Annual Report of JDS Program
in
Department of Bioresource and Bioenvironmental Sciences
Graduate School, Kyushu University

Vol.5 (2007)

1. Introduction

Japan's Grant Aid for Human Resources Development Scholarship (JDS) Program is to provide opportunities for academic research at Japanese higher educational institutions under the Grant Aid assistance by Government of Japan. The objective of this program is to support the respective Government in its efforts to facilitate its own plans for human resource development mainly for capacity building and institutional building, and thereby extend and enhance the bilateral relationship with Japan.

The JDS Program targets young government officers for public sector, researchers, business people and others with the potential to play leadership roles in their specialties after return to each country as well as to become leaders in their homeland in the 21st century.

The JDS Program started in the Graduate School of Bioresource and Bioenvironmental Sciences, Kyushu University in 2002 and 32 students graduated from the graduate school. In the 2007 school year, the graduate school has a total enrollment of 17 JDS students. The students belong to the International Development Research Course. The JDS students are also studying in their laboratories for preparing of their Master thesis and attending the lectures performed in English.

Scientific tour for JDS students was started on December 2003. The aims of these tours were to promote a greater understanding of policy, circumstances and technologies of Japanese agriculture. This annual report contains the scientific tour reports and research or campus life reports from JDS students.

2. List of JDS Students

Name	Nationality	Major Subject	Supervisor
Nang Myint Phyu Sin Htwe	Myanmar	Crop Science	Mari Iwaya-Inoue, Professor
Manythong Chanhsom	Lao PDR	Tropical Crops and Environment	Kazuo Ogata, Professor
Samadmanivong Olavanh	Lao PDR	Nutrition Chemistry	Takafumi GOTOH, Associate Professor
Ou Ratanak	Cambodia	Agricultural Economics	Hiroshi Yokogawa, Professor
Thida Chaw Hlaing	Myanmar	Agricultural Policy	Shoichi Ito, Professor
Latmany Phonesavanh	Lao PDR	Farm Management	Kazuhiko HOTTA, Professor
Vu Chi Cong	Vietnam	Bioproduction and Environmental Information Science	Ken MORI, Professor
Nguyen Manh Dat	Vietnam	Postharvest Sciences	Toshitaka UCHINO, Professor
Thongphanh Daovorn	Lao PDR	Forest Management	Shigejiro YOSHIDA, Professor
Horm Visal	Cambodia	Forest Resource Management	Shoji OHGA, Professor
Pham Thanh Tu	Vietnam	Forest Resource Management	Shoji OHGA, Professor
Phi Cong Nguyen	Vietnam	Plant Breeding	Atsushi YOSHIMURA, Professor
Le Son Ha	Vietnam	Insect Pathology and Microbial Control	Susumu SHIMIZU, Professor
Huynh Viet Khai	Vietnam	Agricultural Economics	Hiroshi YOKOGAWA, Professor
Haymar Hein	Myanmar	Agricultural Marketing	Satoshi KAI, Professor
Em Huy	Cambodia	Agricultural Marketing	Satoshi KAI, Professor
Hour Ix	Cambodia	Drainage & Water Environment	Kazuaki HIRAMATSU,Professor

3. Overview of International Development Research Course

The Graduate School of Bioresource and Bioenvironmental Sciences regards the role of agricultural sciences to overcome issues related to global food and the environment and to contribute to worldwide progress in maintaining a stable supply of food and materials, conservation of the environment, and promotion of health and welfare. To fulfill this, the School includes leading researchers and specialists highly knowledgeable in the fields of life science, environmental science and socio-economics.

The International Development Research Course aims to build on the capacity of the above fields for international students from developed and developing countries whose aim is to contribute to worldwide sustainable development. The Master's program emphasizes the acquirement of synthetic and practical abilities.

4. Description of the Program

Students will be awarded the Master of Science (M.Sc) on completion of a satisfactory thesis. Students are also required to complete a four-semester course over a two-year period. The course consists of lectures, practicals, seminars and tutorials. Students must obtain 30 credits with a minimum pass grade of 60 %.

5. Qualification Requirements of Applicants for JDS student (Master's Course in 2008)

Note: As to further information, you should refer to guidelines for JDS applicants and the application form of the course.

(1) **Academic Requirements:** Applicants must hold a Bachelor's degree (or equivalent) awarded by a postgraduate school outside Japan or expect to receive a Bachelor's degree by September 30, 2008.

(2) **Health:** Certified as both physically

and mentally healthy by a qualified and recognized physician.

(3) **Language:** Non-native English speakers must possess a sufficiently high official English qualification such as TOEFL, TOEIC, or the Cambridge Certificate.

6. JDS Scientific Tour

To disseminate knowledge and information on agricultural technologies and politics, JDS scientific tour was carried out as follows:

Date: May 19 (Sat), 2007 (AM9:00 - PM5:00)

・Planting Rice in Tanada Patty Fields (Ukiha town, Fukuoka)

Date: July 7 (Sat), 2007 (AM9:00 - PM5:00)

・Integrated Rice and Duck farming (Mr. Takao FURUNO's Farm, Keisen town, Fukuoka)

7. Reports from JDS Students

Nang Myint Phyu Sin Htwe

Effects of nitrogen and sucrose starvation on expression levels of autophagy -related genes in soybean seedling.

I am a first year Master student of the JDS program (2006-2008) in the laboratory of Crop Science under the supervision of Professor Dr. Mari IWAYA-INOUE and associate professor Dr. Takashi YUASA. I am very proud of being one of the students of Kyushu University which give me enormous chances to study in my specific field with sufficient facilities that I have never used in my country. We can easily find text books, journals, magazine, references from library via internet. Moreover, we can discuss and ask frankly any difficulties to our supervisor, tutor and other students in laboratory and they are our family's members while we are studying abroad. Beside studying, we also have chances to participate in JICA seminar, workshop and study trips arrange by JDS program from which we could have broad knowledge about Japanese life and culture and also great time to enjoy the beautiful scenery of Japan.

Here, I would like to share one part of my research experiment. The studied deal with effects of nitrogen and sucrose starvation on expression levels of autophagy -related genes in soybean seedling.

Introduction: It is well know that soybean leaves on the whole plant are senesced when it reaches to fully maturity. However, there are still some leaves which can remobilize nutrient into sink organ; mainly to the pod. During senescence, different pathways of protein and other molecules degradation will occur. One of them is autophagy pathway. Autophagy is an intracellular process for vacuolar bulk degradation of cytoplasmic components, which is required for nutrient recycling. Autophagy might play a role in maintaining viability during senescence and environmental stress. There are two types of autophagic process according to their size; microautophagy and macroautophagy (Fig1). Several mechanisms essential for yeast autophagosome formation have been characterized from studies of the gene products. Among these mechanisms , the ATG8 conjugation pathway is an ubiquitin like system that allows the transient covalent binding of the soluble ATG8 protein to phosphatidylethanolamine (Fig 2). Cloning and characterization of autophagy related genes (ATG1-ATG25) in yeast have been carried out in genetically and biochemical studied. In this report, we investigated induction of GmATG8s and GmATG12 from soybean seedling to detect their expression patterns in nutrient starvation condition.

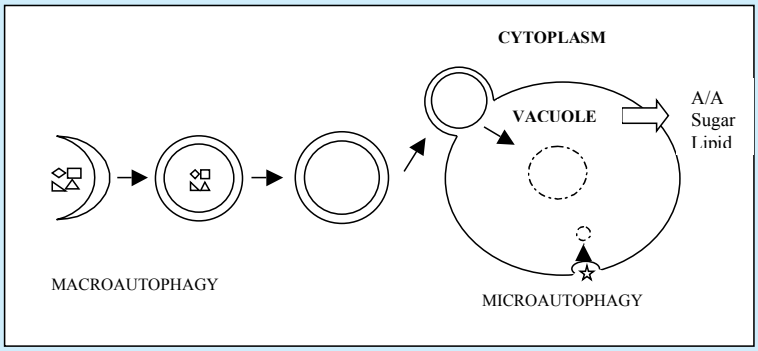

Fig.1 Autophagy process in plant. Macroautophagy involves the formation of a membrane containing cytoplasmic components moving into the vacuole while microautophagy materials are engulfed by tubular invagination of vacuolar membrane.

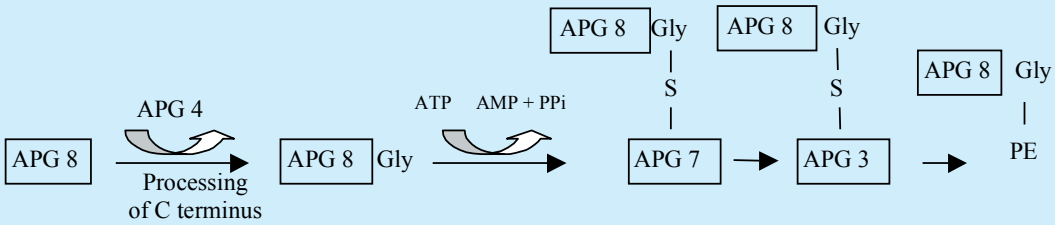

Fig.2 Schematic representation of ubiquitin- like modification in autophagy pathway. APG8 precursor is processed by APG4 and then activated by E1-APG7 and E2-APG3 and finally conjugated to phophatidyl-ethanolamine (PE) which is appear to promote formation of autophagic vesicles.

Materials and Methods: 8 sets of one week old seedlings soybean (***Glycine max*** Merr.cv Fukuyutaka) were used in this experiment. For nutrient rich media, the seedling were transferred to supplemented with 2% of sucrose, 10mM of KNO_3, 2mM

of $MgSO_4$, 10mM of KH_2PO_4 under the pH 7.0~7.5. For nutrient starvation and protease inhibitor treatment, the seedlings were transfer to nitrogen and sucrose depleted medium that had been prepared by replacing KNO_3 with KCl and added with or without 5-10mM of quinacrine, serine and cysteine protease inhibitors of 1mM phenylmethylsulfonyl fluoride, 1μg/ml leupeptin, 100μM E-64d as final concentration. All samples in different media were incubated at 25°C and harvested at 0, 8, 24 hr. Semi-quantitative RT-PCR was performed with total RNA from soybean seedlings by using M-MLV reverse transcriptase and Ex Taq DNA polymerase with gene specific primers designed according to GmATG8s and GmATG12 which were identified by BLAST search using Arabidopsis APG(ATG) genes in the Soybean Gene Index in DFCI (http://compbio.dfci.harvard.edu/tgi/)

Result and Discussion: One week old soybeen seedlings growing on vermiculite were pre-incubated at 25°C for 1 day after removing cotyledon on complete media and after that transferred either nutrient supplement medium or nutrient free medium with or without protease inhibitors. The plants were harvest at 0, 8, 24 hr and specific mRNA were analyzed by RT-PCR. Only soybean seedling of ATG8i was significantly induced on the first 24 hr of nitrogen/sucrose starvation as the same case as Arabidopsis suspension culture (Fig. 3). In suspension cultured of Arabidopsis cells, more than one third of the proteins was degraded during the first 24hr of sucrose starvation. Thus, we examined whether homologue of ATG8 and ATG12 genes function in autophagy process under starvation condition. In this experiment, we identified that ATG8i is one of the autophagy related gene which is highly specific under nutrient starvation in soybean seedling.

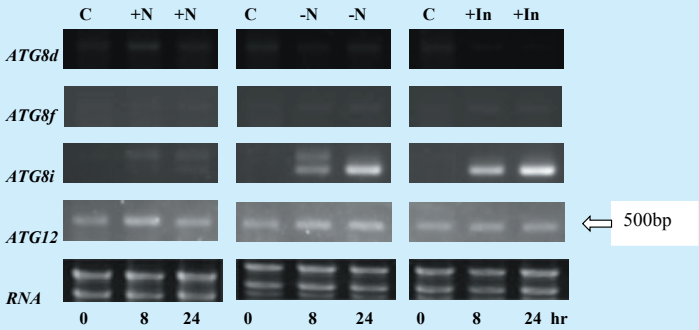

Fig.3 Induction of autophagy gene in soybean seedling under (+N) nutrient rich, (-N) starvation and (+In) starvation with protease inhibitors media under different time intervals.

It was reported that sucrose starvation and protease inhibitor treatments induce autophagy in yeast, tobacco suspension culture cell and *Arabidopsis* plant respectively. Treatment of yeast cells with the serine protease inhibitor PMSF results in the accumulation of the autophagic bodies in the vacuole. Similarly, cysteine protease inhibitors, leupeptin and E-64c inhibit net protein degradation and then accumulate autophagic bodies in the vacuole of tobacco suspension cell.

In further study, we speculate that ATG8i may be involved in protein degradation associated with senescence in pod formation stage of soybean plant. For the purpose of in vitro re-constitution assay of the ATG8-PE conjugation, cloning of GmATG7 and GmATG3 are in progress.

Manythong Chanhsom

My Research, My country, Kyushu University and Japan

Overview

Paper mulberry (*Broussonetia Papyrifera.*) or Kozo (Japanese) is a hardy wood fast growing tree. It is an indigenous species to Laos, especially in northern part of the country. Fiber from bark of this tree is a famous raw material for making paper in Japan. The paper were processed to several kind of products such as wrapping paper, lampshades, umbrellas, envelops, photo frames, artificial flowers, photo albums and art books

In the last decades, Lao rural farmers have been collecting bark of this tree from forest. However, in the recent years, due to population pressure and limited of the natural resources, farmers have been starting to grow the species. Although the farmers can produce more production they still earn the minority of the product share. They have no negotiating power.

Later on, I have learned that **Laos** is a major raw material producer while **Japan** is the biggest consumer of paper mulberry products. Finally, I realize that Kyushu University must be the right place to study and conduct my research

concerning the species.

My research: Ecology of paper mulberry in relation to farming systems in Northern Laos.

Actually, there are so many topics that I would like to study about this species for instance, processing and marketing of paper mulberry because Japan is the right place to study about paper making since the best technology for paper making has been developed here. Marketing is another important issue, which can improve farmers' income, if we can provide them better market. However, due to limitation of time, I decided to concentrate on ecology and farming systems of the species.

With supports from my professor and other instructors in the Institute of Tropical Agriculture and Laboratory of Wood Sciences, I could start my experiment in the beginning of August, 2007. My main experiment is about seed germination and seedling development under different light intensities, growth of paper mulberry under light intensities and chemical analysis of paper mulberry bark. I expected that all of these experiments will be finished in the next 4 months.

There are full options of research equipments, facilities and research environment in Kyushu University, which can be utilized to my experiment and research. Once when I have chance to study in the most outstanding university of the most advanced and developed country like Japan, I should try to use those facilities for my research.

Finally, I would like to sincerely thank to all the time support from my Professor and supporting professors, Professor Dr. Kazuo Ogata, Associate Professor Dr. Miyajima Ikuo, Assistant Professor Dr. Fukuda Shinji, Dr. Miyazawa Yoshiyuki and Dr. Kuboki Yuzuru from the Institute of Tropical Agriculture. I also would like to thank to Associate Professor Dr. Nobuya Mizoue, Assistant Professor Shimizu and Dr. Wakimoto Rie from the Department of Forest for their active support for my field works, experiments.

Olavanh SAMADMANIVONG

Experience and impressions of studying in Kyushu University

I am a postgraduate student of the master's course, who entered in July of 2006. It is really a golden opportunity for me to study in a famous university of Japan, Kyushu University. It is located in the city of Fukuoka, the largest metropolis on Kyushu Island. The city has a reputation for being one of the most habitable cities in Asia. First of all, I would like to talk briefly about my experience and impressions of the first 6 months after the arrival in the main campus (Hagozaki). All JDS fellows moved into the international house known as "Ryugakusei Kaikan" which was a very convenience place for living. As we were new comers, we all foreign students were assigned a tutor whom we could talk with, to discuss matter concerning our daily life or studies. It was really an exciting for the first semester, it challenged me to communicate with people in both Japanese and English every day life.

After 6 months attending the lectures in the main campus, I have moved to do my research in the Kuju Agricultural Research Center of University Farm, which is about 2.900 Km away from the main campus. The center is located in Oita Prefecture where there are many famous hot spring, beautiful grass lands and mountainous. The center is known as university farm of Kyushu University which involves providing technical knowledge for students in the field of beef cattle production systems, and doing the research with the concept of effective use of domestic grass resources in highlands or abandoned agricultural lands as grazing fields for low-cost animal production and environmental conservation. Similarly, my research topic is based on the improvement of beef production

system using grass resource. This study is conducted to test the hypothesis of regulating body structure during the early growth period of cattle to create a fatty constitution in calves in order to produce good quality beef from grass foraging. As livestock, especially beef cattle pays an important role in the livelihood of Lao farmers in rural areas, while raising systems are mainly based on natural feed resource, it makes me more interested in this research because I believe that this research would be applicable to solve problems of cattle production in my home country in some extent. Besides this, I also have an excellent opportunity to practice many useful techniques on farm, which would be very helpful to my work in the future. Another important thing that impresses me a lot is that at that I feel more confidence to study since my professor always encourages me and guides me how to conduct a research. He always support me to develop my own ways of thinking, concepts and ideas, which may help us, explore some important issues in the present situation of beef cattle production especially in Japan.

After one year of study and experiencing the research atmosphere, I think I have made a fortunate choice to study here. In the coming academic year, as I prepare my master thesis, I am looking forward to getting more guidance and support from my teachers and course mates.

Ou Ratanak

Academic Life and Study in Kyushu University, Fukuoka City, Japan

Kyushu University is located in Fukuoka city, the major city in Kyushu, rich in nature and surrounded on three sides by the sea, a wide variety of activities including skiing, shopping, eating, golf, and hot springs. *Kyushu University* was established along with the Faculty of Agriculture in 1919 after Fukuoka Medical College was established as the foundation of *Kyushu Imperial University in 1903*.

After I had been taken some lectures and study tours at JICA Osaka and had been attended Japanese course at JICA Kyushu in Kitakyushu for three months, I went to Kyushu International House on the third October of year 2006 accompanied by Yoshino san from JICE staff at JICA Kyushu. I have been staying at Kyushu International House for almost one year and right now I am going to move to the new apartment near Kyushu University next month. I feel very well taken care of by the University of Kyushu and JICE staff at JICA Kyushu and I also feel very warm welcome both in academic and social environment But I have to make some adjustment in the beginning because I could not eat food outside everyday, so I have to start cooking myself. In Kyushu University, everything is very accessible to me with any kind of literatures and resources that I need and I was also surprised that the gap between professors and students is not that big especially my professors are easily accessible to help me not only my study but also my research. He also went to my survey areas with me at Phnom Prich Wildlife Sanctuary, Mondulkiri Province, Cambodia.

Seminar at JACA Sapporo, Hokkaido

My host family at Meinohama

The academic life and study in Kyushu University is very nice because I met quite a lot of people not only the students at the University but also some Japanese and foreigners who are living in Fukuoka and Kitakyushu and I also have been jointed all activities

that organized by Kyushu University and Japan's Grant Aid for Human Resources Development Scholarship (JDS) program such as Annual Meeting 2007 at Okinawa International University and seminar on Tourism promotion in disaster stricken areas in JICA Sapporo, Hokkaido. People in Fukuoka are very nice and helpful; they always invite me to joint some parties and other activities such as Japanese New Year, rice planting and harvesting at their houses. In Kitasyushu, I went to Hiraodai Plateau with my god mother, where is the first time to me to walk through cold water under the caves, one of the most famous karst tablelands in Japan, under the plateau are rare limestone caves. I have been visiting many places in Fukuoka prefecture especially Dazaifu Tenmangu, the head shrine of many Tenmangu shrines all over Japan dedicated to the spirit of Sugawara no Michizane, well known as a god of academic achievements and she explained me about the history of the shrine. To my mind the Japanese people go out of their way to help me if I ask them, so I must not be afraid to approach new people. Right now I am writing my thesis on Ecotourism Potential in Phnom Prich Wildlife Sanctuary, Modulkiri Province, Cambodia.

Finally, I think life in Kyushu University is very nice and full of new experiences. I would recommend other students to learn Japanese language as soon as possible if they want to study and to enjoy academic life in Japan.

Thida Chaw Hlaing

Great Opportunity of Studying at Kyushu University under JDS Program

Myanmar is an agro-based country and agriculture sector plays a pivotal role in the nation's production sector for sustainable economic growth. The Government of Myanmar has been endeavoring to promote agriculture sector with a view to expending agro-based industries in Myanmar. During this status, existing agricultural plans and supportive policies should be justified through economic analysis whether it is viable in global economy. The broad-based agricultural growth can not only ensure poverty reduction and domestic food security but also improve the competitiveness of agricultural products into international trade. Myanmar is now trying to transform its economy to market-oriented economy. In this period, country needs many qualified economists to improve its economy in each sector, especially in agriculture sector as her economy based on agriculture. Due to the less number of trained persons who are skilled in the field of agricultural economics, I earnestly would like to study at Kyusyu University to be able to fill up the gap conducting research activities under the Ministry of Agriculture and Irrigation, Myanmar.

I am very grateful to be given a chance to study in Kyushu University by JDS program. With the good guidance of my supervisor, Ito Shoichi, Professor of Agriculture Policy Laboratory, Faculty of Agriculture, Kyushu University, my research is going fine and interesting related with Trade Development of Asia including Myanmar. My life in Kyushu University is marvelous with good research environment, especially my tutor, my lab mates (who ever show their kind cooperation by translating their presentation in English to exchange research knowledge in our lab) and my classmates by sharing the study knowledge, different country's traditional food and culture. I got the exceptional chance to study Intermediate Japanese Language class in Waseda University at Tokyo provided by JICE. So I gained the different study life both in Tokyo and Fukuoka having good friendships with my Japanese classmates from different countries. I am lucky again that the Kyushu University provides Japanese Language class for international students and I can continue my language study in my available time.

Concerning with the special course lectures, we are taught by Japanese professor in English. All of the professors from Kyushu University are very kind and patient to the students whenever the students wants to discuss for their research technique and knowledge inside and outside the class room. Out of the special course lectures, we can take some special lectures

from visiting professor from oversea University. Another chance is that you are available to get credit lectures from Japanese course even though you are JDS student from special course. That shows the kind cooperation of the professors from Kyushu University. Moreover, we will have better chance to find many text books, references books, magazine and journals via internet from our modern library. Kyushu University library is very big and modern and all kind of text books and journals for all research fields are available in the library.

To broaden our scientific knowledge and information concerning with our field, JDS program has many kind of study tour organized by the faculty of agriculture. By participating the study tour provided by JDS program, I can have a chance to learn the scientific technique and culture from the local people and organization around Fukuoka Prefecture. One of the remarkable trip among all trips is the scientific tour of Integrated Rice and Duck Farming to Mr. Takao Furuno's farm, Keisen town, Fukuoka.

Since I am JDS student, my daily life is going well and very smooth with the kind help of JICE staff and my tutor. I have a chance to stay in the Kyushu University International House for a year. This is also a good chance to exchange food and culture among international students. I can get good environment in the beginning day of life in Japan. Staying out of international dormitory, I got enough support from JICE to find the better place and to stabilize my life in the apartment.

In conclusion, taking great opportunity to study in Kyushu University by JDS program, I will surely gain a lot of advanced skills and knowledge to contribute my home country. Myanmar should be made necessary adjustments with the well trained persons to improve the administrative efficiency and building up capacity for the secure and sustainable economic growth. In this context, I am thanking to the Japanese Government for giving me this opportunity to study in Kyushu University not only for my further carrier but also for the human resource development of my ministry.

Latmany Phonesavanh

One-day excursion to the Integrated Rice and Duck FarmingAnd Experience of Climbing Mount. Fuji.

As one of Lao JDS fellows who are enrolling in the Graduate School of Bioresource and Bioenvironmental Science, Kyushu University, I have begun my study and research in this graduate school since October 2006. While taking lectures in university, I have participated in several excursions to various places in order to gain off-campus understanding and experiences. Among the many places I have visited was the Integrated Rice and Duck Farming, which so far impressed me the most. Located just about one and half hour from the university, the farm is owned and operated by Furuno family.

On 7th July 2007, I and the other students had one-day excursion to the organic farming using ducks in Iiduka, Fukuoka. There, we were given a presentation about Integrated Rice and Duck Farming by Mr. Takao Furuno. After graduating from Kyushu University, Mr. Takao Furuno has started his own farm in 1977, and ten years later he began practicing the integration of duck in the rice field. However, it took him almost three years to realize its success. He and his family have shown their great efforts to bring about the achievement of this farming practice.

His technique of Integrated Rice and Duck Farming is simple and environmentally friendly. First, he encloses the paddy field by using bamboo fence, a net and electric fence in order to keep out predators, while preventing ducks from escaping. Then, 1-2 weeks after transplanting rice, 1-2 week old ducklings are released in the paddy field. Duck used in his rice field is known as ***Aigamo***, a cross-breed of a wild male duck and a domesticated female duck. Ducklings are raised 24 hours a day in the paddy field until the formation of rice ears occur, which is about 2-3 months in Japan. Then ducks are removed from the rice field. While raised in the paddy field, ducks are swimming, eating the weeds, insects, frogs, tadpoles and mud. By doing those activities, ducks have six combined effects on the rice: ***Weeding Effect, Pest Control Effect, Nutrient Supplying Effect, Full time Ploughing and Muddying Effect, Golden Snail Control Effect, and Rice Stimulation Effect***, said Mr. Takao Furuno. Weeds and insects, however, have reduced year by year as a result of duck effects. Consequently, he has introduced a water weed called "Azolla" to his paddy field in order to feed the ducks.

Picture 1: Ducks are swimming and finding their food in the paddy field

After listening to his lively presentation, we went to his paddy field to observe the real practice. There, I saw the two

week-old ducklings moving and finding their food freely and happily. I had seen with my own eyes how he integrates ducks into the rice field, and how rice and ducks coexist.

At noon we had tried duck meat, potatoes, onions and tomatoes grown on their farm for our lunch. Everything was fresh and delicious; I even gave up talking to enjoy the food. After lunch I had talked and asked Mr. Furono many things regarding his experiences on this farming system. From the conversation, I realized that he is good not only at doing on the paddy field, but also at speaking words of great wisdom. His talk was kind of informal lecture about how experience and not giving up could help you become successful in your career. If I have a chance, I wish to spend one week with the Furono family to learn more about his farming practice and experiences. Besides, one of his sons, Ryotaro Furuno, is my laboratory colleague as well as my supporter who always helps me out many things.

Picture 2: Standing on my right with the purple outfit is Ryotaro Furono who is my colleague; Mr. Takao Furuno is standing next to me.

The integration of duck into rice field has shown the great success because it is simple and harmless to the environment. To reduce the use of chemical fertilizer and pesticide, the integrated rice and duck faming is one of the potential farming practices that should be promoted broadly.

Experience of climbing Mt. Fuji

As the highest and most prominent mountain in Japan, Mt. Fuji is one of the challenging mountains for the hikers or climbers all over the world. Numerous hikers both professional and amateur have come each year to climb up the Mt. Fuji.

I am one of hundreds of people who have a great time on the summit after I spent an over night climbing Mt. Fuji on August 7th this year. Firstly, I took a bus from the Fujinomiya train station in Shizuoka prefecture to the 5th station of Mt. Fuji where I began my walk at the elevation of 2500 meters. At 9:00 pm after having dinner and resting, I had got started ascending together with approximately hundred hikers. During my walk, I took frequent breaks in order to rest my muscle and had some drinks. All the time I took hold of the rope tightly; winter clothe, flash light, gloves and stick were greatly necessary on the route to the summit. “The higher, the colder” is an expression to describe the temperature eventhough it was summer. Finally around 4:00 am, I reached the summit at the elevation of 3776 meters after seven hours hiking on the trail. I was so worn out. After resting for a while to regain my energy, I carried on to the peak to witness the sun rise at 5:00 am. After having noodle as a breakfast, I climbed down to the 5th station. However, I spent only 3 and half hour to descend.

It is really nice and memorable experience. Once in my life, I was on the top of the famous mountain at the elevation of 3776 meters.

Vu Chi Cong

A good environment of study in Kyushu

I’ve got a chance of becoming a JDS fellow under JDS program in Viet Nam. That’s the greatest opportunity I’ve ever had. Under JDS program, there is 2-stage Japanese class. One is operated in Vietnam and the latter, in Japan. After a short time of studying Japanese in Vietnam, I wondered myself how I can manage with my poor knowledge of Japanese and Japanese society when living in Japan.

Japanese class was quite an attractive course with whole-hearted teachers, friendly students and variously interesting topics. The more Japanese language I studied, the more knowledge I got from teachers about Japanese cultures and their life styles, not only language. Time of studying is not only limited in the class but also by going out for picnic. We’re taken to some places in Kokura, Kita

Kyushu to visit art museum, city library as well as to participate in some traditional festivals (wasshoi hyakuman, fire work festival). To practice Japanese and understand more about local people's culture, we could also join in home-stay program. Four months of studying language is not so much but by lots of practice and by warm-welcome from Japanese people, I got used to living in Japan.

In my point of view, JDS program in some way is perfect. JDS fellows like us can have the best condition of living and concentrating on our study. In every procedure for daily life from alien card, insurance card registration to house-rent, I can get such helps from coordinators that every thing has been going smoothly.

Entering Kyushu University, the first impression I got was the warm welcome from teachers and students in my laboratory. Here, I really got the best condition of studying with variously huge data online for reference, helpful instructions from professors and especially, very interesting experiment apparatus. Besides sophisticated experiment apparatus, so many manual apparatus are also available. Those are what by oneself creativeness produce for the most suitable. This recalls me: "nothing is impossible" to make the best experiment.

Up to now, I realize that I got use to living and studying in Kyushu University. Thanks so much for JDS program that gives me an opportunity of studying in this University.

Nguyen Manh Dat

Student life in Kyushu University

I feel very happy to be once more a student after several years of working, especially studying and living in one of the most developed countries like Japan. My first year in Kyushu University was passed so fast with the helps of JICE coordinators, Kyushu University's Professors, Laboratory members, Kyushu International House's staffs, International and Vietnamese friends.

Firstly, under the taking care of JICE, my life in Japan is very comfortable. The preparation for the master course done very carefully by JICE with 4 months of learning Japanese language, many orientation meetings, etc, has helped me much in later studying and living in this really new environment. When dealing with difficulties, they also always give useful advices and helps. Recently, Kyushu University has established a foreign student affair office which is also very helpful for us.

Secondly but most importantly, my research in Kyushu University which is my purpose of coming here, is running well under the supervision of my supervisor - Prof. Dr. Uchino Toshitaka. In my laboratory, there are weekly seminars about my research field on microbial biofilms where I can talk, ask and discuss with professors and other students. It is very interesting that I can use both English and Japanese and my Japanese is also improved in my specialized field by helping of my professors and friends through these seminars. Besides, I can participate in many activities of the laboratory such as playing sport, sight seeing and introducing Vietnam to them. I can observe and learn from them many Japanese characteristics.

Thirdly, attended lectures given by professors in the university are almost their current research topics, therefore are very advanced and useful. Another way to access most recent knowledge is exploring the online library of the university. There are free and huge scientific references here.

The last thing I want to talk about is activities of Vietnamese student association in Kyushu University. With about 40 members we help each other to integrate into this new living and studying environment. Thanks to them, some time I have the feeling of being at home with traditional activities and foods.

In conclusion, message for who want to study further is that Kyushu University is a nice place to study, and JDS is a good

program for master degree. Message for Vietnamese who preparing to come here, please bring "omiyage" (present) to me, I miss Vietnam!

THONGPHANH Daovorn

Report on Field Research in Pha-oudom District, Bokeo Province, Lao People's Democratic Republic, 26th March to 05th April, 2007

Introduction

Pha-oudom is one of the poorest districts in the Lao People's Democratic Republic (Here after Lao PDR). It is located in the mountainous areas of Bokeo province, Northern Lao PDR. Geographically, Pha-oudom is settled in the foot hill surrounded by the mountains. It has border with Houayxai District to the northwest, Nalae and Viengphoukha District of Louangnamtha province to the northeast, Houn district of Oudomxay to the east, Pakbeng to the south and Paktha district of Bokeo to the west. With a total area of 1,579 km^2, Pha-oudom is a very remote and mountainous area which 65 percent of the lands are up hill (Vidananh, 2005).

Pha-oudom consists of 94 villages, 54 of which are considered as the poorest communities - with more than 2000 households. The total population in the district is of about 36,400 inhabitants with the average density of 23 people per square kilometer. People residing in this area are diverse; Khmu ethnic group constitutes 80 percent, followed by 12 percent of Lowlander and 8 percent of Hmong.

Most of the people living in this area are mainly experienced and engaged in shifting cultivation practice, hunting, animal husbandry, cash crop production, handicrafts and collecting non-timber forest products- especially paper mulberry which is one of the main income generating activities. However, there were some farmers who shifted to practice both rainfed and irrigated paddy rice (irrigated paddy rice cultivation had started in 2006). Villagers who are living in the upland areas and engaged in shifting cultivation are facing difficulties to reach the basic needs of their subsistence. In this case, the district official tried to encourage them to move down and settle in the lowland areas in order for them to have better access to some facilities such as roads, market, education, health care center etc. and shift to practice intensive farming system (cash crop production). Land use planning and land allocation policies aim to reduce the use of forest resources and promote the sustainable land use in the upland areas. These policies are very important to the farmers residing in the upland areas. Nonetheless, it is sometimes increasing pressure on the ethnic groups for earning their daily food. Due to the lack of skill on wet rice cultivation, some farmers are faced a technical problem to do so. One significant issue for them to move down to the lowland area is that the land availability is scarcity for the new comers.

Research Methodologies and Themes

By collaboration between Kyushu University of Japan, Hohenheim University of Germany and Chiang Mai University of Thailand (Upland Program), the interdisciplinary study has been formulated. In the field survey, the Participatory Appraisal Approach (PRA) and team-based field research were employed. However, three groups had been divided based on the research topics and background of participants. The following sets of approaches were applied:1. Village Mapping. 2. Transect Walk. 3. Resource Flow Diagram. 4. Seasonal Calendar.5. Wealth Ranking. 6. Simi-structured Interview and 7. Observation.

Some samples had been collected for soil mapping and biomass production of bamboo in the forests. In these cases, the soil of certain area of study has been taken to conduct an experiment later on in Chiang Mai University and some bamboos have also been measured and taken to laboratory work. *In any case, this report is based on the team survey of Socio-economics team.*

Observation and Discussion

This study was conducted under team-based research and a time constraint. Even though it was a very short visit but we

had obtained a lot of experiences and understood the situation in Pha-oudom district in regard to livelihood, culture, natural resource use and management and the direction of the development themes (Official overview).

According to the discussion and observation with both officials and farmers, we found that most of the farmers are mainly engaged in shifting cultivation (here clarified as circle or rotation system after the ban of shifting cultivation in 1996 (Thongphanh, 2004)), especially upland cultivators. This is, however, not easy for officials to eliminate a long practice of such a kind of cultivation. We also observed that new comers to the community are faced land insufficiency for agricultural production; this is because the land in the community has been allocated to the villagers and demarcation had been done between inter-villages. All though they have right to obtain some agriculture land like other villagers by the law, but as new comers, they have to wait. In some cases, they have to buy land from others, even though the land is in the poor soil condition.

Pha-oudom district has been officially established on 02nd, May 1992 (Prime Minister's Office, 2001). Because of the poor and isolated area surrounded by the mountains, it has faced poverty all over the district. Recently, officials had worked hard to fight for poverty eradication. Many attempts had been introduced to farmer, this including promotion of cash crop farming system, intensive rice cultivation (two seasons rice growing both rainfed and irrigated), animal husbandry, rubber plantation and also sustainable non-timber forest products cultivation. These are challenging to the official to carry out such a hug jobs successfully. To overcome the poverty problem, some infrastructures is in an urgent improvement such as road construction (both newly and the available road).

However, the following works are the most priorities to be improved in order to get rid of poverty line:
1. Transportation accessibility (Road construction). 2. Water supply (Well, Gravity water). 3. Education (schools, curriculum, teachers etc...). 4. Shelter. 5. Food security. 6. Job opportunity. 7. Health care Center. 8. Telecommunication network. 9. Financial accessibility. 10. Market information access. 11. Agricultural land availability. 12. Electricity availability. 13. Investment opportunity.

Those mentioned sectors have close relation to each other, and will become a significant chain for agricultural production in the near future. In anyhow, some works are under implementation with support from local and international organizations such as Rural Development in the Mountainous Areas of Northern Laos (RDMA/GTZ). CONCERN, IFAD and so on.

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Horm Visal

Impressions and Academic life in Kyushu University

I am a Cambodian JDS fellow 2006, the first year master student in forest resource management laboratory under the supervision of Professor Dr. shoji OHGA. Study in Kyushu University provides me not only basic knowledge concerned the forest field but also cultural and social experiences. On the first day of the arrival in Japan, I felt very happy to meet and take part in cultural exchanges with other JDS students from different countries as well as Japanese people. According to JDS program, JDS fellows attended intensive Japanese language class for two months in Kitakyshu before moving to Kyushu University. It was a bit difficult for the students who had never learned Japanese language before because students were crammed for lessons, exams, and much homework almost every day. During stay there, to be convenient in living, helpful teachers and friendly JICE staff introduced us a lot of traditional culture of Japanese through participating home stay program and some festivals including transportation such as bus, train, and subway by taking us to visit resorts, museums and a lot of beautiful natural landscapes. My first impression is infrastructure and characteristics of Japanese people, which strongly attract me during this stay. Infrastructures of the rural areas are

not different from that of the towns; it amazes me that the rice field dikes are tarred and drainage channels in the rice fields are concrete. Majority of Japanese people are helpful, respect, polite, and quiet. They never use rude words and express anger though they dislike any activity. Furthermore, they are not outgoing because they are normally shy particularly the young generation, but they are helpful when any one needs help, so don't be afraid of asking them for help if you have a trouble.

When I have attended Kyushu University, I have more opportunities to acquire new knowledge and information through the lectures and discussions with professors and foreign students from other counties. All students are fairly treated without discrimination. I found that Kyushu University is very convenient for studying and research; facilities are good at condition and peaceful environment for study. Moreover, students can find reference documents, journals and text books from modern library as well as internet. According to study program for special course of foreign students, we have to take together the lectures to complete the required credits at the lecture hall; after the lecture, each student normally studies and works in the individual laboratory led by supervisor. My laboratory is far from the university; it takes about 50 minutes by bus from the international dormitory. At the first time, I felt tired of taking bus every day to the laboratory because I spent at least 2 hours for round trip, but I am now familiar to this trip and I find that the bus trip can reduce the stresses after hard work. Each JDS fellow has a tutor at the laboratory to help when we have difficulties. My tutor is very kind and helpful; he assists me not only hardship of the daily life but also research experiment in laboratory. Of course, when I get difficulties in my researches, my supervisor, tutor and laboratory mates often give me some good advice on dealing with many difficult works. Beside study activities in class and laboratory, international students can take part in many activities such as study trips, field trips, excursions, conferences, and seminars...etc organized by university and lab, which we can exchange new knowledge and information for study, research, and daily life. During the study, I also have the opportunity to visit many forest sites around Kyushu island and Okinawa and to make presentations in the official conferences. Furthermore, to build relationship and exchange tradition and culture among international students, students from JDS program and other students also organize parties such as barbecue and new year parties of the individual country.

In conclusion, Kyushu University is convenient for study; it gives me a good opportunity to not only learn the forest science, but also understand traditional culture of Japanese and other nations. I have very good feeling when I study and live there. I would like to appreciate my professors, tutors, and Jice staff who help me in the study and daily life.

Pham Thanh Tu

Japanese Grand Aid for Human Resource Development Scholarship (JDS) - One of the best scholarships in the world.

It is my great honor to become a JDS Fellow. I realize that JDS is one of the best scholarships in the world. Why do I say that? Please listen to what I am tellingyou now, you will find it true.

To make us familiarize ourselves with Japanese language and use it in necessary situations of daily life when we live in Japan, JDS program organized 2 moth-Japanese class for JDS fellows before going to Japan. The teachers of Japanese are teachers who have lots of experience and attractive teaching method. They not only taught us Japanese but also instructed us Japan country, Japanese people and their culture. That was such a useful time. I was so interested in learning Japanese, attracted in their stories about tea ceremony, rakugo,... and their traditional food as well.

In the first days in Japan, the orientations instructing about Japan's economics, politics and culture were held for us to understand more about this country. Besides that JDS program organized tours of Japan's famous landscape such as: Nara, Buddhist temples in the old capital Kyoto and tour of Japanese Rakugo also.

2 months before entering the university, we continued our studying Japanese in Kitakyushu JICA centre where JDS fellows from many countries including Vietnam, Laos, Cambodia, Myanmar, Philippines, Indonesia, Uzbekistan, and Bangladesh had opportunities to to get acquainted with each other, exchanging culture during the time learning Japanese together. The Japanese teachers are very kind. Not only did they teach us in class time but also take us to enjoy going sightseeing around Kitakyushu. That was such a period time full with joy.

We entrance our own university in the beginning of October, 2006. I am very proud of being a student of Kyushu

University - one of Japan's most prestigious national universities and the largest public university on the island of Kyushu. Right after I came to university, JDS program had already chosen appropriate laboratory and supervisor professor for me. My supervisor professor is professor Shoji Ohga. I really received lots favor of him about understanding specialist knowledge. Furthermore, I have a Japanese tutor who is a student in our laboratory helping me with being new to the surroundings in daily life whenever I need. For the research work, the thing made me extremely absorbed is modern research equipment, different from in my country. Here, we can turn your science dreams become true. Moreover, the system of books, journals, and other references are very copious. You can borrow books, journals...from library, or we can just sit in your laboratory loading article without having to go out.

Beside the class and research working time, we can participate in field trips. These trips usually bring you more interesting understanding about realities.

Until now, I can say that JDS is one of the scholarship programs taking care of fellows most considerately. They care from about our inmist feeling, our health to about taking a look for apartment for us. In summary, we do not have to worry about anything without concentrating in studying.

Do you agree with me that JDS is one of the best scholarships in the world?

Phi Cong Nguyen

Hard working in the plant breeding laboratory = truly happy

Hello alls,

Firstly, I would like to introduce myself. I am a master student from Plant Breeding Laboratory, Faculty of Agriculture, Kyushu University, the laboratory even though with very short time passed, I feel my family.

I started studying in the laboratory of plant breeding from Oct 2005 and from that time I have the chance to study, work in the laboratory and in the field of Kyushu University. Every ones are now working in this place and others who graduated from this laboratory must say that they can obtain good knowledge and good experiences from working and very hard working in the plant breeding laboratory.

Every years, crop season starts from April. I just say it starts from April but everything is the result of previous years. All the things we do this year is come from very hard work of the previous years. All plans will be made in detail in advance and discussed to improve and to get the most effective ways to conduct field work and laboratory work. Seeds will be prepared and will be sown soil will be ploughed and raked. Every people work together to prepare trays, labels, soil and other things...Many seeds from different rice varieties, cultivated rice and wild rice accession will be planted. They grow and become higher and higher day by day. Green color is full. Water makes them stronger and stronger. I really like this feeling when I am observing them and supplying them water . They will grow up and give us good results. They will be ready about one month later for transplanting. Those of transplanting days, all of them will be transferred to the field, separated and transplanted on the field. At first, they seem to be very weak. However, it is just the recover stage and they will growth up very fast one or two weeks later. It is also rainy time and field will be fulfill with water that is really necessary for the growth of rice plants. We can think about good results in the near future.

Every ones work hard. Professors, students, and all laboratory's members work together. Transplanting days, many students will join this event. All of us work until we have break and lunch boxes are prepared for us by our secretaries. For me, they will be always very delicious food after hard work. We can

spend very short time for relax before start working again in the afternoon. Many students join this event make transplanting work faster and much more interesting. Students, they can do professionally even though they have very few experience in this kind of work. And the hardest time is crossing time. Normally, official time start from 9 am, but we need to go to the farm earlier and start for that from 7:30 am. Crossing work continues even at noon. Room temperature is very high, sometime it reach to 43°C. You will feel thirty and need to drink a lot of water. You may feel tired but you need to concentrate on working and do each of work carefully. You will have hybrid seeds or you may not have the chance to work with them again. Therefore, all of steps you need to be careful. After crossing work finished in the afternoon, we can prepare for tomorrow work by moving plants from the field to greenhouse. Everything can be finished until 7 pm. Other time, students in our laboratory can work overnight for experiment but this time we need to keep our physical health, therefore if it not very urgent we can have rest after one day of hard working.

I did not always work very carefully. Thus sometimes, professors talked to me to concentrate on working. I also do not have much experience on field work. I till remember the first time when I did transplanting, my professor said that I was a city boy. I knew that and then, I always tried my best to improve my skill and work in the field. I thought, my friends they can do and of course I can do too. However, I till made some mistakes and my professor one again talk to me that is my personality. It was really difficult for me because I want to change myself but some time careless mistakes till happened. For me, it was really disaster. I could not sleep at night and think about my professor statement: "Think about your work 24 hours a day". Many times, I worked overnight without sleep but I think it is not really like my professor said. I always work hard but never complete.

Now, when all experiments have been finished I am till trying to improve myself. Hard work from the field gave me many things. Hard work from the laboratory of plant breeding made me grown up. Even some things I have not improved yet or not perfectly completed, I feel happy with the time working in plant breeding laboratory. Some days later, when I have to say goodbye to all our laboratory members, I will keep those as my best memories and hope a chance be back and work hard again.

Working in the Plant Breeding Laboratory made me happy!

Le Son Ha

Production of conidia of *Paecilomyces* sp. in solid-state fermentation

1. Introduction

Species of the genus *Paecilomyces* are commonly found in nature and have a wide range of hosts, mainly lepidopteran larvae. Many researches have done on the mass production of the entomopathogenic *Paecilomyces* species. However, much emphasis has been placed on the development of liquid culture media and production of blastospores, even short comings of blastospores such as not amenable to simple drying techniques and tends to perish more rapidly during storage. Aerial conidia, in contrary, are more stable to challenging environmental conditions and easy to formulate with oil for ULV application because of its lipophilic character.

The *Paecilomyces* sp. isolated from soil in the Kyoto, Japan is also a promising microbial control agent because of its pathogenicity to the diamond back moth (*Plutella xylostella*)-a key pest of cruciferous crops. However, production of sufficient quantities of the conidia has not been well investigated. The objectives of the studies are as follows:

1. Determining the best liquid culture for the production of fungal inoculum transferring to solid state fermentation.
2. Designing and optimizing a simple system for the production of aerial conidia from *Paecilomyces* sp. on solid substrates.

2. Materials and Methods

Fungal isolate and culture conditions

The *Paecilomyces* sp. isolated from soil in the Kyoto, Japan was used in this study.

Three liquid media (L-broth, corn steep liquor and Czapek dox broth), four agar media; L broth agar (LBA), Czapek dox broth agar (CDBA), Potato dextrose agar (PDA) and Oatmeal agar (OMA), cereals (long-grain white rice, barley and oat) and non-woven pulp fabric sheets were used for the studies. All cultures were grown at 25°C and dark: light regime of 12:12 (except

liquid cultures).

Determination of growth and conidiation

Blastospore and conidium production were counted using a haemocytometer

3. Results and Discussion

Production of blastospores in liquid cultures

Three liquid media: L-broth, Czapex dox broth and corn steep liquor were used for this experiment. The highest concentrations of blatospores were produced in L-broth medium with the yield of $4.4x10^8$ spores/ml after 9 days inoculation, followed by Corn steep liquor and the last is Czapek dox broth.

Production of conidia on agar media

The results show that OMA is the most suitable agar medium for production of conidia of *Paecilomyces* sp. The highest yield of 1.6×10^8 conidia /cm^2 was produced on OMA transferred by L-broth liquid culture and followed by OMA transferred by corn steep liquor. Extract of silkworm pupa stimulated conidiation rapidly but not produced high yield of conidia.

Production of conidia on cereals

Various rates of water, peanut oil and cereals were used for testing the production of conidia of *Paecilomyces* sp. The results demonstrated that the optimum ratio of water and cereals being 10:6 and the best solid substrate for production of conidia of *Paecilomyces* sp. is rice. A high yield of 6.3×10^8conidia/g was produced on rice plus 60% water and 2% peanut oil after 3 weeks incubation.

Further experiments carried out with rice plus 60% water and 0, 1, 2, 3 and 5 % peanut oil with the duration of incubation for only 2 weeks. The results show that there are no significant differences in the peanut oil rates 1, 2, 3 and 5 %. Therefore, to reduce cost, the addition of 1% of peanut oil is suitable.

Production of conidia on non woven pulp fabric sheets

Non woven fabric sheets were soaked into L-broth liquid cultures diluted by fresh basal media supplementation of sucrose (2, 4, 6 and 6 %) and yeast extract (0.3, 0.6 and 0.9%). Adding the sucrose at the rates of 4% or 6 % and yeast extract of 0.3 or 4% sucrose and the yeast extract of 0.6% may lead to increase the yield of production of conidia. However, addition of 8 % sucrose (and 0.3 yeast extract) or 0.9 % of yeast extract (and 4% sucrose), the yields of conidia tend to reduce.

Optimal media for production of conidia of *Paecilomyces* sp. on fabric sheets are basal media supplementation of 6% sucrose and 0.3 yeast extract that obtained the yield of 1.3×10^8 conidia/cm^2

4. Conclusion

From the research results, the following conclusions were made:

1. L-Broth is the best medium for the production of blastospores among the three used liquid media.
2. Conidial production on OMA was significantly higher than those on LBA, PDA and CDBA.
3. On cereals, the highest yields were obtained on medium of rice at 60% water and 2% peanut oil additions.
4. In the case of non woven pulp fabric sheet used, basal medium supplemented 6% sucrose and 0.3 % yeast extract produced high yield of conidia (1.3×10^8conidia/ cm^2).
5. From the aspects of cost and efficiency, the medium of rice at 60% water and 1% peanut oil addition is the most suitable media among the tested media for production of conidia of the *Paecilomyces* sp.
6. Further investigations on C:N ratio, type of nitrogen source required by the *Paecilomyces* sp., effects of carbon and nitrogen on the germination rate of conidia should be useful for mass production of the fungus as well as the use it for microbial control.

TECHNICAL, ALLOCATIVE, AND ECONOMIC EFFICIENCY IN SOYBEAN FARMING OF THE MEKONG RIVER DELTA, VIET NAM

1. Introduction

The main objective of this study is to measure the possibilities of productivity gains by enhancing the efficiency of soybean farmers in the Mekong River Delta, Viet Nam. The first step of objective is to estimate a stochastic production frontier which gives the result for measuring farm-level technical (TE), allocative (AE) and economic (EE) efficiency. After that, the second step of analysis is to calculate separate truncated equations for TE, AE and EE as a function of various attributes of the farmers in sample.

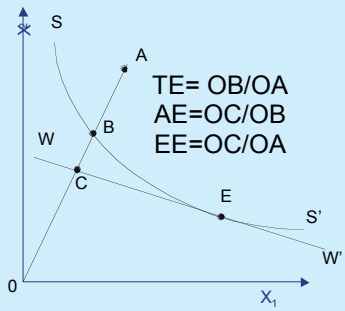


Figure 1. Technical, Allocative, and Economic Efficiencies

III. Methodology

Efficiency

The stochastic production frontier

The stochastic production frontier can be written as

$$\ln(Y_i) = \beta_0 + \sum_i \beta_i \ln X_{ij} + \varepsilon_i \qquad (1)$$

Y_i is output of the i farmers; X_{ij} is the j input used by farmer i; $\varepsilon_i = v_i - u_i$ is a "composed" error term.

The conditional mean of u given ε is defined by:

$$E(u_i \mid \varepsilon_i) = \sigma_* \left[\frac{f^*(\varepsilon_i \lambda / \sigma)}{1 - F^*(\varepsilon_i \lambda / \sigma)} - \frac{\varepsilon_i \lambda}{\sigma} \right] \qquad (2)$$

Where $\sigma_*^2 = \sigma_u^2 \sigma_v^2 / \sigma^2$, f* is the standard normal density function, and F* is the distribution function, both functions being evaluated at $\lambda\varepsilon/\sigma$.

Farm specific technical efficiency will be obtained by using the relationship:

$$TE_i = \exp\left(-\hat{u}_i / \sum_i \hat{\beta}_i\right) = \exp\left(-E(u_i \mid \varepsilon_i) / \sum_i \hat{\beta}_i\right) \qquad (3)$$

The frontier function adjusted for the statistical noise v_i

$$\ln(Y_i^*) = \beta_0 + \sum_i \beta_i \ln X_{ij} - u_i = \ln(Y_i) - v_i \qquad (4)$$

Where $\ln(Y_i^*)$ is defined as the farm's observed output adjusted for the statistical noise contained in v_i.

The cost frontier dual to the production frontier:

$$\ln(C_i) = \alpha_0 + \sum_i \alpha_i \ln P_{ij} + \gamma \ln(Y_i^*) \qquad (5)$$

Where C_i is the minimum cost to product output Y, P_{ij} is a vector of input price, and α is a vector of parameters. From this function, we also get allocative and economical efficiencies.

IV. Empirical results

Technical, allocative and economic efficiencies of soybean production at farm level

The stochastic frontier model is given as:

$$\ln(Y_i) = \beta_0 + \sum_i \beta_i \ln X_{ij} + \varepsilon_i \qquad (6)$$

Y_i :Soybean output, X_{1i}:human labor used, X_{2i}: fertilizer quantities, X_{3i}: Pesticide quantities, X_{4i}: Machinery service hired.

Table 1. OLS and Maximum likelihood estimates for technical efficiency

Variables	OLS		MLE	
	Coef.	St.Errors	Coef.	St.Errors
Labor	0.161***	0.053	0.163***	0.053
Fertilizer	0.359***	0.057	0.356***	0.056
Pesticide	0.174***	0.052	0.177***	0.052
Machinery	0.042*	0.024	0.041*	0.024
Constant	3.932***	0.239	4.158***	0.422
Function coefficient	0.736		0.737	
F-statistic model	54.01***			
F-statistic CRTS [a]	27.24***			
σ^2			0.249	
$\lambda=\sigma_v/\sigma_\varpi$			0.688	
Log Likelihood			-68.830	
R^2	0.67			

[a] CRTS = constant returns to size, ***= 1%, **=5%, *=10%
Source: Own estimates; data appendix available from authors.

Table 2. Frequency distribution of technical, allocative and economic efficiency

	TE		AE		EE	
Eff.level (%)	No.	%	No.	%	No.	%
>85	3	3	1	1	0	0
>75≤85	52	46	4	4	0	0
>65≤75	47	42	22	19	1	1
>55≤65	10	9	24	21	7	6
>45≤55	1	1	25	22	23	20
>35≤45	0	0	18	16	35	31
>25≤35	0	0	14	12	31	27
>15≤25	0	0	4	4	14	12
>5≤15	0	0	0	0	1	1
≤5	0	0	1	1	1	1
Mean (%)	73.9		51.5		38.0	
Minimum (%)	52.4		4.4		3.8	
Maximum (%)	86.5		86.4		67.5	

Source: Own estimates; data appendix available from authors.

The models were statistically significant at 1% and $\gamma = \lambda^2/(1+\lambda^2) = \sigma_U^2/\sigma_\varepsilon^2$ which means that 32% of the total variation in farm output is due to technical inefficiency.

The result of the cost frontier dual to the production frontier:

$$\ln C = \ln(0.012) + 0.221\ln P_1 + 0.483\ln P_2 + 0.240\ln P_3 + 0.056\ln P_4 + 1.357\ln Y^*, \qquad (7)$$

Ci: The cost of Soybean production per farm, P_{1i}: The hired price, P_{2i}: The price of fertilizer, P_{3i}: The price of pesticide, P_{4i}: The price of machinery.

TE indices range from 52.4% to 86.5%, with an average of 73.9%. The mean of AE is 51.5% with a low of 4.4% and a high of 86.4%. The average EE is 38%, with a high of 67.5% and a low of 3.8%.

Source of efficiency

$$\text{EFFICIENCY} = b_1\text{TRAINING} + b_2\text{CREDIT} + b_3\text{GOVERNMENT} + b_4\text{LN(EXPERIENCE)} + b_5\text{LN(AREA)} + b_6\text{LOCAL} \qquad (8)$$

Table 3. The truncated estimates for the sources of efficiency.

Variables	TE		AE		EE	
	Coef.	Z	Coef.	Z	Coef.	Z
TRAINING	0.021	0.92	0.040	0.72	0.038	0.86
CREDIT	-0.008	-0.62	0.029	0.98	0.020	0.86
GOVERNMENT	0.033*	1.44	0.053	0.93	0.058*	1.3
EXPERIENCE	0.007	1.05	0.024*	1.46	0.021*	1.55
AREA	0.028***	3.84	-0.079***	-4.36	-0.042***	-2.89
LOCAL	-0.022**	-1.73	-0.010	-0.3	-0.017	-0.69
Constant	0.688***	37.52	0.581***	12.92	0.399***	11.17
Log likelihood	160.142		60.536		85.693	

***= 1%, **=10%, *=20%
Source: Own estimates; data appendix available from authors.

TRAINING is not statistically significant in all TE, AE and EE models. This indicates that trainings given by Government do not change the efficiency of soybean cultivation.

CREDIT is not statistically significant in all TE, AE and EE functions. This suggests that the availability of credit is not important factor for attaining higher levels of TE, AE and EE.

GOVERNMENT is only statistically significant at 20% level in TE and EE functions. Because the error is rather large, the result is only useful for reference. The Supports of Government is also useless to raise the EE of soybean production.

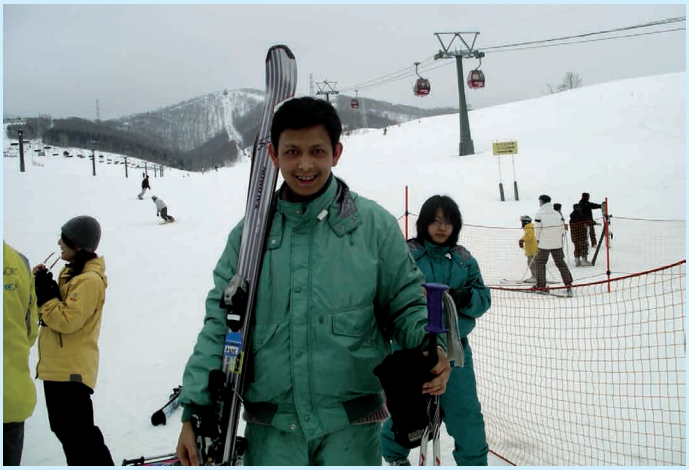
EXPERIENCE is only statistically significant at 20% level in AE and EE functions, and not significant in TE model. This means that the more experience farmers have, the higher AE and EE scores they get. This rule is not correct for TE score.

AREA is positive and statistically significant at 1% in TE model. It indicates the more areas farmers have, the higher

technical efficiency they get. However, this result is not correct for AE and EE since the variable is negative in AE and EE models.

LOCAL, TE model shows that there is the difference of TE among farms in Can Tho and An Giang at 10% level. Farmers in An Giang that grow soybean with higher TE than those in Can Tho are about 2.2%. However, farmers in both provinces have the same AE and EE.

V. Conclusion



The analysis shows that, for our sample of MRD soybean farms, average technical efficiency is 74 percent, average allocative efficiency is 51 percent, and average economic efficiency is 38 percent.

In a second step analysis, relationships between TE, AE and EE and various attributes of the farm and farmer were examined. The second step analysis relied on the truncated regression techniques to estimate three separate equations, where TE, AE and EE were expressed as functions of six farm characteristics: training, credit, government, experience, area, and local. The results show that the larger-scale farmers have, the higher technical efficiency they get. The supports from government also have a few effects on the technical efficiency of soybean farmers. The AE and EE model shows that farmers who have more experiences on cultivating soybean have higher allocative and economic efficiency. Due to the favorable natural conditions, farms in An Giang obtain the TE score higher than those in Can Tho. Moreover, in this study almost all activities given by the Government have no impacts on increasing the efficiency of soybean farmers.

Haymar Hein

Effects of Trade Liberalization on Rice Marketing and Farmer's Behaviour in Myanmar

Abstract

Rice plays an important role in Myanmar's economy as a staple food and high amount of foreign exchange earnings from rice export. Therefore, it is important for both farmers and consumers in Myanmar. Rice is also used for different varieties of snack such as vermicelli, rice noodle, rice cake, etc. Due to the widespread utilization of rice, people in Myanmar consume relatively more amount rice than countries. The average annual per capita consumption of rice is 211 kg, the highest in 1999. Thus, Paddy alone has been accorded very high priority, and the production policy was focused on maximizing output rather than farmer's income.

Two liberalizations of rice marketing were implemented in 1987 and 2003. The first liberalization allowed the private sectors to participate in free domestic marketing and export of some agricultural products except rice. In the second liberalization, all rice procurement and rationing systems by government have been abolished as the main point for the agricultural reform. However, the marketing of rice domestically and foreign export are still being regulated by the government. After that, the production of rice becomes more market oriented, the farmers are more concerned about the quantity and quality of output they produce, and how they access in the marketing activities after the New Rice Trading Policy.

The main purpose of this paper is to examine the effects of the trade liberalization on farmer's behavior in survey area and rice marketing in Myanmar and to access the status of rice producers and market participants in survey area.

This study also aims to analyze the before and after effects of on the producers and market intermediaries,

cost and profit of paddy production, changing the price of paddy at harvest time and changing the rice marketing system in Myanmar based on the survey data collected from 68 farmers located in Kyauktan Township.

According to analysis, millers have high market power in the study area after new rice policy. The farmer with high level of education can store their farm output for long duration and can get much more profit than the others. The old farmers sell their product as paddy. The farmers should have not only large farm size but also enough knowledge and experiences for managing the productivity.

As increasing cultivated farm size would result in substantially increasing farm output. The State should allow longer term user rights, and remove unnecessary barriers related to transfer of land use rights and the acquisition of land titles would encourage further investment in land improvement. The State should also conduct more research to improve technology as well as provide and transfer the knowledge to the farmers through training programs and extension services.

EM Huy

SPATIAL CONNECTION OF VEGETABLE MARKET IN CAMBODIA
Food Marketing Laboratory

Cambodia is one of developing nations. Its economy mostly relies on the agricultural sector, which is the backbone of about 80 percent of lives. Cambodia in the past two decades went through civil war and social turmoil, which torn up the country to fall behind development. Since Cambodia moved out of communism colony from 1989, the country then started reforming its economic policy. Frequently reforming in developed nations created concentration and vertical integration, while in opposite in developing countries like Cambodia deconcentration and specialization are the results of reforming (Marcel Fafchamps, *et al*., 2002). Since Cambodia undertook free market economy from 1994, it is seen that development has been seen working very slowly to response to market reforming. One of them is agricultural sector. Most of farmers still face many problems in their farming career and stay in a poor living condition. The surplus and deficit often have occurred, and created a situation of food insecurity. This shows the poor connection between markets. However, the degree of market interrelationship in Cambodia has not been statistically revealed yet so far. From this point of view, it drives us to find out causes that have influences on vegetable market performance to seek the best possible solutions.

The main objectives of this study are to analyze the pattern of price fluctuations across the markets, and to examine whether movements of prices in the different markets for the same commodity are separated or synchronized. To achieve the above goal, we use monthly wholesale prices of five categories of vegetables from 2002 to 2006 from 11 markets in 11 provinces/cities throughout Cambodia because of unavailability of transport cost and quantity, and since prices the most suitable resources for market analysis and available in developing nations. To catch the exogenous effects, we include certain dummy variables, including harvest season, water shortage, dry period, and flood into the equation. The monthly prices series is obtained from marketing office of Ministry of Agriculture, Forestry, and Fisheries (MAFF), Cambodia. Our hypotheses are that the change in price at regional markets is independent from the change in central prices, and regional markets are separated from central market in short run and in long run.

Timmer's model (1987) is used to test the level of market connection. The concept of model is that if the two markets, central and local, are connected, an adjustment of regional price will be made to respond to the change in central price promptly. Here is the specification of dynamic regression:

$$P_t^l - P_{t-1}^l = \alpha_0 + \alpha_1 (P_{t-1}^l - P_{t-1}^c) + \alpha_2 (P_t^c - P_{t-1}^c) + \alpha_3 P_{t-1}^c + \beta X + \varepsilon \qquad (1)$$

Where P_t^l is the logarithm of price of commodity at time *t* of local markets, P_t^c is the logarithm of price of commodity at time *t* of central market, *X* is the vector of exogenous influences on local markets, α_i, β are parameters to be estimated, ε is disturbance term. Because there is a difficulty to handle the equation (1) to separate the short-run and the long-run effects of central market on regional markets, the equation (1) can be transformed into

$$P_t^l = \alpha_0 + (1+\alpha_1) P_{t-1}^l + \alpha_2 (P_t^c - P_{t-1}^c) + (\alpha_3 - \alpha_1) P_{t-1}^c + \beta X + \varepsilon \qquad (2)$$

So, the price of a regional market is formed by the lagged regional price, the change in central price, the lagged central price and other exogenous factors(X). From equation 2, index of market connection can be calculated and measured by

$$IMC = \frac{1+\alpha_1}{\alpha_3 - \alpha_1}$$

The value of IMC shows the degree of market integration in short-run sense. If /IMC/ < 1, it indicates the strong connection between the markets, and if /IMC/ > 1, it indicates the poor connection between the markets. In addition in spatial market connection we can test markets in three aspects - markets are segmented if the estimates of α_3-α_1 and α_2 are insignificant, short- run if the estimate of α_3-α_1 is significant, and long-run connection if the estimate of α_2 is significant. The following is one of the study results relating to Chinese Kale vegetable.

Results and Discussion

Table of results of estimated coefficients of Chinese Kale price formation equation for 10 local markets

Variables	M1[a]	M2	M3	M5	M6	M7	M8	M9	M10	M11
Intercept	1.593	3.688	2.374	1.385	0.817	1.742	0.505	4.056	0.220	1.134
	(0.78)[b]	(1.12)	(2.22)	(1.40)	(0.70)	(1.22)	(1.19)	(3.09)	(0.30)	(1.38)
P^l_{t-1}	0.467**	0.488**	0.375**	0.364	0.336**	0.488**	0.187	0.459**	0.100	0.353**
	(3.47)	(3.60)	(2.87)	(2.62)	(2.40)	(3.60)	(1.28)	(3.95)	(0.71)	(2.76)
$P^c_t - P^c_{t-1}$	-0.076	-0.110	0.747**	0.608*	0.776**	0.116	0.844**	0.463**	0.991**	0.569**
	(-0.26)	(-0.30)	(3.92)	(3.32)	(3.59)	(0.56)	(12.73)	(2.52)	(7.15)	(5.27)
P^c_{t-1}	0.321	0.023	0.292	0.441**	0.552**	0.293	0.754**	-0.005	0.852**	0.482**
	(1.14)	(0.06)	(1.44)	(2.43)	(2.56)	(1.38)	(5.59)	(-0.03)	(4.75)	(3.32)
Harvest	-0.216*	-0.240*	0.023	-0.116	-0.187*	-0.244*	-0.019	-0.126	0.206*	-0.066
	(-1.78)	(-2.18)	(0.22)	(-1.19)	(-2.05)	(-2.14)	(-0.37)	(-1.17)	(2.19)	(-0.70)
Draught	-0.174	-0.153	-0.122		-0.243	-0.150	-0.054	-0.177	0.003	-0.218
	(-0.73)	(-0.59)	(-0.93)		(-1.88)	(-1.18)	(-0.82)	(-1.35)	(0.04)	(-1.81)
Water	-0.106	-0.213*	-0.100		-0.259**	-0.072	-0.069	-0.233*	-0.105	-0.253**
shortage	(-0.83)	(-1.83)	(-1.00)		(-2.70)	(-0.56)	(-1.35)	(-2.11)	(-1.38)	(-2.95)
Flood			0.238*			-0.009	0.011	0.222*	0.131	
			(2.33)			(-0.04)	(0.19)	(2.00)	(1.42)	
F-value	5.75	4.94	13.12	13.01	11.09	5.39	57.80	10.91	24.22	17.01
R^2	0.4776	0.4458	0.6476	0.5255	0.5809	0.4616	0.9042	0.6044	0.7723	0.6668

"*" significance level at α = 5 %, and "**" significance level at α =1%

(a): M1: Serey Sophorn market, M2: Bung Chhouk market, M3: Leu market (K.Chhnang), M4: Deum Kor market, M5: Leu market (K. Som), M6: Samaki market, M7: Doun Keo market, M8: Takhmao market, M9: Nak Loeung market, M10: Bung Kok market, M11: Leu market (Siem Reap). (b): Figures in parentheses are *t-value*

Table of Index of Market Connection (IMC)

Pair-market	Cabbage	Chinese Kale	Cucumber	Radish	Tomato
Dem Kor-Serey Sophorn	1.48	1.45	2.33	1.86	3.98
Deum Kor-Bung Chhouk	2.62	21.22	0.36	5.78	761
Deum Kor-Leu (K. Chhnang)	2.02	1.28	1.28	3.04	15.73
Deum Kor-Leu (K. Som)	86.12	0.82	1.11	1.65	10.54
Deum Kor-Samaki	0.37	0.61	1.31	0.79	1.34
Deum Kor-Doun Keo	1.78	1.66	1.6	0.69	3.28
Deum Kor-Takhmao	0.25	0.25	0.05	0.04	0.81
Deum Kor-Nak Loeung	4.53	91.8	34.8	8.95	8.16
Deum Kor-Bung Kok	0.57	0.12	0.49	0.99	3.54
Deum Kor-Leu (Siem Reap)	1.00	0.73	0.46	1.93	1.03

Table of IMC and table of coefficients suggest that Takhmao has a very good connection with Dem Kor in short and long run for all commodities studied while Serey Sophorn and Bung Chhouk tend to be independent. The good connection is because Takhmao is one of markets located in the main production areas, connected by good road and communication network with Deum Kor in addition to near in distance. So, vegetable trade and information flow smoothly under a cheaper and faster way. In contrast, Serey Sophorn and Bung Chhouk, located in north-west part of the country and far in distance from Deum Kor, are poorly connected with this central market in short and long run for almost commodities selected for study. This is because they both have additional source from Thai markets, which stay close to their location.

In the price elasticity sense, from table of coefficients of long-run connection for instance one percent change in price of Chinese Kale at Deum Kor market leads to 0.75 percent change in price adjustment at Leu market of Kampong Chhnang in respond.

In conclusion, Deum Kor is the major consumption and distribution center of vegetables in Cambodia from which information flow out to other regional markets. The flow of information eventually creates a phenomenon of short-run and/or long-run connection between markets spatially. The closer to the central market the regional market is located, the greater the markets are integrated. However, the degree of vegetable market connection varies depending on characteristics of vegetables, regions where markets are located, road and communication system, and market structure. Certain markets are under effects of

Table of coefficients of long-run market connection

Pair-market	Cabbage	Chinese Kale	Cucumber	Radish	Tomato
Dem Kor-Serey Sophorn	0.56**	-0.07	0.18	0.22	0.11
Deum Kor-Bung Chhouk	0.12	-0.11	0.35*	0.06	-0.09
Deum Kor-Leu (K. Chhnang)	0.43**	**0.75****	0.24*	0.3*	0.26**
Deum Kor-Leu (K. Som)	0.21	0.61**	0.56**	0.29*	0.28
Deum Kor-Samaki	0.82**	0.78**	0.3**	0.37**	0.56**
Deum Kor-Doun Keo	0.39**	0.12	0.23**	0.24**	0.3**
Deum Kor-Takhmao	0.87**	0.84**	0.61**	0.65**	0.48**
Deum Kor-Nak Loeung	0.48**	0.46**	0.21*	0.15	0.17**
Deum Kor-Bung Kok	0.6**	0.99**	0.59**	0.35**	0.22**
Deum Kor-Leu (Siem Reap)	0.47**	0.57**	0.34**	0.18*	0.36**

harvest season, draught, water shortage, and flood period on their price formation as well.

Is improving pasability of road, and communication network the best solution to improve the degree of market connection in Cambodia?

Paul J. Heytens (1986) argued that in developing nations, regional markets are not well integrated, and transport and communication are commonly difficult and expensive. Furthermore Barry K. Goodwin and Ted C. Schroeder (1991) said price differentials from region to region occur due to transportation and transaction cost. These two concepts evidence the important contribution of transportation and communication to efficiency of marketing performance. Therefore, improving road and communication system is necessary in Cambodia to reduce transport costs and to meet spatial market connection in addition to laying down market based program and policies to facilitate marketing performance and promote domestic agricultural products. Moreover, marketing system should be improved to increase the degree of market connection. However other factors affecting price formation should be taken into account as well. These factors, including harvest season, water shortage, etc. often lead to seasonality, which has created price fluctuation and food scarcity or insecurity. To reduce the seasonality, proper irrigation system should be restored and built under a proper strategy.

This is one of farmer market taken along from Komamoto prefecture

Hour Ix

Fukuoka is a quiet city of Kyushu Island located in Southern Japan. With more relaxing atmosphere, Fukuoka people are regarded as more friendly people compared with those in other parts of Japan where lives are much busier and more challenging. Within two-year stay in Fukuoka city, I attended many activities organized by Cambodian Student Association and Japanese friends. In special occasions such as new years and public holidays, we often celebrate party to introduce and exchange our own culture like Cambodian food and Khmer traditional dance. Moreover, we introduce our language by opening a Khmer language class in the city which is held once a week.

Every year, we are invited to participate in some Japanese farming events particularly rice planting and harvesting when the seasons come. We normally try both conventional and sophisticated methods to experience real life in Japanese farming.

Back in school, I attended some Japanese classes in addition to the university ones. In Kyushu University, Japanese language courses are provided for free to foreign students. Proficiency of Japanese language is very necessary for foreign students while living in Japan for their daily lives. Exchange and full-course international students can enjoy not only the courses of Japanese language but also the courses of other languages such as English, Korean, Chinese and French as interested.

With regard to the specific fields of study, field trips and study tours are provided in addition to the University courses in class. Through out the activities we can learn and experience real things and practical application. Both local and international

students are strongly encouraged to attend the seminars and international conferences to exchange their experiences from different regions. Furthermore, international students can also enjoy some sight seeing tours to some other parts of Japan which are periodically organized by the International Student Office.

In general speaking, life in Kyushu is much more enjoyable than in other part of Japan. People are very kind and friendly, living expenses are cheap, and the weather is moderately nice. I am really thankful to JDS program as well as to Kyushu University for providing me a chance to peruse my Master's degree.

8. LIST of Subjects and Supervising Professors for on international Development Research Course (Academic Year 2007)

Applied Genetics and Pest Management

Bioresources and Management Michio OHBA, Professor
Genetics and Plant Breeding
Plant Breeding Atsushi YOSHIMURA, Professor
Silkworm Science Yutaka KAWAGUCHI, Professor
Plant Pathology and Pesticide Science
Plant Pathology Yoichi TAKANAMI, Professor
Pesticide Chemistry Eiichi KUWANO, Professor
Zoology and Entomology
Entomology Osamu TADAUCHI, Professor
Zoology Takayuki MŌRI, Professor
Biological Control
Insect Pathology and Microbial Control
Susumu SHIMIZU, Professor
Insect Natural Enemies Masami TAKAGI, Professor

Plant Resources

Applied Plant Science Shoji YAMASHITA, Professor
Agricultural Botany
Crop Science Mari IWAYA-INOUE, Professor
Horticultural Science Hiroshi OKUBO, Professor
Soil Science and Plant Production
Soil Chemistry Kazuhiko EGASHIRA, Professor
Soil Biology and Biochemistry Kenji SAKAI, Professor
Plant Nutrition Ken MATSUOKA, Professor
Plant Production Physiology Fumitake KUBOTA, Professor
Plant Metabolic Physiology Yoshichika KOBAYASHI, Professor
Agricultural Ecology Kei NAKAJI, Professor
Environment Control for Biology Jiro CHIKUSHI, Professor
Tropical Crops and Environment Kazuo OGATA, Professor

Bioscience and Biotechnology

Applied Biological Regulation Technology
Masahiro OKAMOTO, Professor
Applied Biological Chemistry
Biochemistry Makoto KIMURA, Professor
Chemistry and Technology of Animal Products
Yoshihide IKEUCHI, Professor
Nutrition Chemistry Katsumi IMAIZUMI, Professor
Food Chemistry Koji YAMADA, Professor
Food Biotechnology
Food Analysis Kiyoshi MATSUMOTO, Professor
Food Hygienic Chemistry Takahisa MIYAMOTO, Professor
Food Process Engineering Mitsuya SHIMODA, Professor
Microbial Science and Technology
Applied Microbiology Kensuke FURUKAWA, Professor
Microbial Technology Kenji SONOMOTO, Professor
Marine Biological Chemistry
Marine Biochemistry Miki NAKAO, Professor
Marine Resource Chemistry Makoto ITO, Professor
Marine Environmental Science Tsuneo HONJO, Professor

Animal and Marine Bioresource Sciences

Advanced Animal and Marine Bioresources
Mitsuhiro FURUSE, Professor
Animal Science
Functional Anatomy Hisao IWAMOTO, Professor
Reproductive Physiology Masa-aki HATTORI, Professor
Animal Feed Science Yasuhisa MASUDA, Professor
Marine Bioresources
Marine Biology Michiya MATSUYAMA, Professor
Fisheries Biology Akinobu NAKAZONO, Professor
Fish Production Technology Seiichi MATSUI, Professor

Agricultural and Resource Economics

Agricultural Resource Economics and Business Administration
Agricultural Economics Hiroshi YOKOGAWA, Professor
Agricultural Policy Shouichi ITO, Professor
Farm Management
Industrial Organization of Agribusiness
Quantitative Analysis of Agribusiness Organization
Agricultural Marketing Satoshi KAI, Professor

Bioproduction Environmental Sciences

Bioproduction and Environment Information Sciences
Ken MORI, Professor
Regional Environment Science
Irrigation and Water Utilization Yoshisuke NAKANO, Professor
Drainage and Water Environment
Kazunori HIRAMASTU, Professor
Environmental Soil Engineering Masami OHTUBO, Professor
Applied Meteorology Taichi MAKI, Professor
Bioproduction System Science
Bioproduction Engineering Eiji INOUE, Professor
Postharvest Science Toshitaka UCHINO, Professor

Forest and Forest Products Sciences

Systematic Forest and Forest Products Science
Ryuichiro KONDO, Professor
Forest Environment and Management Science
Forest Management Shigejiro YOSHIDA, Professor
Erosion Control Hiroshi OMURA, Professor
Forest Policy
Forest Bioscience
Silviculture Susumu SHIRAISHI, Professor
Wood Science Kazuyuki ODA, Professor
Forest Chemistry and Biochemistry Kenichi KURODA, Professor
Biomaterial Science
Wood Material Technology Yasuhide MURASE, Professor
Bioresources Chemistry Hiroyuki WARIISHI, Professor
Biomacromolecular Materials
Mitsuhiro MORITA, Professor
Forest Ecosphere Management
Forest Ecosystem Management Kyouichi OHTSUKI, Professor
Forest Resources Management

Genetic Resources Technology

Molecular Gene Technology Satoru KUHARA, Professor
Protein Chemistry and Engineering Yoshizumi ISHINO, Professor
Cellular Regulation Technology Sanetaka SHIRAHATA, Professor
Applied Genetic Resources
Silkworm Genetics
Plant Genetics Hikaru SATOH, Professor
Microbial Genetics Toshihisa OHSHIMA, Professor

*These laboratories also belongs to Graduate School of Systems Life Scilences.

(Remarks)
A professor in charge of the specific field, an associate professor, and assistant professor are usually assigned to each subject.
Other professors may be selected based on approval from the supervisory professor.

9. Curriculum of Special Course (Master's Course)

The Graduate School of Bioresource and Bioenvironmental Sciences runs two graduate education programs: the standard course and a special course. The special course, which focuses on International Development Research, is aimed at international students. The International Development Research Course follows a 2 semester system, starting in October with the autumn term and followed by the spring term, unlike the standard course which is taught in Japanese and commences in April.

(1) **Thesis work will be carried out in English.** Since the course is aimed at international students, all thesis work should be carried out in English.

(2) Students are expected to learn the Japanese Language during the course of their studies, and while not compulsory, this is aimed at bettering communication during daily life.

(3) Theses should be based on research conducted during the course, and on completion, should be submitted to the Division of Agriculture, the Graduate School of Bioresource and Bioenvironmental Sciences at Kyushu University. If the examiners' requirements are satisfied, an appropriate degree will be awarded.

Students will be awarded the Master of Science (M.Sc) on completion of a satisfactory thesis. Students are also required to complete a four-semester course over a two-year period.

The course consists of lectures, practicals, seminars, and tutorials. Students must obtain 30 credits with a minimum pass grade of 60 %. The Master's course curriculum is presented in Table 1.

Table 1. The Master's Course Curriculum

Code*	Subjects	Credit	Term**			
			Ⅰ (A)	Ⅱ (S)	Ⅲ (A)	Ⅳ (S)
C01	Master's Thesis Research Ⅰ	6	6			
C02	Master's Thesis Research Ⅱ	6			6	
C03	Seminar in Specified Field Ⅰ	2	2			
C04	Seminar in Specified Field Ⅱ	2		2		
C05	Seminar in Specified Field Ⅲ	2			2	
	(Subtotal)	(18)				
M01	Fundamentals of Agricultural Sciences	2	2			
M02	Biological Resources: Utilization and Conservation	2	2			
M03	Soil and Water Environment	2	2			
M04	International Rural Development	2	2			
M05	Advanced Technology in Agriculture	2			2	
M06	Food Science and Food Systems	2			2	
M07	Special Lecture on International Development Ⅰ	1			1	
M08	Special Lecture on International Development Ⅱ	1			1	
	(Subtotal)	(10)				
S01	Applied Genetics and Pest Management	2		2		
S02	Plant Resources	2		2		
S03	Bioscience and Biotechnology	2		2		
S04	Animal and Marine Bioresource Science	2		2		
S05	Agricultural and Resource Economics	2		2		
S06	Bioproduction and Environmental Science	2		2		
S07	Forest and Forest Production Science	2		2		
S08	Genetic Resource Technology	2		2		
	(Subtotal)	(2)				
	Total	30				

*C: compulsory subjects = 5 subjects (18 credit units); M: module subjects = 5 subjects (10 credit units) selected from a total of 8; S: specialized subjects = compulsory and particular to each department (2 credit units).

** A = Autumn term; S = Spring term

An outline of the Master's course subjects is given in Table2. Compulsory subjects consist of the thesis (12 credits) and laboratory seminars (6 credits); module subjects of 5 subjects from a total of at least 8 (10 credits); and specialized subjects of one specific subject (2 credits) given by the department to which the student belongs.

Table 2. Preponderant features of the Master's course subjects

	Aim	Lecture methods	Choice	Professors	Required
Compulsory subjects	Research practice	Conventional form	5 subjects	Laboratory Prof.	5 (18 credits)
Module subjects	Improvement of basic academic abilities focusing on agricultural administration and rural development	Block module	8 subjects	Special team	5 (10 credits)
	Cross-cutting or interdisciplinary research				
Specialized subjects	Improvement of expertise	Block module	8 subjects	Your Depts.	1 (2 credits)

Table 3. An Outline of the Module Subjects

Code	Subject	Specification	Relevant Departments
M01	Fundamentals of Agricultural Sciences	Fundamentals of Agriculture and rural development (Biostatistics, etc.)	All
M02	Biological Resources: Utilization and Conservation	Fundamental sciences necessary for maintaining biodiversity and sustainable utilization of biological resources	Applied Genetics and Pest Management, Plant Resources, Animal and Marine Bioresource Science, Forest and Forest Products Science, etc.
M03	Soil and Water Environments in Agriculture	Irrigation, drainage, reclamation engineering, and the control of water resources	Plant Resources, Agricultural and Resource Economics, Bioproduction Environmental Science, Forest and Forest Products Science, etc.
M04	International Rural Development	Fundamentals and practical research on international rural development	Plant Resources, Agricultural and Resource Economics, Bioproduction Environmental Science, Forest and Forest Products Science, etc.
M05	Advanced Technology in Agriculture	Agricultural life sciences and biotechnology	Applied Genetics and Pest Management, Bioscience and Biotechnology, Animal and Marine Bioresource Science, Genetic Resources Technology, etc.
M06	Food Safety and Security	Science, technology and economics related to food safety and security	Bioscience and Biotechnology, Agricultural and Resource Economics, Bioproduction Environmental Science, etc.
M07	Special Lecture on International Development I	Special lecture (Technical communication, etc.)	Adjunct professors
M08	Special Lecture on International Development II	Special lecture (Wide-ranging issues related to international development strategies, etc.)	Adjunct professors

Lectures are given in a **block module format**. Each semester comprises three blocks, each of which includes 1 to 2 module subjects. A brief outline of the various module subjects is provided in Table 3.

The topic of the thesis research is specified after discussion with your supervisor. Students **must submit their master thesis in English** to the appropriate examination board in the department consisting the teaching staff.

Students are required to give an **oral presentation of the thesis during the spring semester of the second year. A committee will evaluate overall performance based on a report by the department committee**. Satisfactory performance will lead to an award of the Master of Science from Kyushu University.

10. Acknowledgement

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