



INFLUENCED FACTORS IN AGRICULTURAL SECTOR, LAMPUNG, INDONESIA

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Abstract

An important activity to support the revitalization of agricultural sector development is the development of human resources in agriculture. In the era of the development of information technology (IT) that is so fast, the development of agricultural human resources must be supported by various breakthroughs, one of which is through the implementation of cyber extension (CE). CE as a means of disseminating information to extension workers, especially in the provision of information to assist agricultural extension workers, farmers, and businesses in overcoming information limitations and agricultural innovation. To obtain information, innovation and technology, there must be adequate infrastructure available through the internet. The purpose of this study was to determine the factors related to farmers' needs for CE-based information. This research is a descriptive study using a survey method with quantitative and qualitative approaches. The study was conducted in South Lampung Regency and Metro City with 207 farmers as respondents. The results showed that the factors that influence to the farmers' information needs on cyber extension are the motivation of farmers in farming, environmental factors, and the existence of conventional information media. Farmers' need for information on cyber extension is information on crop cultivation, market information, post-harvest information and institutional information. Fulfillment of information needs are still low and still needs to be improved and requires support from various parties.

Key words : Agriculture, cyber extension, Farmers' needs, information.

Introduction

The agriculture, fisheries and forestry sectors are sectors that are the pillars of national economic growth (Mayrowani, 2012; Alston and Pardey, 2014). The strategic role of this sector is in line with the condition of the Indonesian population who live in agrarian-style rural areas, including Lampung Province as the “ Bumi Agribisnis” (Agribusiness Land) (Euler *et al.*, 2017; Sumaryo and Rangga, 2017). Until now the agricultural sector is the main driver of the agricultural sector in Lampung Province. The agricultural sector in 2015 contributed 35.92% of gross added value to the GDP of Lampung Province (BPS, 2019). In addition, the agricultural sector is the sector that absorbs the most labor in Lampung Province. The Central Statistics Agency of Lampung states that the agricultural sector still dominates the main occupation of the population

compared to other sectors, its role reaches 45.94% of the entire working population).

The important role of the agricultural sector for the life of the Indonesian nation has long been the government's attention (McCarthy and Cramb, 2009; Rada *et al.*, 2011). There have been many policies related to the development of the agricultural sector that were rolled out by the government. Even the current government, through its Nawacitanya, includes the development of the agricultural sector as one of the main priorities for development in Indonesia (Soleman and Noer, 2017). In order to realize food security or national food sovereignty that the current government aspires to, the Ministry of Agriculture develops information systems on agricultural extension through the means of cyber extension (Amin *et al.*, 2013). The Minister of Agriculture in the agricultural extension technical meeting has launched a cyber extension as a means of

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disseminating information to agricultural extension agents, especially in the provision of extension materials to assist extension workers, farmers, and businesses in overcoming the limitations of agricultural information materials. In 2010, the Ministry of Agriculture has distributed 1,000 units of cyber extension facilities in the form of computers (PCs), printers and modems to extension institutions at the provincial, district / city and sub-district levels. With the availability of cyber extension facilities at the Counselling Center, it is expected that extension workers in the field can access information materials on agricultural technology, especially appropriate technology as counselling materials in a faster, cheaper and efficient manner (Mulyandari *et al.*, 2010; Sumaryo and Rangka, 2017). The appropriate technology is then passed on to farmers, farmer groups, and farmer groups to be applied in the field, so that the expected production and productivity of agriculture can be increased according to the set amount. Although there have been many agricultural development policies that have been rolled out by the government, the results achieved have not been able to effectively and significantly improve the welfare of farmers.

To improve the farmers welfare, they must applied an appropriate agricultural innovation and technology which can be collected from agricultural extension workers and other sources (Lubell *et al.*, 2014). Order to meet the disparate farmers' information needs, the public and extension services, researchers, educators, information services and other agricultural actors should conduct regular studies on information needs, map communities' knowledge and information sources, create awareness of information sources, and knowledge culture, and use multiple sources of information (such as print and ICTs) to deliver relevant information in the communities. A little different with mentioned before that farm women expressed relatively high need for information on farm management and income generation at her than the crop-biased information (Soyemi, 2014).

The Revitalization of Agriculture, Fisheries and Forestry (RPPK) policy launched in 2005 was also slow, so the government's target to reduce unemployment and poverty in the 2005-2009 RPJMN, respectively 5.1% and 8.2% were not achieved. When observed, the paradoxical conditions of agricultural, fishery and forestry development reflect that the development program so far has weaknesses, namely: not well directed from the planning side and many face obstacles in terms of implementation in the field, so that it seems less coordinative, less guarded, incomplete, and not sustainable. In addition, various results achieved are less satisfying and often unsustainable. Such

constraints are also felt in the development of food crop subsectors.

At present the role of the agriculture, fisheries and forestry sectors in economic development is very significant, especially in terms of the ability to absorb labor. This role is not only from its contribution to the economy of Lampung Province, but also to the provision of employment. Until now the agricultural sector is the main driver of the agricultural sector in Lampung Province. To realize national food sovereignty that the current government aspires to, the Ministry of Agriculture develops information systems on agricultural extension through the means of cyber extension. In order to be able to become an entry point for the program while escorting cyber extension programs, the institutional and human resource capacity of extension workers and farmers must be strengthened or improved so that they become capable stakeholders in utilizing the existence of cyber extensions. Intensive interaction between these parties will be an effective vehicle to find solutions to various problems or obstacles encountered in the implementation of the program in the field. Cyber extension is expected to be able to provide information, innovation, and agricultural technology needed by extension agents and farmers (key actors) and business actors. In other words, cyber extension will play an effective role in bridging the information, innovation and technology gaps that often occur in the peasant community. From the explanation above, the research problem can be formulated what factors are related to the needs of farmers in seeking information through the implementation of cyber extension. The purpose of this research is to answer the existing problems.

Materials and Methods

Research Location

The research location was chosen by assisted farmers in BPP Jati Agung and BPP Natar; while from Metro City elected assisted farmers in BPP Metro Barat and assisted farmers in BPP Metro Selatan. From each BPP 30 sample farmers were selected who owned and used android mobile phones. Because each variable has a number of indicators and parameters that are not the same, then to classify an indicator variable or parameter it is necessary to transform it into an index form. Based on the total score of the index score then the next classification is carried out. Thus, the bias caused by the number of parameters and indicators that are not the same in measuring a variable can be avoided as small as possible. Presentation of ordinal data for parametric statistical test needs, first data transformation is done

using measure successive interval (MSI) software.

Data Collection

The type of data collected in this study includes primary and secondary data. Primary data collected in the form of data on the characteristics of assisted farmers, mastering computer software supporting internet operations by interviewing farmers using a research questionnaire. The secondary data includes cyber extension infrastructure facilities in various related institutions (Provincial and District / City Agriculture Service), Agricultural Extension Centers (BPP), Association of Farmers Groups (Gapoktan), and Farmers' Groups. Primary data is also complemented by direct observations obtained by researchers during carrying out primary data collection, but not included in the questionnaire. This data is expected to complement the data and general description of the sample and research area. Primary data is collected by interview (filling out questionnaires) and Focus Group Discussion (FGD).

Data analysis

Data analysis of this study uses descriptive analysis techniques, correlational analysis, principal component analysis, and continued with Structural Equation Modeling (SEM) analysis which is also known by the term Structural Equation Model. Spearman Rank Correlation Analysis (r_s or \tilde{r}_n) is used to determine the closeness of the relationship between variable data including ordinal or interval data. To determine the main component (principal component analysis) which affects the changes in the behavior of instructors in utilizing cyber extension, calculated by the equation:

$$KU_i = a_{1i}X_1 + a_{2i}X_2 + \dots + a_{pi}X_n$$

Note: Main component number-1, where $i=1, 2, n$

a_{1i} feature vector number- i , where $i=1, 2, n$

X_n = independent variable to n

Structural Equation Modeling (SEM) is used to study a series or series of dependency relationships simultaneously (dependence relationship simultaneously) into an independent variable (an independent variable) in subsequent dependency relationships (in subsequent dependence relationship). Set this relationship, each with an independent variable and an independent variable is the basis of the model. Mathematically, SEM formulations can be described through the following equation:

$$Y_1 = X_{11} + X_{12} + X_{13} + \dots + X_{1n}$$

$$Y_2 = X_{21} + X_{22} + X_{23} + \dots + X_{2n}$$

$$Y_3 = X_{31} + X_{32} + X_{33} + \dots + X_{3n}$$

.....

$$Y_m = X_{m1} + X_{m2} + X_{m3} + \dots + X_{mn}$$

↓

(metric) (metric, non metric)

SEM analysis makes it easy to understand this relationship simultaneously from the variables of this study. SEM analysis is able to comprehensively access relationships and provide a transition from exploratory to confirmatory analysis. In other words, SEM can answer three objectives simultaneously, namely the examination of instrument validity and reliability (equivalent to confirmatory analysis factors), testing the relationship model between late variables (equivalent to path analysis), and obtaining a useful model for estimating an event (equivalent to a structural model or regression analysis). The data processing stage starts from editing, tabulation, compilation, and data entry using SPSS (Statistical Package for Social Sciences) software. Furthermore, the data was analyzed with the help of Lisrel 8.50 software.

Results and Discussion

BPP as a gathering place for agricultural extension workers who have the main task of increasing the capacity of extension workers and farmers in the region, with various programs both from the central government, local governments, and universities. However, in this era of globalization demands the readiness of agricultural human resources (extension workers and farmers) to have competitiveness to face the era of globalization. Through BPSDM Ministry of Agriculture, since 2010 BP3K development program has been launched and followed up by the Lampung Provincial Government by developing BP3K as a Center of Excellence, in order to improve the skills of extension workers and assisted farmers.

This research was conducted in an effort to optimize various programs and is a follow-up to the results of research conducted by Sumaryo and Yanfika entitled The BP3K Development Model Study as a Center of Excellence (CoE) for the Quality Development of Agricultural Human Resources in Lampung Province which found that implementation of cyber extension in extension activities is able to improve the performance of agricultural extension workers, however the application of cyber extension in Lampung still faces various technical and non-technical constraints. Cyber extensions are able to provide information that is more complete and clearer for extension agents and farmers because it can be audio-visual, even though it is not described as what the implementation model is at the extension institution level (Mulyandari *et al.*, 2010). Therefore, this study is expected to be able to formulate an implementation model of cyber

extension to increase the capacity of extension workers and farmers. Extension agents facilitated by computer and internet network communicating using social media, however capabilities in using the internet to search information related agricultural technology remained low (Listiana *et al.*, 2019a,b).

Some of the results of previous studies that are in line with this research are the results of research by Ardiansyah *et al.*, (2014) who found that the factors that were significantly related to farmers' perceptions of the performance of extension workers in the BP3K Metro Barat area were the level of education of farmers, and the level of social interaction of farmers. Likewise with the results another research, showed that: (1) after the CoE program, there was an increase in the performance of extension workers, including an increase in the preparation of extension programs, increased productivity of superior agribusinesses in each region, and extension agents felt that they could implement cyber extensions to assist extension activities; (2) the effectiveness of the CoE program on improving the performance of extension workers at BP3K in Batanghari District is effective. From these studies it can be concluded that to increase the capacity of agricultural stakeholders (agricultural extension workers and farmers) efforts must still be made, including the implementation of cyber extension (Praza, 2016).

Characteristics of Individual Farmers

Farmer's Age

Farmers who are over 57 years of age are around 5.77 percent, the average age of 43-year-old farmers includes productive age. This is in line with the study of (Listiana, Sumardjo, Sadono, & Tjitropranoto, 2018) that the average age of agricultural entrepreneurs is in the category of productive age, where a person's age will affect the mindset and behaviour of individuals in running their business (Listiana *et al.*, 2018). Age 18 years is the youngest age of the respondent farmers. This shows that the paradigm shift that was formerly a farmer was old people, but nowadays young people are also interested in the world of agriculture. Age distribution of respondent farmers is presented in table 1.

Level of formal education

The level of formal education that has been followed by the respondent farmers is mostly at the junior high school level. At the study site only 2.88 percent of farmers who did not attend school / did not complete elementary school (SD). Farmers who have received high school education are also quite numerous, which is around 29.81 percent. There are still many farmers who only attend

formal education, only limited to junior high school due to limited costs and location of the place of residence that is far from school, making them reluctant to continue their education to a higher level.

Non-formal education Level

Most of the respondents farmers in the study area had attended counseling activities, as seen from table 1, most farmers had attended extension activities for the past year for more than 11 hours. On average farmers participate in extension activities as much as 17 hours a year. Counseling that was once followed by farmers is still relatively low. Non-formal education that suits the needs and conditions of farmers can be given as an alternative to overcome the growing number of agricultural innovations. Non-formal education can be done by involving farmers in various extension activities, so that farmers will always get different things about the latest information and technology needed to develop their farms. Long time to work The farmers' experience in farming varies from 10 years to 59 years. Agricultural activities carried out are hereditary or inherited from their parents. Experience that farmers have in farming can be used as knowledge or lessons to cultivate their agricultural land in the future, so that it can be used as a guide to avoid the risk of failure. Farmers' experiences can be used as knowledge or lessons to run their farms well (Listiana *et al.*, 2018). Distribution of individual characteristics of farmers can be seen in table 1.

Farmers' cosmopolitaness

The level of farmers' cosmopolitan is included in the high classification, 76.92 percent of farmers often leave the social system to find information related to their farming. Based on the results of the study, most farmers often travel to sub-districts, BPP / BP3K offices at least twice a month. The trip was carried out by visiting BPP and BP4K (Department of Agriculture) in the district capital. There are only a few farmers who have never traveled out of their area with regard to finding information to support their farming. Farmers who have never been out of their social systems are due to age, making it difficult for farmers to travel long distances. This is also because the location of the residence is quite far from the district capital and the district capital. The cosmopolitan nature of farmers is the level of farmers' relations with the environment outside their social systems

Courage to take risks

Courage to take risks owned by farmers in running their farms on average in the low category. This is because the land owned by farmers is not too broad and also the farmers' capital is barely enough to make farmers afraid to take risks in carrying out their farming. The distribution

Table 1 : Distribution of Characteristics of Individual Farmers in Metro and South Lampung 2017.

No.	Individual Characteristic	Category	Amount (n=172)	Percentage	Average
1	Age				
	Very young	18 – 30 year	20	9, 62	43year (young)
	Young	31 – 43year	90	43, 27	
	Adult	44 – 56year	85	40, 87	
	Old	57 – 70 year	12	5, 77	
2	Formal Education				
	Very low	Not completed in primary sch.	6	2, 88	
	Low	Elementary sch.	28	13, 46	
	High	Junior high sch.	111	53, 37	
	Very high	Senio high sch.	62	29, 81	
3	Non formal education				
	Very low	8-10	2	0, 96	17hours(2 days)Low
	Low	11-12	25	12, 02	
	High	13-14	160	76, 92	
	Very high	15-17	20	9, 62	
4	Farming experience				
	Very low	<16 tahun	161	77, 4	13year(very low)
	Low	17 – 30 tahun	41	19, 71	
	High	31 – 44 tahun	2	0, 96	
	Very high	45 – 59 tahun	3	1, 44	
5	Cosmopolitaness (score)				
	Very low	8-10	2	0, 96	Score: 14(high)
	Low	11-12	25	12, 02	
	High	13-14	160	76, 92	
	Very high	15-17	20	9, 62	
6	Courage to take risk (score)				
	Very low	9-10, 74	27	13, 00	Score: 12 (low)
	Low	10, 75 – 12,49	138	66, 30	
	High	12, 50 – 14, 24	23	11, 14	
	Very high	14, 25 – 16	19	9, 10	

of the courage of farmers in taking risks is generally presented in table 1. Farmers' Need for Information on Bebasis Cyber Extension (CE) Most farmers consider the need for information on cyber extension is still very low, because the information needs of farmers are still filled by extension agents or community leaders, there are even some farmers who say there is no internet in their area. The absence of internet in the farmers area due to its location far from the city center. Locations that are between mountains so the internet signal is weak. Less than one percent of farmers who highly assess the need for information on cyber extension. Cyber extension based information cannot be separated from the internet network. Listiana (2018) states that the internet network is an information technology that utilizes electronic networks to communicate through computer devices, mobile phones and other media that aims to access, and disseminate information in the form of knowledge,

technology, and entertainment quickly throughout the regions that affordable electronic network. Distribution of respondents based on information needs based on cyber extension can be seen in table 2.

Adequate environmental factor support will be able to increase farmers' need for information on cyber extension. Environmental factors are the most powerful variables affecting information needs based on cyber extension. Agricultural information can be in the form of information on technical methods of farming (planting, spacing, seed varieties, etc.), prices of crops, fertilizer prices, and information on agricultural research results.

Factors that Influence the capacity of freelance daily extension workers (THL)

Farmers' need for cyber extension-based information is influenced primarily by environmental factors (X3)

Table 2: Distribution of information needs based on cyber extension.

Classification(score)	Ability of freelance daily extension workers		Average
	Amount	(%)	
Very low (32 – 44)	104	50,00	
Low (45 – 57)	86	41,35	
High (58 – 70)	15	7,21	
Very high (71 – 84)	2	0,96	
Amount	207	100,00	
Average	46,2 (Low)		

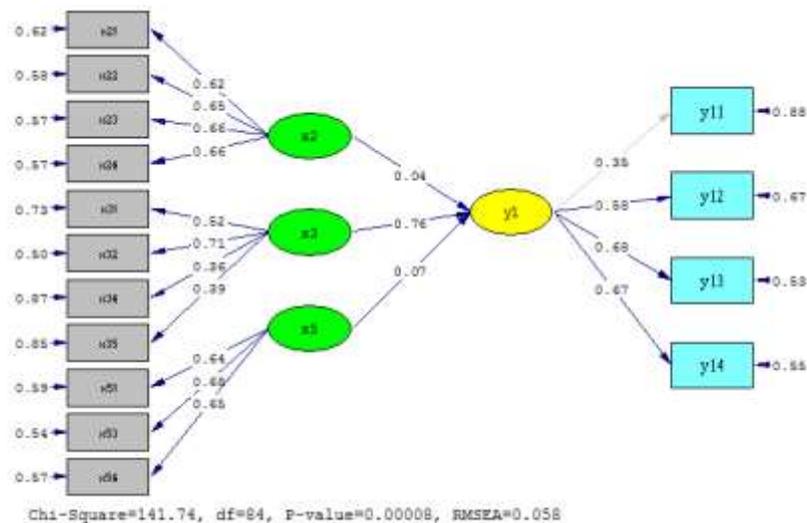


Fig. 1: Estimation of structural model parameters of information needs based on cyber extension.

which include: availability of information systems (X31), ownership of cyber information systems (X32), traditional traditions (X34) and family support (X35). Furthermore, it is influenced by the conventional information system (X5) which is reflected by the conventional information system accuracy (X51), the conventional information system sharpness (X53), and the accuracy of the information presented by conventional system informs (X54). Another factors that influences information needs based on cyber extension is the motivation of farmers (X2). Farmer motivation is reflected by indicators: motivation in increasing production (X21), motivation in improving the information system (X22), motivation in increasing the potential of information systems (X23), and motivation in increasing the ease of accessing information systems (X24). Information needs based on cyber extension (Y1) needed by farmers are: (Y11) cultivation information, (Y12) market information, (Y13) post-harvest information and (Y14) information on agricultural institutions.

The results of testing hypotheses indicate that the factors that directly influence the information needs of cyber extension based on: environmental factors (X3), Potential conventional information sources (X5), and farmer motivation (X1); while the individual characteristics of farmers and the potential of cyber information sources have no significant effect on information needs based on cyber extension. This means that if farmers can take advantage of environmental factors, the potential of conventional information sources and improve their motivation appropriately and appropriately it will affect the increase in information needs based on cyber extension. Similar with mentioned result by research that found that farmers need information for various purposes of agricultural activities, and they use different sources and media for access such information (Ronald *et al.*, 2014). They applied the agricultural innovation and technology in order to increase their income and welfare.

Overall to see the direct and indirect effects between variables, the decomposition of influence between variables was carried out. Decomposition between variables is the separation of total influence into direct and indirect effects. Direct influence is the

influence of an independent variable on the dependent variable without going through other variables. The influence of indirect variables shows the effect of an independent variable on the dependent variable that occurs through one or several other variables that are conceptualized as variables between. Based on the image estimation of structural model parameters can be explained the direct influence and indirect effect between the research variables tested. table 3 briefly summarizes the causal relationship between the latent variables of the study and the t value as a statistical test.

Table 3: Test of goodness of fit model.

Goodness-of-Fit	Cut of Value	Result	Conclusion
RMSEA	0,05 ≤ RMSEA ≤ 0,08	0.058	good fit
GFI	≥ 0.90	0.92	good fit
AGFI	≥ 0.90	0.88	Fit
CFI	≥ 0.90	0.95	good fit
IFI	≥ 0.90	0.95	good fit
NFI	≥ 0.90	0.88	Fit
NNFI	≥ 0.90	0.94	good fit

Conclusion

Farmers' need for cyber extension-based information is influenced by: (a) environmental factors (X3) which include: availability of information systems (X31), ownership of cyber information systems (X32), suitability of tradition (X34) and family support (X35). (b) conventional information system (X5) which is reflected by the accuracy of conventional information systems (X51), conventional information system acuity (X53), and the accuracy of the information presented by conventional information systems (X54). (c) farmer motivation (X2) reflected by indicators: motivation in increasing production (X21), motivation in improving information systems (X22), motivation in increasing the potential of information systems (X23), and motivation in increasing ease of accessing information systems (X24) Farmers' need for cyber-based information is included in the very low category. The low needs of farmers for information based on cyber extension makes the low information that farmers get through cyber extensions regarding cultivation, market information, post-harvest information and institutional information.

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