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The behavior of Extension Agents in Utilizing Information and Technology to Improve the Performance of Extension Agents in Lampung Province

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Abstract. The ability of individuals to utilize information and technology (IT) is needed, it also happens in the agriculture field. Extension agents are required to have the ability to use IT to support their performance. The ability to utilize IT can encourage the presence of professional, broad-minded and high-capacity extension agents. The high capacity of agents will facilitate them to carry out its performance. In fact, the problem in the field is the low performance of agricultural extension agents. It can be due to various issues such as low capacity, lack of infrastructure availability, low ability to access information and others, these issues were also found in extension agents in Lampung Province. The aim of this study is to measure the behavior of agricultural, fisheries and forestry extension agents in utilizing IT. This research is a descriptive study using a survey method with quantitative and qualitative approaches. The study was conducted in Lampung Province with 355 respondents. The results suggested that the knowledge of the extension agents in utilizing IT classified as the high category, however, the behavior of the extension agents in utilizing IT still needs to be improved to be good behavior in utilizing IT. Likewise, the extension agent's skill in utilizing IT is still in the medium category, therefore the support of all parties is needed to increase extension agent's behavior in utilizing IT becomes better and can support the performance of extension agents.

1. Introduction

The role of agricultural extension agents is very strategic to improve human resources (HR) of farmers which in turn can improve the national Human Development Index (HDI). The role of extension activity after the Reformation era in Indonesia with the issuance of Law No. 16 of 2006 concerning the Agricultural, Fisheries and Marine Extension System (SP3K) became more complex [1]. Increased farmer human resources can be optimized through extension activities with extension agents that have high capacity and are competent in carrying out their performance. Extension agents with high capacity are those who mastered and her ability to utilize and develop science and technology in the sustainable management of resources. Extension agents are individuals with efforts to improve the quality of human behavior through non-formal education in order to materialize the quality of personal life, families, and communities who become the target of extension activities [2]. An agent must have personal, social, managerial and professional competences (non-formal education). However, the existing issues in the field are most agricultural extension agents have a low individual quality and low quantity in doing extension activities [3-6].

An extension is one of the efforts to increase the capacity of farmers, of which to increase the capacity of farmers extension agents must firstly increase their capacity. To have high capacity, extension agents must be able to master information technology to provide good and quality services for the main actors and businesses. The capacity level of extension agents in Lampung Province did not meet the reference standard for extension functions according to the Extension System in Law No. 16 of 2006 [7]. The role of extension as a pillar in increasing the capacity of

farmers has also undergone a shift. The implementation of extension programs before the Law No. 16 of 2006 [8] concerning Agricultural, Fisheries and Forestry Extension System Agricultural extension officers have a very strategic role in supporting and overseeing the program to achieve four successful agricultural development, namely: (1) self-sufficiency and sustainable self-sufficiency; (2) food diversification; (3) increasing added value, competitiveness and exports; and (4) increasing the capacity of farmers. However, based on Law No. 16 of 2006 the function of extension agents has changed, in this term, extension agents must have a higher capacity in order to be able to identify the needs of the main actors and at the same time to find any information to provide alternative solutions related to problems faced by extension target (assisted farmers). The role of extension agents continues to increase, firstly the task of extension agents was mostly as a supporter and supervisor of the agricultural development, at this time the extension agents is very dependent on the information of the facilitator as the project implementer in charge of supporting and supervising the agricultural development.

Extension agents must have good behavior in utilizing information technology in order to improve their competence. Therefore, to change the behavior of the agents in utilizing information technology, their ability to utilize information technology must be improved, besides that extension agents must be given an understanding that the utilization of information technology can improve their competence. Considering the problem described, the problem to be answered in this research is how is the behavior of extension agents in Lampung Province? How to improve the extension agents' ability in utilizing information technology? Hence, the purpose of this study is to measure the behavior of extension agents in utilizing IT and the efforts that can be done to improve the ability of extension agents in utilizing IT.

2. Method

Based on the purpose, this research is a descriptive study to explain the basic conditions of an event and explain the rules of relationships between events by describing their characteristics [9]. The study uses survey methods with quantitative and qualitative approaches. This research is located in Lampung Province in six selected districts namely Pesawaran Regency, Tulang Bawang Regency, Bandar Lampung City, Mesuji Regency, East Lampung (Lampung Timur) Regency, and Way Kanan Regency. Data collection was conducted from March to August 2017. The study population amounted to 608 extension agents in 70 BPP, the determination of the research sample who stated that if the study subjects were less than 100 then it would be better if all the samples were used as study samples, while 10 to 15% or more can be used as study samples if the study subjects more than 100; then the sample for this study was 355 respondents [10]. The primary data collection process is carried out by conducting structured interviews using questionnaires containing predetermined assessment instruments. In addition, unstructured interviews, discussions and direct observations were carried out to enrich the data collected. Secondary data is obtained from the Central Bureau of Statistics, Related agencies, Department of Agriculture and BPP, in the form of reports and profiles needed for study purpose. The measurement of the behavior of extension agents in utilizing IT was done by scoring method.

Assessment of the behavior of extension agents in utilizing information technology is carried out based on several key indicators, namely: knowledge of extension agents in utilizing IT; skills in utilizing IT, attitudes of extension agents; and the attitude of extension agents in utilizing IT. In addition, a correlation test was also conducted to see the relationship between individual characteristics and the behavior of the agents in utilizing IT. The correlation test used was the Spearman Rank Correlation Test with alpha (α) 0.05. Data processing used in this study was tabulation and statistical methods. statistical analysis was performed using the Rank Spearman test. The Rank Spearman test formula is as follows

$$r_s = 1 - \frac{6\sum_{i=1}^{n} di^2}{n^3 - n}$$

Where r_s = Spearman correlation coefficient
         n = Number of Respondents
         di = Difference between X and Y

This formula rs is used because this research investigated at the correlation (closeness of the relationship) between the independent variable and the dependent variable to see the correlation rank and divide it into certain classifications. The significant value of rs was determined using the tables of critical prices of rs Rank Spearman correlation [11]. If there are ranks with the same or equal numbers in the variables x or y, then the correction factor T is added, with the following formula [11]:

$$r_s = \frac{\sum x^2 + \sum y^2 - \sum di^2}{2\sqrt{\sum x^2 \sum y^2}}$$

$$\sum x^2 = \frac{n^3 - n}{12} - \sum Tx \quad \sum y^2 = \frac{n^3 - n}{12} - \sum Ty$$

$$T = \frac{t^3 - t}{12}$$

Where
X^2 = The number of squares of variable x given a correlation
Y^2 = The number of squares of variable y given a correlation
T = Correction Factor
T_x = Number of correction factors for variable x
T_y = Number of correction factors for variable y
n = Number of respondents

Because the number of samples is greater than ten, the test of H0 is continued by the "t" test with the following formula:

$$t_{hitung} = r \frac{\sqrt{N - 2}}{\sqrt{1 - r_s^2}}$$

Hypotheses testing and decision-making rules are:
1) If the significance value is $\leq \alpha$, then reject Ho and accept Hi at α =0,05 indicates that there is a significant relationship between the two variables.
2) If the significance value $> \alpha$, then accept Ho and reject Hi at α =0,05 indicates that there no significant relationship between the two variables.

3. Result and Discussion
3.1 Respondent Characteristic
Individual characteristics of extension agents include the gender of the extension agent, the age of the agent, and the training that has been attended by the extension agent. These characteristics are individual characteristics of each agent, the detailed information is shown in Table 1. Most of the extension agents are male (72.95%) while the remaining 27% are female extension agents, then the ratio of the number of male and female extension agents is 7:2; suggested the number of female extension agents is very lacking, this research is in line with the results of the study by Hernanda et al [12]. Female extension agents need to be increased in number because females are very instrumental in helping family farming. That women have an important role in extension agencies. Its role lies in the communication skills and different approaches of farmers and women farmers [13]. The work of extension agents was still dominated by male, whereas the presence of female extension agents was very important. This is due to the contribution of female agents in the implementation of extension activities [14].

In terms of age, all respondents are in the productive age in accordance with BKKBN (2013) which states that the productive age is between 15-64 years. The overall age range of extension agents is dominated by ages 31-41 years (35.21%) and 51-60 years (33.80%) [7]. Based on the number of the Civil servant (PNS) and freelance (THL) extension agents, there were significant differences in the age range between the two; the PNS extension agents were mostly 51-60 years old (57.92%), suggested that more than half of PNS extension agents were in old age. Most of PNS extension agents in the next 5 to 10 years,

will enter retirement age. This should become a concern of the government of the Republic of Indonesia as in Lampung Province the regeneration of PNS agricultural extension agents was very slow. By contrast, 50% of THL extension agents are in the age range of 34-47 years, which indicates productive ages and can have an impact on the extension agents who are actively involved in carrying out extension activities [7,12]. That agents in late adulthood (40-60) have experienced satisfaction with work [15] and That the age of the extension agents will greatly affect its performance [16].

The age range of THL extension agents is categorized in the young category, most of them are aged between 21-41 years (77%) [4]. Generally, agents in early adulthood have a higher enthusiasm at the working process because they have not achieved career satisfaction [15]. THL extension agents who are generally included in the young category usually have a great and smart curiosity in utilizing cyber IT, besides being supported by strong physical, creative thinking and a dynamic soul. While civil servant extension agents who have an average age of more than 40 years make them not too proficient in using IT, however, they have field experience that can support their performance [17]. Based on the benefits of the training in improving performance effectively and efficiently, it is unfortunate that based on the results of the study in Table 1, the frequency of extension agents in training was very small, most of them only attended one training in the last three years. Efforts to overcome this issue can be done by facilitating the implementation of training related to extension agent competencies, such as training in various agribusiness-based farms, processing agricultural products and various other appropriate materials. In addition, extension agents are necessary to be encouraged continuously to actively participate in various training held, both from related agencies, district governments, provincial governments, ministries, even from parties outside the government [18-19].

Table 1 Characteristics of PNS and THL extension agents in Lampung Province

Variable	PNS		THL		TOTAL	
	n	(%)	n	(%)	n	(%)
Gender						
Men	145	79.23	114	66,27	259	72,95
Women	38	20.76	58	33,72	96	27,04
Total	183	100.00	172	100.00	355	100.00
Training quantity (Last 1 Year)						
0-2	91	49,72	133	77,32	224	63,09
3-4	29	15,84	22	12,79	51	14,36
5-6	43	23,49	10	5,81	53	14,92
7-8	20	10,92	7	4,06	27	7,60
Total	183	100.00	172	100.00	355	100.00

Extension agents as the spearhead of counseling must always develop their abilities through training. Training can change individual behavior for the better, starting with improving the skills and knowledge of the extension agents so that their attitude towards new innovations becomes positive. Therefore, the frequency of the extension agent in participating in the training will affect their skill. The existence of training has a direct influence on individual behavior [16].

3.2 The behavior of Extension Agents in Utilizing IT

Behavior is an action that arises due to a stimulus, thus the behavior of extension agents in utilizing IT (mass media and the internet) is the action of extension agents in accessing IT media such as smartphones, computers, tv, radio, magazines, and newspapers to obtain agricultural information that can support their performance. By utilizing IT, it is expected that there will be an increase in extension agents' knowledge and skills and have an impact on the attitude in assessing IT innovations to change positively which can indirectly change the behavior of the agents in utilizing IT. Information technology commonly abbreviated as IT is hardware and software and includes networks and telecommunications which are usually in the business and entrepreneurship context [20]. Information and communication technology systems continue to be developed in order to increase public knowledge in general. The development of information and communication technology both in the mass media and through the internet network is

very useful to reach remote areas so that people in remote areas can freely obtain information, including the extension agents and farmers.

Table 2 Distribution of information obtained from utilizing information technology

Information obtained from IT	PNS		THL		Total	
	Quantity	(%)	Quantity	(%)	Quantity	(%)
Smartphone						
Entertainment	137	74.9	146	83.40	283	79.71
advertisement	26	14.2	47	5.16	74	20.84
News	91	49.7	92	10.10	183	51.54
Agricultural Information	55	30.1	68	7.46	123	34.64
Internet through a computer						
Entertaiment	129	70.5	114	66.27	243	68.45
Advertisement	28	15.3	26	15.11	54	15.21
News	85	46.4	72	41.86	157	44.22
Agricultural Information	51	27.9	58	33.72	110	30.98
TV						
Entertaiment	105	57.38	95	55.23	200	56.34
Advertisement	76	41.53	69	40.12	145	40.85
News	151	82.51	137	79.65	288	81.13
Agricultural Information	36	19.67	43	25.00	79	22.25
Radio						
Entertaiment	80	43.72	87	50.58	167	47.04
Advertisement	49	26.78	60	34.88	109	30.70
News	121	66.12	110	63.95	231	65.07
Agricultural Information	10	5.46	25	14.53	35	9.86
Newspaper						
Entertaiment	34	18.58	41	23.84	75	21.13
Advertisement	70	38.25	90	52.33	160	45.07
News	136	74.32	138	80.23	274	77.18
Agricultural Information	47	25.68	24	13.95	71	20.00
Magazine						
Entertaiment	54	29.51	57	33.14	111	31.27
Advertisement	70	38.25	69	40.12	139	39.15
News	114	62.30	97	56.40	211	59.44
Agricultural Information	53	28.96	17	9.88	70	19.72
Average						
Entertainment	68	37.30	70	38.25	138	38.87
Advertisement	66	36.20	72	39.34	138	38.87
News	130	71.31	121	65.85	251	70.70
Agricultural Information	37	19.95	27	14.89	64	18.03

Table 2 shows that the average behavior of extension agents in utilizing information technology is dominated with the aim of finding news, both civil servant extension agents and THL extension agents. In addition to searching for news, extension agents utilize information technology to get entertainment and see advertisements on information technology media. Extension agents as the closest parties to farmers have direct access in providing inputs and guidance. Ideally, they are able to utilize IT to find information based on farming needs and information to support the performance of extension agents. The need for extension agents in seeking information should be driven by the responsibility of extension agents as the spearhead of agricultural development in Indonesia.

The use of online applications installed on smartphones by extension agents, in addition to being a communication tool is also used to search for entertainment, advertising, news and agricultural information. The social media applications available on smartphones are mostly used to seek entertainment, only a small number of extension agents, both civil servant extension agents, and THL

extension agents who utilize smartphones to find agricultural information. Many farmers participate in information retrieval using cell phones, those who seek agricultural information (prices and markets) are very few [21] [22]. Similar to the use of smartphones, the use of the internet through computers by extension agents is still relatively low. Extension agents use the internet relatively higher to find entertainment (listening to music, movies and looking for information about friends or family). Slightly different in utilizing conventional mass media (TV, Radio, Magazines, and Newspapers), extension agents use the media to get news in general, however, internet utilization to get agricultural information still in the low category. The appropriate utilization of information technology by extension agents will facilitate them to carry out their duties.

Table 3 Distribution of Behavior of Extension Agents in Utilizing IT in Lampung Province

Classification of Behavior of Extension agents	PNS		THL		Total	
	quantity	(%)	quantity	(%)	quantity	(%)
Very low	12	6.55	5	2.90	17	4.78
Low	58	31.69	36	20.93	94	26.47
High	89	48.63	113	65.69	202	56.90
Very High	24	13.11	18	10.46	42	11.83
Total	183	100	172	100	355	100

The behavior of Extension agents in using IT is mostly categorized as the high category in which the Extension agent already understands the benefits of using IT. Extension agent resources and good farmers are one of the spearheads of counseling to improve farmers' human resources which are then expected to act as a driving force for agricultural development in Indonesia. Along with the development from all aspects, both in terms of economic, social, cultural and so on, the more individuals involved and actively engaged in realizing development. Related to this, the Extension agents in carrying out their performance are required to utilize information technology to support their performance; this is seen as an important part. Extension agents as a resource in the organization of agricultural institutions have the potential to function to achieve food security with the concept of sustainable agriculture.

Table 4 Distribution of knowledge, attitude and skills of extension agents in utilizing IT in Lampung Province, 2017

classification of numbers	PNS		THL		Total	
	Quantity	(%)	Quantity	(%)	Quantity	(%)
KNOWLEDGE						
Very low	17	9.28	11	6.39	28	7.88
Low	48	26.22	32	18.60	80	22.53
High	58	31.69	72	41.86	130	36.61
Very High	60	32.78	57	33.13	117	32.95
Total	**183**	**100**	**172**	**100**	**355**	**100**
SKILL						
Very low	43	23.49	22	12.79	65	18.30
Low	57	31.14	68	39.53	125	35.21
High	69	37.70	63	36.62	132	37.18
Very High	14	7.65	19	11.04	33	9.29
Total	**183**	**100**	**172**	**100**	**355**	**100**
ATTITUDE						
Very low	26	14.20	20	11.62	46	12.95
Low	116	63.38	104	60.46	220	61.97
High	28	15.30	40	23.25	68	19.15
Very High	13	7.10	8	4.65	21	5.91
Total	**183**	**100**	**172**	**100**	**355**	**100**

Based on the definition of behavior, it can be concluded that behavioral components are stimuli, individuals and individual responses to these stimuli. In the digital era, human resources of extension agents who are able to utilize IT is needed to support their performance to achieve sustainable agricultural development. The agricultural extension activity is expected to be the implementation of the task of mentoring and consulting the main actors and business actors in developing their farming business. The Extension agent's performance may be good when the Extension agent has good behavior in utilizing information technology as the behavior in utilizing IT is the accumulation of knowledge, skills, and attitudes of extension agents in using information technology. The behavior of extension agents is well reflected in how they utilize information technology to improve their capacity and how they are able to prepare, implement, and evaluate extension activities [23].

The behavior of extension agents is reflected in their knowledge, skills, and attitudes. This means that this process occurs naturally due to the presence of a stimulus or the presence of stimulation. Moreover, the formation of attitude is influenced by the presence of stimulants in the social and cultural environment; family, norms, customs, religion together form individual attitudes. In fact, individual attitudes develop in line with their biological development and the environment in which they are located, although attitudes do not always lead to actions; the attitude that leads to action is then called behavior. Otherways, attitude will not be formed without interaction with other humans or with other objects. Meanwhile, external factors include social interaction outside the group, between humans and cultural output, for example, their interaction with communication instrument. Attitudes can be changed or formed with the presence of a direct reciprocal relationship between humans and the existence of direct communication from one party to another

The extension agent was aware that to carry out extension activities smoothly requires good preparation. Good and ready extension preparation will reflect the needs of an assisted client in the field and will be very useful for further extension activities. Preparation of an agricultural Extension should be integrated with the development of research, education, training and extension activities as well as agribusiness activities in unity. This preparation still not done by extension agents Lampung Province. Extension agents should also continue to develop extension programs so that existing programs are responsive to the needs of farmers.

3.3 The relationship between individual characteristics of extension agents and their behavior

The relationship between the individual characteristics of extension agents and their behavior on extension activities was analyzed using the rank sperman (RS) correlation analysis test. Table 5 shows that there is a very significant relationship between individual characteristics (age, working period, motivation and cosmopolitan extension) with the behavior of Extension agents in utilizing information technology. Characteristic variables also have a significant effect on confidence for behavioral abilities in fisheries activities, indicating that characteristic variables contribute to determining the ability of fishermen to behave in a positive manner. The behavior of farmers in using cyber instrument affected the perception and effectiveness of farmers in using cyber extensions [24].

Table 5 Correlation coefficient between individual characteristics and extension agents' behavior in utilizing IT

individual characteristics	extension agents' behavior				
	Knowledge	Attitude	Skill	extension behaviour	agents'
Gender	0.057	0.066	0.033	0.032	
Age	0.028	0.014	-0.146*	0.143*	
Education Level	0.122*	0.403**	0.715**	-0.061	
Training Expereince	0.078	0.094	0.076	0.071	
Working period	0.039	0.374**	0.146*	-0.268**	
Motivastion	0.125*	0.325**	0.178*	0.158*	
Cosmopolitant	0.122*	0.209**	0.344**	0.336**	

The importance of utilizing IT to support the performance of extension agents, developing the capacity of agro-based rural communities through the expansion of cyberspace with the use of ICT will create opportunities for growth and prosperity through the desire for opportunities to market of the Indian

Agriculture by creating more efficient network of information and knowledge [25][26]. The availability of information through the internet also helped the agricultural extension process and makes it faster and more effective. The availability of IT bridges the communication gap between important components of the agricultural extension system including agricultural research, marketing, and farmers. Fast and continually improved communication between these components' system resulted in the development of a comprehensive agricultural system.

4. Conclusion

Based on the results and discussion, the conclusions can be formulated as follows: (1) most of the civil servant extension agents in Lampung Province are between 51-60 years old and THL extension agents are at the age of 21-41. The extension agents are dominated by male and their extension agents experience in training activities are still very low (2) Behavior of extension agents in utilizing information technology in Lampung Province is in the medium category. This issue requires the efforts of all parties to encourage extension agents to utilize information technology properly and wisely to improve the performance of extension agents.

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