

Program

Workshop on Agricultural Sciences

Organizers: Ta Viet Ton, Ngo Minh Hai, Dong Dao Dung, Nguyen Cong Thanh, Tran Thu Trang, Nguyen Van Thinh, Nong Thi Hue, Luu Van Duy, Hoang Phan Bich Ngoc, Do Thuy Linh

Date: October 22nd, 2019

Venue: Room 232, West 5, Ito campus, Kyushu University

Time	Activities
12:30 – 13:00	Registration
13:00 – 13:05	Welcome remarks Kumamaru Toshihiro (Professor, Kyushu University)
13:05 – 13:30	Viet Nam at an Sustainable Economic Development Crossroad Vo Tong Xuan (Professor, Nam Can Tho University)
13:30 – 13:55	Analysis on cassava production in Vietnam - a complete modelling for clarifying most effect factors of the yield Nomura Hisako (Lecturer, Kyushu University)
13:55 – 14:15	Arsenic, Trace Toxic Metals and Microbial Community Structure in Ancient Sediment Layers in Asia Nguyen Van Thinh (Researcher, Kyushu University)
14:15 – 14:35	Improving consumer trust in safe vegetables in Vietnam: the role of brand trust Ngo Minh Hai (PhD student, Kyushu University)
14:35 – 15:00	Break and poster session A Study on Polyphenol Extracting Optimization, Phytochemical Profile Analysis and α -Glucosidase Inhibitory Evaluation of Avocado (<i>Persea Americana</i>) Seed Nguyen Huu Thien (Master student, Kyushu University)
15:00 – 15:20	Analysis of the transgenerational nitrogen deficiency stress memory in rice Nong Thi Hue (PhD student, Kyushu University)
15:20 – 15:40	Molecular cloning and characterization of two types of CD83 in ginbuna crucian carp, <i>Carassius auratus langsdorfii</i> Tran Thu Trang (Master student, Kyushu University)
15:40 – 16:00	Characterization and genome structure of virulent phage ϕ EM4 infected to <i>Enterobacter</i> sp. M4, a cause of soft rot disease of plants Nguyen Cong Thanh (PhD student, Kyushu University)

Abstracts

Analysis on cassava production in Vietnam
 – a complete modelling for clarifying most effect factors of the yield–

Hisako Nomura (Kyushu University) 、 Nien Chau Nguyen (Nong Lam University) 、 Tamon Baba (Kyushu University) 、 Kasumi Ito (Nagoya University)

Introduction

The amount of cassava production in Vietnam has been increasing these years. According to FAO 2014, the total amount of cassava in Vietnam is 1,021,000 tons and this is the 7th most produced nation in the world. With the price is getting lower, Vietnamese farmers are putting more inputs to increase yields for the efforts to keep the same profit. However, overuse of the inputs could cause counterproductive effect. Correlation between the initial investment components and yield of cassava in Vietnam has not been clarified. Further, although cassava stem can be used as seedling and most farmers can re-use their own stem for the next propagation, some farmers had to replant due to bad weather (either drought, flooding or both). Thus, this study investigates production efficiency of cassava product as well as inefficiency of technical efficiency with consideration of weather effect on cassava productivity.

Method

The study was involved 182 cassava producers in three different provinces, Dong Nai, Tay Ninh, and Gia Lai, in southern Vietnam. The producers were interviewed by using a designed questionnaire with its questions being coded as continuous and categorical variables. The continuous variables referred to cassava production expenses, whereas the categorical ones consisted of climate effect, invasive pest and producers' experience. For analysis, the stochastic production frontier approach, introduced by Aigner et al. (1977) and Meeusen and van Den Broeck (1977) was applied with

$$Y_i = f(X_i, R_i) - u_i + v_i, \quad (1)$$

where Y_i is the output, X_i is the vector of physical inputs, R_i is the vector of the variable for the replanting cost, and v_i is assumed to be an independently and identically distributed $N(0, \sigma^2 v)$ two-sided random error, independent of the u_i , which is a non-negative random variable ($u_i \geq 0$) that accounts for technical inefficiency in production and is assumed to be independently distributed as truncations at zero in the normal distribution with a mean $-Z_i \delta$, and variance $\sigma^2 u$ ($|N(-Z_i \delta, \sigma^2 u)|$). The technical efficiency of the stochastic frontier production function of the i^{th} farm is defined as follows (Battese and Coelli, 1995):

$$TE_i = E[\exp(-u_i) | \xi_i] = E[\exp(-\delta_0 - \sum Z_i \delta | \xi_i)], \quad (2)$$

where $\xi_i = v_i - u_i$ and E is the expectation operator. This is achieved by obtaining the expressions for the conditional expectation u_i for the observed value of ξ_i .

Result

From descriptive statistics, average yield calculation resulted a significant different among provinces with the ranking order of Tay Ninh (32.8 ton. ha⁻¹), Dong Nai (23.8 ton. ha⁻¹), and Gia Lai (19.4 ton. ha⁻¹). The start year of cassava production for farmers in Tay Ninh is 2001 compared to 2004 of Dong Nai and 2007 of Gia Lai respectively, and it is the most productive province and has implemented advanced technology such as irrigation system to increase yield. 64% of farmers says they mainly engage in cassava production. Most of them use own land for cassava production, however 20% of total farmers, especially, in Dong Nai rent lands to expand their production land area to produce cassava.

Table 1 shows that the overall correlation between production expense and yield was specified the significant effect of the dependent variables including replanting

in negative correlation. It means that those who had to replant seedlings due to weather, the cost of replanting has a negative impact on yield. Applying manure, P₂O₅, NPK and other organic fertilizer in positive correlation. Others negatively affect yields are herbicide and accelerator. On the technical inefficiency, the significant negative correlation between invasive pest on farm and cassava yield. It means that farmers who faced invasive pest on farm and cassava, they might have taken more careful measures and those cautiousness consequently improved efficiency of cassava production. Effects of drought, flooding or both using farmers' perception of damage caused by the weather did not necessarily affect efficiency on cassava yield.

Conclusion

This study looked at the production efficiency of cassava product as well as inefficiency of technical efficiency with consideration of weather effect on cassava productivity in Vietnam. While manure, P₂O₅, NPK and other organic fertilizer are in positive correlation with cassava yield, replanting cost, herbicide and accelerator are in negative correlation. For technical inefficiency, farmers' perception of negative weather impact on cassava yield was not actually insignificant. Thus, farmers who lost their seedlings due to the weather such as drought, flooding or both should not necessarily replant their seedlings. They should reduce the use of herbicide and accelerator, too.

Table 1. Parameter Estimate of Technical Inefficiency by SFA

	Coefficient	Std. err.	t-value
<i>1. probabilistic production frontier</i>			
<i>constant</i>	3.367 ***	.503	6.69
<i>lnlha (dong/ha)</i>	-.001	.007	-1.16
<i>lnmownha2017 (dong/ha)</i>	.011 **	.005	2.44
<i>lnmhreha (dong/ha)</i>	.008	.008	.91
<i>lnfleiha (dong/ha)</i>	-.019 **	.014	-2.08
<i>lnmisha (dong/ha)</i>	-.000	.004	-0.02
<i>lncairentoha (dong/ha)</i>	-.005	.006	1.07
<i>lnadbbha (dong/ha)</i>	.006	.006	.97
<i>lnrepbha (dong/ha)</i>	-.040 ***	.006	-6.44
<i>lnmanha (dong/ha)</i>	.010 *	.009	1.72
<i>lnk2oha (dong/ha)</i>	-.00	.004	.56
<i>lnp2o5ha (dong/ha)</i>	.008 *	.004	1.76
<i>lnmpkha (dong/ha)</i>	.008 *	.005	1.68
<i>lnf6iha (dong/ha)</i>	.009	.017	0.54
<i>lnherha (dong/ha)</i>	-.019 *	.010	-1.87
<i>lnpesha (dong/ha)</i>	-.005	.005	-.98
<i>lnfinha (dong/ha)</i>	.003	.007	.36
<i>lnaccaha (dong/ha)</i>	-.020 **	.0098	-2.05
<i>lnorgferha (dong/ha)</i>	.025 **	.110	2.32
<i>lnadapha (dong/ha)</i>	-.007	.007	-1.04
<i>lnstrawha (dong/ha)</i>	-.010	-.010	-1.51
$\sigma^2 = \sigma_u^2 + \sigma_v^2$.355	.069	
$\gamma = \sigma_u^2 / (\sigma_u^2 + \sigma_v^2)$	5.747	.118	
Log likelihood	-49.814		
<i>2. Technical inefficiency</i>			
<i>Constant</i>	.601 ***	.041	14.47
<i>Ddongnai</i>	.061 *	.037	1.66
<i>Dtay Ninh</i>	.223 ***	.051	4.40
<i>Catimes</i>	-.002	.003	-0.90
<i>Camain</i>	.049	.032	1.55
<i>Tofarmha</i>	.003	.002	1.65
<i>Drought</i>	.041	.045	0.91
<i>Flood</i>	-.043	.037	-1.16
<i>Fldr</i>	.057	.052	1.11
<i>Dichousee</i>	-.084 *	.037	-2.26
N	204		

Note: ***, ** and * represent significance at the 1% (p<0.01), 5% (p<0.05) and 10% (p<0.10) levels, respectively. All of Vietnamese dong are divided by 10000.

Std. Error means standard error.

Source: Own estimates

Arsenic, Trace Toxic Metals and Microbial Community Structure in Ancient Sediment Layers in Asia

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Arsenic (As) concentration and the fractionation of this toxic metalloid in the sediment cores in Bangladesh were investigated using ICP-MS and sequential extraction technique. The present of As in various opaque minerals also were analysed using FE-EPMA with Ga-As standard. The results of present study indicated that the main source of As in aqueous layer (from 0-10 m) was organic matter, with the highest concentrations of arsenic were in peat layers. Several types of iron (oxyhydr)oxides and framboidal pyrite, which contain As, also were found in peat samples. The high concentration of As in exchangeable form (F2) and ammonium concentration in the peat layer indicated that the organic matter in sediment samples at depth of 7.5-8.0 m have highly potential to release As to aqueous environment under reducing condition. Two bacterial phylum were identified in the ancient peats using DNA sequencing analysis, which suggested that microorganism might have an important role on As mobilization from As-rich peat layer to groundwater.

Improving consumer trust in safe vegetables in Vietnam: the role of brand trust

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Consumer trust in food safety based on system trust and brand trust has been studied thoroughly in developed countries, while such research is very few in developing nations. This study examines the role of system trust and brand trust in forming consumer trust in the safety of “safe vegetables”, which is the official term used by the Vietnamese government to indicate vegetables certified as safe, in Vietnam. Besides, the impact of consumer worry about vegetable safety – a major problem in Vietnam – on the trust in the safety of safe vegetables is also evaluated. Based on a sample of 361 randomly chosen consumers from the urban districts of Hanoi, we deployed structural equation modeling to explore the factors associated with consumer trust in the safety of safe vegetables. Our main results show that brand trust plays the most vital role in building consumer trust in safe vegetables. In addition to the direct effect, brand trust also acts as a mediator between system trust and trust in the safety of safe vegetables. Interestingly, consumer worry about vegetable safety has two opposite effects on trust in safe vegetables: a direct negative impact and an indirect positive impact through brand trust. Based on the results, we propose important recommendations for improving consumer trust in safely branded food products in general, and safe vegetables in particular in Vietnam.

Analysis of the transgenerational nitrogen deficiency stress memory in rice

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Nitrogen (N)-deficiency is an abiotic stress being repeatedly experienced by plants. However, possible impacts of N-deficiency on transgenerational epigenetic stability and their potential biological consequences in rice remains limited. Here, we investigated the existence of the transgenerational memory of nitrogen deficiency stress in rice. Rice has been maintained to different N condition (L:low, M:middle, H:high) for 2 successive generations were used in this study. In each growth stage, nitrogen content and expression of nitrogen transporter genes were analyzed. There was no significant difference in shoot length and root length of LL, MM and HH plants in each stage. Although a similarity in growth, LL plants produced a significant increase of dry matter in both shoot and root at seedling stage, but no difference was observed in plant dry matter at tillering and heading stage, even LL root displayed a slightly higher dry weight compared to MM and HH plants. These results also showed that no significant difference was found in total nitrogen content at seedling stage, though nitrogen was accumulated at higher level in LL compared to MM and HH plants. In the same nitrogen condition, rice growth is likely to be affected by environment experienced in previous generation. Thus, transgenerational effect in response to N deficiency is visible and is more apparent in the earlier than in the later stages. Expression of *ammonium transporter (AMT)* and *nitrate transporter (NRT)* genes in shoot and root at seedling stage was examined. Overall, the expression of *AMTs* and *NRTs* genes were significantly higher in LL root than MM and HH. Some highly-expressed genes include *AMTs* group 1 (*OsAMT1.1*; *OsAMT1.2*; *OsAMT1.3*); *OsAMT2.2*; *NRT1.1*; *NRT1.2*; *NRT2.1* and *NRT2.3a*. These results present a well correlation between gene expression with dry matter and N accumulation. These present findings suggest that the transgenerational effect in response to nitrogen deficiency is present in rice and have a positive effect on seedlings stage. Next, underlying epigenetic mechanism focusing on DNA methylation in our study will be analyzed.

Keywords: Epigenetics, DNA methylation, nitrogen transporter genes, transgenerational response.

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Molecular cloning and characterization of two types of CD83 in ginbuna crucian carp, *Carassius auratus langsdorfii*

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The CD83 is an important cell surface marker and intriguing component as a link between innate immunity and adaptive immunity. It is type I membrane glycoprotein and belongs to the immunoglobulin superfamily (IgSf), was initially described as a highly specific marker for mature dendritic cells (DCs) in human and mice. Besides, CD83 was investigated that also expressed on other various cell types, such as T cells, B cells, macrophages and neutrophils in human when they were activated. In fish, CD83 homologues have been identified in nurse shark (*Ginglymostoma cirratum*) and rainbow trout (*Oncorhynchus mykiss*) and other teleost fishes such as Japanese flounder (*Paralichthys olivaceus*), sea bream (*Sparus aur-ata*). It is well known as co-stimulatory molecular in T cell activation as well as the immune system. However, little is known on CD83 and its homologue, which is newly identified by cloning and full-length sequencing to reveal that there are two types of CD83 in ginbuna crucian carp (*Carassius auratus langsdorfii*). Phylogenetic analysis showed that CD83-1 is closely related to CD83 from mammalian animals, while CD83-2 is indicated in the teleost fish group only. Furthermore, to achieve deeper insights into biological function among them, the tissues distribution of these two types are compared by quantitative real-time PCR and PCR also. On the other hand, an in vitro stimulation with virus will be conducted to describe the viral immune response of CD83 homologues in ginbuna crucian carp.

Characterization and genome structure of virulent phage ϕ EM4 infected to *Enterobacter* sp. M4, a cause of soft rot disease of plants

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【Aim】 *Enterobacter* considered as a reason causing the disease. Aim of this study is to investigate a phage infect *Enterobacter* and against soft rot disease of infected crops.

【Methods & Results】 A virulent phage ϕ EM4 isolated from soil is a positive trend for biological control for plant disease. Based on its morphology, the phage is classified to Viunalikevirus. The phage was examined thermal, pH and chemical stabilities. Its genome size is 160,766 bp, and 219 ORFs are annotated. Gene structures of ϕ EM4 exhibit high similarity with *Salmonella*, *Dickeya*, and *Shigella* phages. Although tRNA species, tail spike protein and thymidylate synthase of ϕ EM4 show specificity of viunalikevirus, phylogenetic analysis of gene products indicate ϕ EM4 is significant different with other viunalikevirus.