOLVACEA* IN AN UNCONTROLLED ENVIRONMENT
USING WATER HYACINTH AND TRADITIONAL RICE STRAW AS BEDDING
MATERIALS**

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This study aimed to determine the growth performance of straw mushroom (*Volvariella volvacea*) using water hyacinth and the traditional rice straw as bedding materials.. Specifically, the study aimed to determine the growth of the straw mushroom in terms of the following: number of days from spawning to appearance of pinheads; number of days from pinhead to button stage; number of days from button stage to biological maturity; number of mushrooms harvested, length of mushroom stalk; diameter of mushroom cap; and weight of mushrooms harvested. It also tried to determine the yield in terms of the Return of Investment.

Statistical tools used were frequency count to describe the number of days from spawning to appearance of pinheads, number of days from pinhead to button stage, number of days from button stage to biological maturity, number of mushrooms harvested; the Mean to describe the growth performance of the straw mushroom in terms of the length of mushroom stalk, diameter of mushroom cap, weight of mushrooms harvested and the t-test to determine if there was a significant difference on the growth performance of the straw mushroom using the two types of bedding materials.

No significant difference occurred on the number of days from spawning to appearance of pinheads. As to the number of days from pinhead to button stage, t-test result showed a significant difference between the two bedding materials used. As to the number of days from button stage to biological maturity, results showed a significant difference between the two treatments. As to the number of mushrooms harvested, t-test showed a highly significant difference between the two treatments. On the length of mushroom stalks, there was no significant difference between the treatments used. As to the diameter of the mushroom caps, results showed no significant differences between the two treatments. On the weight of the mushrooms harvested, no significant difference occurred between the two treatments. And finally, there was a significant difference on the cost and return analysis from the use of the two bedding materials.

Water hyacinth used as a bedding material in the culture of the mushroom *Volvariella volvacea* has a great influence on the growth of the mushroom in terms of the number of days from pinhead to button stage, on the number of days from button stage to biological maturity, and on the number of mushrooms harvested. There is a high Return of Investment (ROI) in using water hyacinth as a bedding material in the culture of *Volvariella volvacea*. The water hyacinth is highly recommended as a bedding material in the culture of the mushroom *Volvariella volvacea*. Further study on mushroom culture should be conducted during the dry season, particularly during summer.

**EVALUATION OF PROCESSING AND TABLE POTATOES
FOR THE PHILIPPINE HIGHLANDS**

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Potato clone IP 84004.7 with recommended name 'GANZA' had been developed through continuous five year evaluation trials from 1999-2004. Work has been done by the Northern Philippine Root Crops Research and Training Center at Benguet State University, La Trinidad,

Benguet, Philippines by a group of experts consisting of interdisciplinary fields; a tissue culture specialist, curator, agronomist, postharvest specialist and a food specialist.

It started with a parent material of TPS-7 which was sourced from the international breeding station of potato in CIP, Lima, Peru. This started through observational, preliminary, advanced and the multi-locational yield trials. This was conducted in the highland provinces of Benguet; Atok, Madaymen, Buguias which is known to be a potato growing area with an elevation of 1,200-2,500 masl. Through the years during the evaluation trials it was participatory approach involving farmers selection and decision. As per standard procedure of the National Seed Industry Council (NSIC), two dry and wet season trials were completed. As per results it showed that it outyielded the two check varieties Igorota and Granola in terms of yield, and found comparable in terms of its resistance to late blight and leaf miner. In terms of acceptability rating and dry matter content, it was comparable with the two check varieties.

AGRICULTURAL PRODUCTION SYSTEMS IN THAILAND: OPPORTUNITIES OR THREAT FOR THAI FARMERS

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The global changes of agricultural production systems due to food safety measures have impacted directly to the exported countries. In Thailand, several primary production systems have been introduced, implemented and enforced in different commodities under the Ministry of Agriculture and Cooperatives. Good Agricultural Practices (GAP) in different names has been adopted such as Good Agricultural Practices for plant commodities, Good Animal Practices for livestock and Good Aquaculture Practices for fisheries. Since the implement of these systems in 2000, the target number of farms have been set up and certified according to the authorized certification system. However, upon the requirements of international system for accreditation and certification rather than official authorization are needed. The National Bureau of Agricultural commodities and Food Standard (ACFS) who responded in this issue must be first accredited under the ISO/IEC 17011 and also certified bodies (authorized departments) such as Department of Agriculture, Department of Fisheries and Department of Livestock Development must be certified under ISO/IEC 17021. The other production systems such as GAP (for plants) in different measures such as DoAGAP, ThaiGAP, UrepGAP (GlobalGAP) and AsianGAP where equivalency are required and also Organic Farming (EU, JAS (Japan) and NOP (US) have also been encouraged. These systems give opportunities as well as threat to the farmer in both production and economy where farmers have to decide to adopt by themselves.

SESSION 4C: AGRIBUSINESS

UPLAND POVERTY REDUCTION THROUGH PAYMENT FOR WATERSHED SERVICES

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Payment for watershed services approach requires hydrological, land use, resource valuation and market research to establish a water supply problem caused by land-use change and increase in water demand due to population increase and industrialization. Willingness-to-provide watershed services surveys were conducted to know the price of the upland farmers and their willingness to convert portion of their farms into watershed conservation plantations. Also, willingness-to-buy surveys were conducted to assess the water-users buying price of water.

The highest opportunity cost of farm is the selling price of raw water of the upland farmers, which will be paid by water buyers annually on a sustainable basis. In return, the upland farmers will use the payment to establish, protect and maintain Vetiver-Citrus-Jatropha conservation plantations in 125 hectares of farm owned by 500 farmers as water recharge system during the first 3 years. Subsequent payments equal to net annual farm income of farmers will paid by water buyers will be used to finance farm productivity improvement through farm inputs optimization. Additional income from the Vetiver-Citrus-Jatropha is expected to start on year 3 from the sales of Vetiver leaves for handicraft and Jatropha seeds. More income will further increase in year 5 when Citrus starts to bear fruit and additional substantial income from Vetiver oil for perfume will start in year 10. Thus, increasing opportunities of watershed-based farmers to earn more income.

Payment for watershed services is not only for upland poverty reduction but also for restoring degraded watersheds, increasing carbon sequestration potential and biodiversity.

Necessary institutional supports to farmers are organizational development and administration, capacity building, watershed management skills, agriculture and forestry skills, payment collection, product marketing and entrepreneurial capacity development.

**ADOPTION, TECHNICAL, POSTHARVEST AND MARKETING CONSTRAINTS IN
GMELINA ARBOREA HEDGEROW SYSTEMS IN CLAVERIA, MINDANAO:
OPTIONS FOR IMPROVEMENT**

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Gmelina arborea was introduced as an integral component of agroforestry systems to conserve soil and increase productivity of smallholder farms in the sloping uplands of Claveria, Mindanao in the early 1990's. Massive government campaigns attracted a number of farmers in the area to plant *Gmelina* trees in hedgerow systems.

Participatory rapid appraisal (PRA) activities, in-depth case studies and household survey were conducted in Claveria, Mindanao to assess the adoption, technical, postharvest and marketing constraints in *Gmelina* hedgerow systems. The major constraints in the adoption of hedgerow systems are the limited land area of the smallholder farms, land tenure, farm owner's decision in case of farmer tenants, and availability of *Gmelina* seedlings. Technical problems in the growing of *Gmelina* trees include the lack of technical skills of farmers in pruning the trees to produce straight tree trunks, the shading effect of the tree canopies on the alley crops, and the difficulty of clearing the

hedgerow of the tree stumps after harvesting the timber. The major postharvest constraint faced by farmers is the lack of cutting saw to process log into sawn timber. Major constraints in the marketing of *Gmelina* timber include the lack of awareness or information on the prevailing price of timber, lack of a marketing facility in the area, difficulty of farm accessibility to road network and lack of market network for timber.

The recommendations to address the various constraints in *Gmelina* hedgerow systems include various strategies, coping mechanisms, and policy options. Establishment of tree seedling nursery in the different sitios or barangays will ensure availability of tree seedlings. Training on silvicultural management of *Gmelina* trees is needed by farmers to produce timber of high quality that can compete with timber from neighboring provinces. Institutional support such as formation of a cooperative for the processing and marketing of timber will greatly improve the marketing of *Gmelina* timber in the study area.

BUSINESS PROSPECTS FOR INTEGRATING ORGANIC FARMING INTO PHILIPPINE AGROFORESTRY SYSTEM

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The paper discusses the prospects of integrating organic farming into the agroforestry system and promoting it as a business enterprise in the Philippines. The first part of the paper deals with the issues and concerns associated with household food security, livelihood and farmers' agroforestry practices, the agroforestry system being of the schemes adopted by the government to develop and protect the natural resources in the Community Based Forest Management (CBFM) production areas of the country.

The second part deals with organic farming as a component strategy for promoting agroforestry as a business enterprise. It discusses the status, prospects and current initiatives for promoting organic farming which is consistent with the objectives of managing and protecting CBFM areas. Although there are very good prospects for integrating organic farming into the agroforestry system, there are some issues and concerns that are faced. The paper provides some recommendations to address the issues related to organic farming to ensure that they become viable as business enterprises among organic farming-agroforestry practitioners.

DESIGNING A COMPETENCY – BASED ENTREPRENEURSHIP UNDERGRADUATE PROGRAM AND BEST PRACTICES IN ENHANCING ENTREPRENEURSHIP IN A PUBLIC UNIVERSITY

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Recent challenges in agricultural universities address the entrepreneurship models of teaching in the academic milieu. Educational reforms and industry needs adopt the necessity of enhancing entrepreneurship environment.

The poster presentation highlights the competency-based entrepreneurship undergraduate program from studies on entrepreneurship. An initial inquiry was made in 2000 on entrepreneurship of agribusiness management students' personal entrepreneurial competencies (PEC), and another in 2001 for undergraduate students in all colleges in the University of the Philippines Los Baños. A follow up study in 2006 was made on the perceptible implications of these to entrepreneurship and a research on

the design of a competency-based entrepreneurship undergraduate program. Findings show, from another survey conducted to agriculture majors in 2007, that an opportunity for engaging in business after graduation strengthens the call for enhancing entrepreneurship.

The proposed entrepreneurship curriculum program was designed using personal entrepreneurial competencies (PEC). Supporting skills under these competencies were matrix using the preferences of undergraduate students. These skills cover the entrepreneurial, technical and business management skills. The competency – based entrepreneurship program has this structure: economics, finance, marketing, accounting, management, business law, information technology, business math and other related courses. Business management skills that have to be enhanced by the program comprise planning and goal setting, human relations, decision making, management, control, negotiation, finance, marketing, managing growth, accounting and venture launch. Entrepreneurial skills that have to be addressed include inner control/ disciplined, innovative, visionary leader, persistent, change oriented and being a risk taker. The technical skills, ranked according to preference that the entrepreneurship program will have to address are the ability to organize, oral communication, management style, listening, interpersonal, network building, monitoring the environment, technical business management, being a team player, technology, writing and coaching.

In a public university experience, some of the best practices on entrepreneurship include major program in agriculture as an option; a general education course for all students; experiential model in teaching agriculture, establish market potentials of matured technologies; technology viability to investors and technology knowledge transfer.