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Morpho-agronomic characteristics of valerian (*Valeriana officinalis* L.) derived from in-vitro culture 01001

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The effect of seed scarification on the germination process and the growth of long bean (*Vigna sinensis*) sprout 01002

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Preface

The 1st International Conference on Assessment and Development of Agricultural Innovation (1st ICADAI), was held virtually during two days, from Tuesday, 6 to Wednesday, 7 July 2021. The conference was organized by Indonesian Center for Agriculture Technology Assessment and Development (ICATAD)-Agency for Agricultural Research and Development (IAARD)-Ministry of Agriculture, Republic of Indonesia, in collaboration with several scientist organizations such as; Indonesian Researcher Union (Himpenindo), Indonesian Society of Agronomy (Peragi), Indonesian Plant Breeding Science Society (Peripi), Indonesian Society of Agricultural Economics (Perhepi), Indonesian Association of Agricultural Meteorology (Perhimpi).

The main theme of conference is Strengthening Agricultural Innovation and Dissemination to Achieve Sustainable Development. There were more than 500 participants, consisting of scientists, academicians, policy makers, NGO's, students, entrepreneurs, government officials, and agriculture practitioners from 12 countries. There were many fruitful discussions and knowledge exchanges in the topic of agricultural innovation and dissemination that contributed to the success of the conference.

The keynote speech was delivered by Minister of Agriculture then continued by five plenary lectures covering the different areas of the conference: (i) Dr. Peter Horne (GM Country Programs ACIAR) talked on The Role of Agricultural Innovation in Rural Development (Cross Countries Study), (ii) Prof. I Komang G. Wiryawan (Bogor University, IPB) on The Role of Feed Innovation To Support Animal Protein Self-Sufficiency, (iii) Prof. Wendy J. Umberger (University of Adelaide) who was represented by Dr Peter Horne at once presentation about Market and Business orientation of agricultural product to robust economic growth, (iv) Assoc. Prof. Elske Van de Fliert (University of Queensland) Trans disciplinary research for development – Transformation needed in RD&E function to achieve sustainable impact in farmer field, and (v) Prof. Michael Madukwe(University of Nigeria Nsukka) Innovation system approach to agricultural development.

The total number of 185 manuscripts were presented in the first and second day forming the heart of the conference and providing ample opportunity for discussions. The manuscripts were divided almost equally into five sub themes, i.e., Plant Science, Agricultural Social Economics and Policy, Integrated Farming, Agricultural Environment and Engineering and Agricultural Technology Transfer.

All in all, the first ICADAI conference was very successful. The plenary lectures and the parallel sessions in 5 sub themes bridged the gap between the different fields of participants, making it possible for non-experts in a given area to gain insight into new areas. Also, included among the speakers were several young scientists, who brought new perspectives to their fields.

These proceeding provides a written record of the synergy that already exists between these communities, and represents a solid framework from which new interaction will result in the future.

Chairman of 1st ICADAI 2021,

Dr. Chandra Indrawanto

Statement of Peer review

In submitting conference proceedings to *Web of Conferences*, the editors of the proceedings certify to the Publisher that

1. They adhere to its **Policy on Publishing Integrity** in order to safeguard good scientific practice in publishing.
2. All articles have been subjected to peer review administered by the proceedings editors.
3. Reviews have been conducted by expert referees, who have been requested to provide unbiased and constructive comments aimed, whenever possible, at improving the work.
4. Proceedings editors have taken all reasonable steps to ensure the quality of the materials they publish and their decision to accept or reject a paper for publication has been based only on the merits of the work and the relevance to the journal.

Title, date and place of the conference

Title: The First International Conference on Assessment and Development of Agricultural Innovation (The 1st ICADAI)

Date: 6-7 July, 2021

Place: virtually organised in Bogor city, Indonesia

Proceedings editor(s):

1. Prof. Dr. Rublyo

07 September 2021

2. Dr. Chandra Indrawanto

Date and editor's signature

07 September 2021

Factors affecting farmers' decisions in changing agribusiness sector: case study of Japan Internship Program alumni

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Abstract. Since 1984, the Japan internship program has been implemented to increase the capacity and income of young farmers in Indonesia. The existence of internship activities has changed the mindset and abilities of farmers in their farming organizations, even some of the trainee had changed their agribusiness sector when this program had ended. The purpose of this study was to identify factors that influenced farmers' decisions in changing their agricultural businesses after the Japaninternship program. This research was conducted in East Java Province, Indonesia from September 2020 to February 2021. The farmers were selected purposively as many as 34 people. Data were analyzed using logit regression analysis. The results of the analysis showed that the factors that significantly influenced farmers' decisions to change the type of agribusiness sector were the motivation level in the business, business experience, the existence of business license, presence of business brands, and participation in agricultural institutions. The existence of Japaninternshipactivities has changed the mindset of farmers to better manage their businesses. In addition, some farmers have even changed their agribusiness sector to a more profitable business.

1 Introduction

Quality human resources committed to building the agricultural sector is one of the success factors in sustainable agricultural development [1]. Labor is a determining factor in the level of productivity of the agricultural sector in its contribution to Gross Domestic Product (GDP). Based on its role in GDP, the agricultural sector has contributed to a fluctuating and declining trend [2]. On the other hand, the agricultural sector is the sector with the largest labor absorption, were 35.42 million people or 27.37% of the total workforce work as farmers. The imbalance of the contribution to the two indicators indicates the low productivity of the agricultural sector.

One of the fundamental problems contributing to the low productivity of the agricultural sector is the low rate of farmer regeneration. The agricultural sector workforce is generally

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dominated by farmers with relatively old age. Meanwhile, youths generally prefer to work in the non-agricultural sector. This is because the non-agricultural sector provides relatively greater income than the agricultural sector [1]. Based on the results of the Inter-Census Agricultural Survey, it shows that the number of agricultural business households is dominated by farmers over 45 years of age by 60.8% [3]. In addition to employment, data from the Ministry of Agriculture in [4] show that there has been a decrease of 1,080,722 people from 2017 to 2018.

The reason for the low interest of farmers in working in the agricultural sector is due to its less prestigious image with low technology implementation and not provided adequate income [1]. The disparity in the use of technology has made many youths not interested in working in the agricultural sector [4]. Low income and high risk are the main reasons why youths are reluctant to work in the agricultural sector [5]. If this condition is not immediately addressed, it will cause the role of the agricultural sector to be increasingly marginalized.

Starting from this problem, the Agricultural Extension and Human Resources Development Agency initiated an internship program to increase farmer regeneration. The program is an internship program for young farmers to Japan to study farm management in that country. The program aims to produce agricultural entrepreneurs through providing experiences related to the agricultural system in Japan so that after returning to Indonesia, they can become agents of economic development in the region [6]. Thus, the existence of this program can affect both directly and indirectly in efforts to regenerate farmers in Indonesia.

This program has graduated around 1333 young farmers in 2018, in which the alumni have spread to various regions in Indonesia. Since 1984, the Japan internship program has been implemented to increase the capacity and income of young farmers in Indonesia. The existence of this internship program has had a positive impact on alumni or farmers who are sent as interns to Japan because all the knowledge and experience that interns get while in Japan are expected to increase the scale of their farming [6]. Internship alumni can continue their farming which is previously abandoned during the internship program and are expected to become job creators in the agricultural sector who can absorb labor in the surrounding environment. In addition, the program has also changed the mindset and abilities of farmers in their farming organizations, even some of the interns have changed their agribusiness sector when this program has ended. Therefore, the purpose of this study was to identify factors that influenced farmers' decisions in changing their agricultural businesses after the Japan internship program.

Research related to Japan internship has been carried out including by [7], [8], [9], and [6]. The research of [7],[8], and [9] discusses survival strategies in Japan and the motivation behind this Japan internship. Meanwhile, the research of Jamil et al. (2021) [6] discussed the impact of this Japan internship program on farmers' income, especially in East Java. Based on this, the novelty of this study compared to previous studies is that this research is more concerned with the factors influencing Japanese interns to change their agribusiness sector by using several factors such as the amount of capital, the number of workers, the length of time involved in agricultural institutions, business profits, motivation in the business, a dummy of a trademark, a dummy of a business license, experience.

2 Methodology

This research was conducted using primary data from interviews and observations on Japan internship participants whose main livelihood was as farmers using a questionnaire as an interview guide. The farmers participating in the Japan internship program were respondents from East Java Province. The interview was conducted on

34 respondents from September 2020 to February 2021. The data obtained from the interview results would be analyzed using logistic regression analysis because this study focused on factors influencing farmers' decisions in changing their agricultural business after participating in the Japan internship program. Farmers who had participated in the Japaninternship program had the choice to change or not in running their agricultural business sector based on the amount of capital ownership [10], the number of workers, the duration of participation in an institution [11], the benefits obtained at the start of the business [12], the level of motivation after the internship, trademark ownership, the existence of a businesslicense, and business experience in agriculture [12], [13].

The use of the logistic regression analysis approach accommodates an econometric model explaining the dependent and independent variables those which are non-linear, in which the dependent variable has two or more categories [14] - [16]. Multiple linear regression models, in general, using the OLS (ordinary least square) approach cannot explain the relationship between the dependent and independent variables if the independent variable has qualitative characteristics or data other than numerical. because if enforced, it will violate the assumptions of Gauss - Markov [18].

$$\text{Logit (Y)} = \text{Natural log (odds)} = \ln\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta X_{L_i} \tag{1}$$

A logistic regression model that could be written [19], [20] was as the following:

$$\pi_i = \frac{1}{1 + e^{-(\alpha + \sum_{j=1}^n \beta_j X_{ji} + \sum_{k=1}^m \gamma_k D_{ki})}} \tag{2}$$

The parable of the model (2) was:

$$(\alpha + \sum_{j=1}^n \beta_j X_{ji} + \sum_{k=1}^m \gamma_k D_{ki}) = z \tag{3}$$

So that logistic model equation (3) was:

$$\pi_i = \frac{1}{1 + e^{-z}} \tag{4}$$

From model (3), it could be created:

$$1 - \pi_i = 1 - \frac{1}{1 + e^{-z}} \tag{5}$$

To be:

$$\frac{\pi_i}{(1-\pi_i)} = \frac{1 + e^{-z}}{(1 + e^{-z})e^{-z}} = e^z \tag{6}$$

Transformation of equation (6) was [20], [21]:

$$\ln \frac{\pi_i}{(1-\pi_i)} = + \sum_{j=1}^n \beta_j X_{ji} + \sum_{k=1}^m \gamma_k D_{ki} + e \tag{7}$$

Model feasibility test could be done by looking at the GoF (Goodness of Fit) criteria. A logistic regression model could be said to meet the GoF assumptions if there was a match between the existing data in the model and the observed data. There are three ways to determine the GoF criteria for logistic regression, namely through the Pearson Test, Deviance Test, or Hosmer-Lemeshow Test [15]. After conducting a feasibility test for the logistic regression model through the GoF criteria, then the next test was variable both partially and simultaneously.

The interpretation of the coefficients in the logistic regression model was based on the coefficient of odds ratios. If the independent variable had a positive sign, the odds ratio would be more than one, and vice versa. The odds ratio equation was written as follows:

$$odds(\psi) = \frac{\pi_i}{1-\pi_i} \tag{8}$$

The odds ratio is a response indicating whether or not inclining to do something [22], [23]. The odds ratio also can be defined as a possibility, namely the occurrence possibility of evidence [15].

$$\psi = \frac{odds A}{odds B} = \left[\frac{I_{1A} / (1-\pi_{1A})}{I_{1B} / (1-\pi_{1B})} \right] \tag{9}$$

Consequently, the operational equation of Japan internship participants' decision model could be formulated into:

$$E(y|x) = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 D_1 + \beta_8 D_2}}{1 + e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 D_1 + \beta_8 D_2}} \tag{10}$$

Equation 10 above could be substituted into the following formula:

$$Y(x) = \ln \left(\frac{Y(x)}{1-Y(x)} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 D_1 + \beta_8 D_2 \tag{11}$$

Explanation:

- Y = Internship Participants' Decision to Change Their Agriculture Business sector
(Dummy 1= change the agribusiness sector; 0= not change the agribusiness sector)
- X₁ = Capital Amount (IDR)
- X₂ = Labor Number (person)
- X₃ = Duration of Participation in the institutions(year)
- X₄ = Initial Profit (IDR)
- X₅ = Motivation Level in the Business (scale 1-5)
- X₆ = Business Experience (year)
- D₁ = Dummy variable of Trade mark existence
(Dummy 1= Trademark Exists; 0= Trademark doesn't Exist)
- D₂ = Dummy variable of Business license existence
(Dummy 1= Business license Exists, 0= Business license doesn't Exist)

3 Results and Discussion

The Japan internship activity initiated by the Agricultural Extension and Human Resources Development Agency has had a positive impact on increasing the capacity of young farmers in running businesses in the agricultural sector. Initially, the alumni of the Japan internship program had a business in agriculture with a certain turnover and a certain number of workers. The business that has been initiated by interns is around 1 to 20 years, and there are even businesses that have a turnover of more than 100 million. However, the majority of apprentices are young entrepreneurs who have only 1-2 years of business experience with a turnover of one million to 10 million. The existence of a one-year Japan internship has changed the mindset of the participants so that it motivates participants to have a better business than before. Some participants changed their agribusiness sector, but some survive with agribusiness that have been initiated previously before joining the internship in Japan. Examples of changes in the agribusiness sector are changes from the livestock sector to the horticulture sector, or from horticulture sector to the food sector or vice versa. Based on this, this study was conducted to determine the factors that influenced interns to change their agribusiness sector. These factors can be seen in Table 1.

Table 1 shows that several variables had a significant effect on the interns' decision to change their agricultural business sector, such as the length of time following agricultural institutions, the level of motivation after the internship, dummy variables related to the

existence of a business license, and business experience. Meanwhile, variables such as the amount of capital, the number of workers, the profit of the initial business, and the dummy variables related to the presence of a trademark did not affect the decisions of Japanese interns. When viewed from the goodness of fit value of the logistic model used, the Nagelkerke R Square value was 0.796. This value implies that as much as 79.6 percent of the diversity of decision model for Japan interns in changing their farming business was influenced by the diversity of independent variables such as the length of time following agricultural institutions, the level of motivation after the internship, the dummy variables related to the existence of business license, business experience, the amount of capital, the amount of labor, initial business profits, and dummy variables related to the existence of a trademark. The Chi-square value showed a value of 18.840 with a probability value of 0.016 (less than $\alpha = 5\%$). The Chi-square value shows that there was at least one independent variable influencing the interns' decision to change their agricultural business sector.

Table 1. The factors influencing japan internship participants to change their agriculture business sector

Variable	Coefficient B	S.E.	Wald Test Value	Prob.
Constant	-10,013	6,013	2,773	0,096
Capital Amount	0,001	0,000	0,774	0,379
Labor Number	0,201	0,229	0,771	0,380
Length of time following the institutions	-0,362	0,189	3,665	0,056*
Initial Profit	0,011	0,000	0,615	0,433
Motivation Level in the Business	2,683	1,564	2,943	0,086*
Dummy of Trademark Existence	1,262	1,786	0,499	0,480
Dummy of license Existence	-2,968	1,341	4,900	0,027**
Business Experience	-0,315	0,152	4,280	0,039**
<i>Nagelkerke R Square</i>	0.796			
<i>Chi Square</i>	18,840			
<i>Prob (Chi-Square)</i>	0.016			

Note: * sig $\alpha=10\%$; **sig $\alpha=5\%$

Source: Primary Data (processed)

The variable length of time following the institutions had a significant effect on the interns' decision to change their agricultural business sector at $\alpha = 5\%$. The coefficient of the variable length of time following the institutions had a negative effect of -0.362. This value shows that if the internship participant increased by one year, it would reduce the odds ratio of the interns' opportunity to change the agricultural business sector by 0.362 with the assumption of *ceteris paribus*. The institutions participated in by interns were farmer groups or farmer group associations, the Japan Internship Alumni Family Association (IKAMAJA), and Mainstay Farmers and Fishermen Contact (KTNA). The institutions that were participated in by interns were those that were already following the type of business undertaken by the interns. The longer the participants took part in the institutions, the more solid the efforts initiated by the participants. This is why the existence of institutions would reduce the participant's decision to change their agricultural business sector. This result is following research by [24], stating that farmers can accept opinions from farmer groups because farmer groups have high credibility and are a highly valued source of information. In addition, Widhiningih's research (2015) in [25] states that the role of

farmer groups (as learning, cooperation, and production units) has a positive and significant effect on innovation adopted. Because the existence of groups can make interns more solid and innovative, causing the opportunity for decisions to change agricultural business to decrease.

The motivation variable after the internship had a positive and significant effect on the interns' decision to change their agricultural business sector. The motivation after internship variable had a coefficient value of 2.683. This result implies that if there was an increase in the motivation level of the interns, there would increase the odds ratio of the interns' possibility to change their agricultural business by 2.683 (*ceteris paribus* assumption). This shows that after participating in this Japaninternship program, participants usually experienced an increase in their business motivation.

The motivation was in the form of enthusiasm to improve the business that had been initiated into a bigger and more profitable one. This motivation was usually accompanied by the interns' decision to change the type of agricultural business sector to another agricultural business that was more profitable and in accordance with the experience gained during the Japaninternship. This condition implies that this internship program had been able to increase participant motivation to have a better business. This is consistent with the study of [26] which revealed that one of the motivations for becoming a migrant worker in Hong Kong was to "broaden the horizon" that they could bring to their home country. Meanwhile, according to the research of [8], Indonesian Interns in Japan hope to get something new, both in the form of curiosity about advanced technology in their home country and businesses that can later be applied in Indonesia. This is what caused some Japaneseinternschanged their agribusiness when they returned to Indonesia.

The dummy variable, the existence of a business license, had a negative and significant effect with a value of -2,968. The coefficient indicates that if the participants had a previous business license, the odds ratio of the farmers to change their agricultural business decreased by 2,968 (*ceteris paribus*). The business license obtained prior by the interns did not make the participant change his agribusiness sector, namely business license like CV (Commanditaire Venootschap), UD (Sole Proprietorship), other agricultural business license. The majority of participants having business license had had a very large turnover, ranging from 20 million to 150 million. This is different with participants who did not have a business license, whose average turnover was still in the range of 2 million to 10 million. This result implies that a business that already had a legal license was a stable business that did not allow the owner to change the agribusiness sector.

Besidesthe variables mentioned above, the interns' decision-making in changing their business was also influenced by business experience. The business experience variable had a negative and significant effect on the error rate of 5 percent. This variable had a coefficient value of -0.315. This means that if the intern business experience increased by 1 year, the odds ratio of the intern's possibility to change his agribusiness would decrease by 0.315 with the assumption of *ceteris paribus*. The more experienced an entrepreneur is, of course, the less likely he is to change his agribusiness sector. When a person has experience in a certain business field, the entrepreneur will tend to explore the business without changing his type of business. This can be seen in interns who had more than 10 years of business experience, tended not to changes theagribusiness. This condition is different from the participants who had less than 5 years of experience, they tended to change their agribusiness and find the most profitable agricultural business for them.

This result is following the research of Staw (1991) in [27] and [28] which state that experience in managing business influences the success of a business. In addition, research by [6] states that this internship program aims to produce agricultural entrepreneurs by providing experiences related to the agricultural system in Japan so that after returning to Indonesia, they can become agents of economic development in their regions. The

existence of this internship program has a positive impact on alumni or farmers who are sent as internships to Japan because all the knowledge and experience that the interns get while in Japan is expected to increase the scale of their farming. This has implications for a person's decision not to change his business after having experience in a particular business.

The amount of capital and labor variables did not affect the participants' decision, it can be caused by the fixed amount of capital and labor owned by the interns during the period of the internship. Likewise, the initial business profit variable did not change too much. In addition, the existence of a trademark did not affect the decision to change the agribusiness sector because most of the interns' businesses did not have a brand which made the business more famous.

4 Conclusion and recommendation

The description above shows that the variables that significantly influenced the decisions of Japanese interns in changing their agricultural businesses were the duration of participants following the agricultural institutions, the level of motivation after the internship, dummy variable related to the existence of business license, and business experience. Meanwhile, variables such as the amount of capital, the number of workers, the initial business profit, and the dummy variable related to the existence of a trademark did not affect the decisions of Japanese interns. This internship program had been able to increase participant motivation to have a better business so that it had a positive and tangible influence on interns' decisions in changing their agricultural business.

The institutions participated in by interns were farmer groups or farmer group associations, the Japan Internship Alumni Family Association (IKAMAJA), and Mainstay Farmers and Fishermen Contact (KTNA) influencing participants to maintain their business. The existence of a business license also caused interns to stick with their previous businesses. Furthermore, the business experience was also able to influence the interns' decision not to change their agribusiness sector. Therefore, this Japan internship program needs to be continued to improve the abilities of interns which will have implications for increasing the scale of the business and income, both for participants who survive with their previous business or for participants who change their agribusiness sector. Related to this, there needs to be institutional support for interns to develop businesses that have been pioneered before or for participants who change their agribusiness sector.

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