ISSN : 0216-8175 EISSN : 2303 - 2499

MIMBAR
Jurnal Sosial dan Pembangunan

Publisher : UPT Publikasi Ilmiah Unisba
Jalan Taman Sari No. 20, Bandung, Jawa Barat, 40116, Indonesia.
Phone : (022) 4203368, 4205546 ext. 6737
Email : mimbar@unisba.ac.id
Website : https://ejournal.unisba.ac.id/index.php/mimbar/index

An Analysis of Agricultural Extension Workers' Competence in Establishing Food Security in Kuantan Singingi Regency

[1] Syafrinal*, [2] Rosnita,
[3] Ardian

[1] Universitas Riau, Riau, Indonesia
Correspondance author: syafrinal@lecturer.unri.ac.id

A r t i c l e

Article History
Received: 2024/04/03
Reviewed: 2024/05/16
Accepted: 2024/06/26
Published: 2024/06/27

DOI:
doi.org/10.29313/mimbar.v40i1.3642

Volume : 40
No. : 1
Month : June
Year : 2024
Pages : 72-81

To cite this article (APA Style):

Syafrinal*, Rosnita, Ardian. (2024). The article title is sentence case style. Jurnal Mimbar. 40(1), 72-81. https://doi.org/10.29313/mimbar.v40i1.3642

A b s t r a c t

Agricultural extension is undeniably very important for farmers in improving rice cultivation because it provides them with the information and activities needed to increase rice productivity and farmers' food independence. This study aims to analyze the level of competence of extension workers in improving food security. The competencies possessed by extension workers in this regard consist of knowledge, skills, and attitudes. Food security in this study is examined from the aspects of availability, access, and safety quality. The research was conducted in Kuantan Singingi District, Riau Province, which has high rice production and adequate agricultural extension services for rice cultivation. The sample was selected using the purposive sampling method, resulting in fifty-eight extension workers being chosen. The Spearman Rank correlation test was used to assess the relationship between the competence of extension workers and food security in Kuantan Singingi Regency. The results reveal that all variables of the extension workers' competence (knowledge, skills, and attitudes) have a significant relationship with the food security of farmers, in terms of food availability, access, and safety quality. Extension workers indirectly play a crucial role in enhancing the food security of farmers' households by sharing information and innovations that help improve rice production and overall household food security. Future researchers can develop sustainable, professional models and technology-based training modules to further improve the competence of extension workers.

Keywords: Agricultural Extension; Competence, Food Security.

Introduction

The development of agricultural sector is strongly correlated to the quality of human resources in carrying out their tasks as an extension worker. Realising resilient agriculture requires a resolution in enhancing professional, creative, inventive, credible, and global-minded human resources (Humaidi et al., 2020). Those working in the agricultural extension service play a key role in changing farmers' behaviour to improve their work or farming given that agricultural extension workers directly equip farmers with knowledge and supervise them from the start until the harvesting process to qain

better results. Extension activities or program can also increase agricultural productivity. A positive collaboration between farmer groups and extension workers can advance the farmers' quality in terms of agricultural knowledge, production or products, even the use of agricultural technology (Mbeche et al., 2022; Nettle et al., 2021).

Agricultural extension service is a system aiming at enhancing the knowledge, skills, and behaviour of farmers so that they can independently manage their farming units to be more profitable; thus, they can improve their life (Sibarani et al., 2022). Agricultural extension service is conducted by workers or authority who are accountable to provide education and trainings to farmers with the goal of increasing the quality of agricultural production and produce (Klerkx, 2020; Nettle et al., 2021). Therefore, agricultural extension workers must be knowledgeable and skillful in at least three competencies (knowledge, skills, and attitude). Those competencies are specifically interpreted into knowledge competence associated to agriculture, technical skills, communication skills, technological skills, and social competencies (Agyei & Stringer, 2021). Different characteristic, competence, and behaviour of individuals will influence their capability, performance as well as productivity in the extension program (Arifianto et al., 2018).

Kuantan Singingi regency is the fifth regency with the largest amount of rice production in Riau province. It has a harvest area of 5,481.44 hectares with a productivity of 3,411 tons/ha and a total production of 18,694.82 tons (Central Bureau of Statistics, 2022). That enormous potential of agricultural sector necessitates a synergistic design between the extension workers and the farmers to rise the productivity and production of rice in Kuantan Singingi regency so that food security can be achieved. Food security is a pillar of a country because the prosperity of agricultural workers in villages or rural cities is directly proportional to the welfare of consumers in urban areas (Hertati, 2023). The manifestation of that condition is known as food self-sufficiency (Yusri et al., 2021). The main issue of food security in Indonesia is the climate change. Unstable climate causes farmers to be unprepared in anticipating the impacts (Saptutyningsih et al., 2020). Other problems are the lack of collaboration between farmers and other agricultural sectors and the failure of governance which causes a decrease in the productivity of the agricultural products (Karabulut et al., 2018). Based on these problems, agricultural extension workers are needed by farmers to assist them in growing rice cultivation because the workers or trainers are going to share knowledge and guide the farmers not only to increase their produce but also their autonomy for food security.

The advancement of food security has a very basic perspective since access to food and balanced nutrition is a part of human right. The success in developing the quality of human resources highly depends on the adequacy of nutrition in the society. Food security is the main pillar to achieve economic and food security as food is a very vital need of a nation. History shows that food strategies are widely used to control national defense. The more a country depends on other nations for food, the more difficult it is for the country to develop. That is why it is essential to achieve independence in fulfilling national food needs. Increasing food security can be reached through several ways, such as 1) developing superior seeds, 2) developing locally-adapted solutions for pests and disease management, 3) improving skills and service capacity building, 4) developing access to marketing, and 5) advancing access to finance or credit for agricultural businesses (Forkuor et al., 2022). In this circumstance, the extension workers act as an educator to upgrade farmers' knowledge, to train necessary skills, and to provide comprehensive training on agricultural technology. The success of the workers as an educator can be seen from the increase in farmers' understanding of agriculture and its implementation in the field (Khairunnisa et al., 2021). Moreover, the failure of extension activity on agricultural productivity can be caused by the incapability of the extension workers or trainers in manage training, choosing a well-suited material for the local farmers, the lack of support from the local authority, and the discrepancy between the raining topic and the problems faced the farmers. (Afdal Zulhendri & Henmaidi, 2021)

For the evidence mentioned above, it is thus necessary to conduct research on the analysis of extension workers' competence measured by several indicators such as knowledge, skills, and attitude. This research aims to actualise food security in Kuantan Singingi Regency through the maximization of extension activities. The results of this research are expected to facilitate not only the researchers but also the government to discover effective methods in increasing the competence of extension workers and to establish qualified human resources working in the agricultural sector.

Research Method

This research is basic research conducted through survey and descriptive methods. The study was conducted in Kuantan Singingi Regency, Riau Province, which has high rice production and adequate agricultural extension workers specializing in rice cultivation. The population in this study

consists of agricultural extension workers specializing in food crops who are actively mentoring farmers in the field, as well as active farmers being mentored by these extension workers in Riau Province. The sample was selected using the purposive sampling method, resulting in fifty-eight extension workers and 116 farmers being chosen as respondents. Primary data used in this study were obtained through observation, documentation, interviews, and questionnaires. Meanwhile, the secondary data were obtained from related agencies and institutions. The competencies of the extension workers examined in this study consist of knowledge, skills, and attitudes. The indicators for each competency are detailed in Table 1.

Tabel 1. The Indicators for Each Competency

No	Agricultural Extension Competence	Indicator
1	Knowledge	1. Knowledge of the agribusiness subsystem
		2. Knowledge of institutions that support improvement in rice production
		3. Knowledge of rice cultivation maintenance
		4. Knowledge of materials of rice cultivation
		5. Knowledge of rice varieties used by assisted farmers
		6. Knowledge of irrigation (e.g. physical condition, availability of water source, and guaranteed availability) that supports the improvement of rice cultivation
		7. Knowledge of the increase of planting index in paddy cultivation
2	Skill	1. Skills in organizing the extension program
		2. Skills in drafting the extension program's plan
		3. Skills in providing various information during the program
		4. Skills in using a certain methods during the extension program
		5. Communication skills
3	Attitude	1. The extension workers' belief in the ability of farmers to innovate and to use technology
		2. The extension workers' belief in the farmers' ability to absorb idea or innovation
		3. The implementation of the rice cultivation extension program
		4. The implementation of evaluation program
		5. The collaboration in preparing the extension program
		6. The extension workers' response to rice plant innovation
		7. The extension workers' ability in resolving the farmers' problems
		8. The extension workers' response and attempt to gain rice plant innovation
		9. The extension workers' response to the proposed rice cultivation program by farmers

The level of competence of the extension workers from indicators of knowledge, skills, and attitude is determined based on the criteria shown in Table 2. The criteria for a score on each competence can be inferred from the range value and the score interval length. The range is obtained by subtracting the highest score from the lowest score. Meanwhile, the interval length is obtained from dividing the range value by the number of class intervals.

Table 2. Agricultural Extension Competence Criteria

Competence Variable	Score Interval	Criteria
Knowledge	<2.267	Low
	2.267-3.534	Adequate
	>3.535	High
Skill	<2.146	Low
	2.146-3.292	Adequate
	>3.292	High
Attitude	<2.316	Low
	2.316-3.632	Adequate
	>3.632	High

The research results were analysed using the *Rank Spearman* correlation test method. This method was proposed by Carl Spearman in 1904 with the purpose of measuring the degree of correlation between dependent and independent variables on an ordinal scale. The dependent variable in this study includes the farmers' food security that is gauged from food availability, food access, and the quality of food safety. Furthermore, the independent variable that likely affects the dependent

DOI: https://doi.org/10.29313/mimbar.v40i1.3642

variable are the characteristics of instructors and their competence seen from their knowledge, skills, and attitude. Finally, the data were analysed using the IBM SPSS Statistics 25 application.

Results & Discussion

Competence is a set of knowledge, skills, and attitude or behaviour that should be possessed, internalised, and sharpened in accordance to the main duty or function as professionals. The competence of agricultural extension workers determines the effectiveness of performance in carrying out their tasks. The workers' competence is influenced by some factors such as motivation, environment, and self-development. Self-development encompasses learning independence and career development opportunity (Yusneli & Tanjung, 2021). The competences of the workers need to be enhanced so they can be more professional. One of the ways to do so, according to Rusman & Rohman (2017), is through training. With training, extension workers or instructors can explore the extension program curriculum to further be developed in according with the objectives as an attempt to sharpen their competency and skills to later be shared to the society. The average competency of agricultural extension workers in terms of knowledge, skills, and attitudes can be seen in Figure 1.

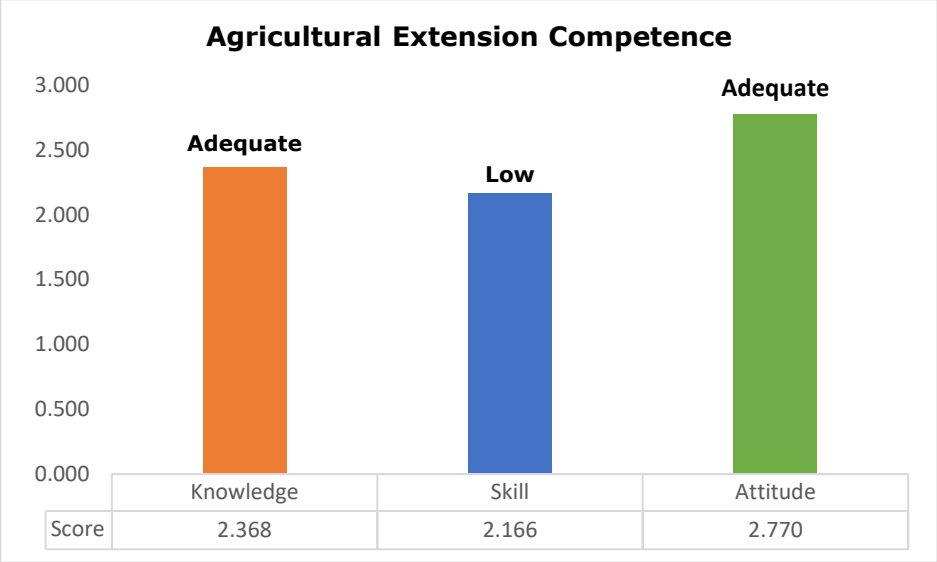

Figure 1. *Agricultural Extension Competence*

Based on the figure, it is known that the competencies of agricultural extension workers in terms of knowledge, skills, and attitudes fell into the low to adequate category. The knowledge and attitude competencies of the extension workers were in the adequate category. The results of the analysis of the extension workers' competencies based on the indicators are detailed as follows.

The Agricultural Extension Workers' Knowledge

The knowledge competence that extension workers must possess consists of seven indicators correlated to general knowledge of agriculture, cultivation, and production of agricultural produce. The descriptive analysis of extension worker's knowledge variable can be seen in detailed in Table 3.

Table 3. Descriptive Analysis of Knowledge of the Agricultural Extension Workers in Kuantan Singingi Regency

Variable	Indicator	Score
X1.1	Knowledge of the agribusiness subsystem	2.652
X1.2	Knowledge of institutions that support improvement in rice production	2.010
X1.3	Knowledge of rice cultivation maintenance	2.866
X1.4	Knowledge of materials of rice cultivation	2.659
X1.5	Knowledge of rice varieties used by assisted farmers	2.731
X1.6	Knowledge of irrigation (e.g. physical condition, availability of water source, and guaranteed availability) that supports the improvement of rice cultivation	1.929
X1.7	Knowledge of the increase of planting index in paddy cultivation	1.730

The result of the analysis in Table 2 showed that the extension workers had a sufficient understanding of agriculture. The highest knowledge competency was in the indicator knowledge of rice cultivation maintenance. The least understood indicators or topics were about institutions that can advocate rice production, irrigation, and also the understanding of ways to increase planting index in paddy or rice cultivation. The ability to manage and enhance understanding is crucial for the extension workers to resolve problems and respond to opportunities and challenges faced by the farmers (Zulhendri & Henmaidi, 2021). As an educator, the extension workers should maximise their competence, particularly in the expertise associated to the agricultural extension service technical issue, technology, methodology, and understanding of the society (Sugino, 2021).

A proper and decent delivery of the extension program not only can escalate farmers' knowledge so that rice cultivation can be maximised but can also facilitate the farmers to realize food security in their own household. A study result from Mulieng et al., (2018) state that farmers give a high rating to those agricultural extension workers who (1) have accurate knowledge in compiling materials for the extension service or activity according to the farmers' need, (2) master the extension program material, and (3) can prepare materials from different sources and compile them thoroughly. Since the agricultural extension materials have been initially tailored to the farmers' needs and verified by authorised agencies such as the Agricultural, Fisheries, Plantation, and Forestry Counseling Centre (known as BP3K) and the Department of Agriculture, the materials can very likely bring positive impacts on increasing the farmers' farming (Mulieng et al., 2018; Yusneli & Tanjung, 2021). Creating a civic agriculture requires active involvement of various parties, and extension workers have an essential role as a facilitator to convey any agricultural information, innovation, and knowledge to farmers (Bravo et al., 2019).

The Variable of Agricultural Extension Workers' Skills

The measured skills of agricultural extension workers' skills are described into five indicators or categories related to planning and the implementation. The descriptive analysis of the variables is presented in Table 4.

Table 4. Descriptive Analysis of the Agricultural Extension Workers' Skills in Kuantan Singingi Regency

Variable	Indicator	Score
X2.1	Skills in organizing the extension program	2.214
X2.2	Skills in drafting the extension program's plan	2.074
X2.3	Skills in providing various information during the program	2.176
X2.4	Skills in using a certain methods during the extension program	2.306
X2.5	Communication skills	2.061

The results of analysis in Table 3 depict that the extension workers have sufficient skills in conducting the extension program. Skills in using certain methods during the extension program are the indicator with the highest score. However, the extension workers communication skills and their capability in drafting the plan were inadequate. Therefore, skilled extension workers should assist farmers to gain information related to rice cultivation and give better counseling to intensify rice farming and food security (Bahua, 2018). Hanafiah et al., (2013) disclose that the extension workers' competence is mostly gauged from their ability in organizing the extension program. Through the program, the workers are habituated to design materials, draft plans, use technology, and communicate with the program's participants (Hanafiah et al., 2013). An example of the skills is using technological and communication tools. According to a study conducted by Putri *et al.*,(2022), farmers frequently complain about the lack of information such as printed or electronic media used in the extension program. Facilitators mostly conduct the extension activities orally without any brochures or other media. Based on the findings, it is, therefore, critical to do follow-up actions to increase the extension workers' skills, particularly in the use of technology and communication as well as the internet (Purwatiningsih et al., 2018).

The Variable of Agricultural Extension Workers' Attitude

The workers' attitude is correlated to their behaviour and ability to socialise with the society and those involved in the agricultural sectors. The workers' attitude also includes their competence in responding, collaborating, and discussing in problem-solving activities (Haryanto et al., 2018). The descriptive analysis of the attitude variables can be checked in detail in Table 5.

DOI: https://doi.org/10.29313/mimbar.v40i1.3642

Table 5. Descriptive Analysis of the Agricultural Extension Workers' Attitude in Kuantan Singingi Regency

Variable	Indicator	Score
X3.1	The extension workers' belief in the ability of farmers to innovate and to use technology	3.004
X3.2	The extension workers' belief in the farmers' ability to absorb idea or innovation	3.405
X3.3	The implementation of the rice cultivation extension program	1,692
X3.4	The implementation of evaluation program	1.714
X3.5	The collaboration in preparing the extension program	1.551
X3.6	The extension workers' response to rice plant innovation	2.944
X3.7	The extension workers' ability in resolving the farmers' problems	3.620
X3.8	The extension workers' response and attempt to gain rice plant innovation	3.370
X3.9	The extension workers' response to the proposed rice cultivation program by farmers	3.630
Average		**2.770**

Similar to the other two competence variables, the result of the analysis of extension workers' attitude shows a moderate score. The extension workers' response to the proposed rice cultivation program by farmers is the indicator with the highest score. The workers seem to have adversities in implementing the rice cultivation extension program, evaluating the program, and collaborating with others. In other words, the workers have a strong belief in the farmers' ability; are able to solve the farmers' issues; and respond well to the rice cultivation innovation, all of which makes the farmers optimistic to increase the productivity of rice cultivation and reach the food security. According to Yulida et al., (2018), the inherent characteristics of the workers possess, such as their disposition, significantly determine the effectiveness of their performance in carrying out the extension program's objectives. In addition, their motivation can influence their competence and attitude. Incentives such as reward, support from superiors, job security, and convenient residence at the extension program location can have a positive impact on the workers' attitude to be proactive in doing the program (Sugino, 2021). An exceptional worker is a motivator and mentor for the farmers to solve agricultural complication (Ardita et al., 2017).

Food Security

The definition of food security is stated in the Decree No.18 of 2012 as a condition of meeting the needs for food for a nation and individuals, reflected in the availability of sufficient food (both in quantity and quality) and also food that is safe, diverse, nutritious, equitable, affordable, does not conflict with any religious beliefs and culture so that people can live healthily and be productive. Food security, according to Hanani (2012), is influenced by several aspects such as food availability, food access, and food quality and safety. Those three aspects indicate that food must be available sustainably in sufficient quantities at any time. The increase in urban population is a challenge for farmers to fulfill food availability, so there is a need for assistance from extension workers to increase the productivity of agricultural products (Hertati, 2023). The quality of agricultural extension program and the workers' competence is strongly related to the realization of food security. The results of correlation between the competence of extension workers and food security are explicated below.

Food Availability

Food availability can calculated in a large context such as at the national level, to the smallest context in a particular area or district, or even individually. The availability indicator is estimated by the proportion of self-produced staple food to the basic food necessity of the family. The bigger the availability of food for the family or the more increased the food stock of the household, the higher the level of food security in the household (Yusuf et al., 2018). The result of the correlation analysis between the extension workers' competence and the availability of food for farmers is described in Table 6.

Table 6. The Correlation Analysis of the Agricultural Extension Workers' Competence and the Farmers' Food Availability

Workers' Competence	The Availability of Farmers' Food	
	Coefficient	Sign
Knowledge	0.666	0.000
Skill	0.535	0.000
Attitude	0.698	0.000

Tabel 6 shows that the three aspects of extension workers' competence are significantly correlated to food availability at the level of 95% (α = 0.05). The aspect of knowledge has a coefficient value of 0.666 with a significance of 0.000 which implies that there is a strong relationship between knowledge and food availability. The aspect of attitude also has a similar significance value as the knowledge aspect (0.000), with a coefficient value of 0.698. It also infers a meaningful and absolute correlation between the workers' attitude and food availability. The skill aspect, however, has a lower coefficient value of 0.535 and a significance value of 0.000. This indicates that there is a moderate correlation between the workers' skills and the availability of food for the farmers' family.

A planned and structured agricultural extension program has a positive impact on the success of food security. Bizikova et al.,(2020) elucidate that the extension program's design features and complementary intervention have a more effective impact on realising food security. Some of the extension supporting features are 1) the right target group, 2) responsiveness to the local food products, 3) discussion about safety issues, and 4) the society's involvement in collaborations with local and national institutions. An example of extension program that can be carried out to multiply food availability is through product integration of good agricultural practices or also known as Good Agricultural Practice (GAP) (Aprillya et al., 2019). An adaptive farming system through integrated farming is a form of adaptation and mitigation for food security. Through this system, the extension workers and the society work together to integrate agriculture and animal husbandry to meet the need of food (Nugroho et al., 2022). The success of that system cannot be separated from the extension workers' competence such as knowledge, skill, and attitude.

Food Access

Food access is described as the ability of household to attain enough nutritious food through one or a combination of various sources such as own production and supply, barter, purchases, loans, gifts, and food assistance. Food access can be seen from the purchasing power of rice farmers' households. Farmers' household purchasing power is the ratio of the household's total income (Rp/month) and the total expense (Rp/month). If the farmers' household purchasing power value is ≤1, then the farmers' household has low purchasing power; on the other hand, given that their purchasing power is >1, it can be said that they have high purchasing power. The affordability of access to agricultural production and sales is supported by the roles of extension workers as an organizer (Listiana et al., 2018). The results of the correlation analysis of the extension workers' competence and farmers' access to food is described in Table 7.

Table 7. The Correlation Analysis of the Agricultural Extension Workers' Competence and the Farmers' Access to Food

Workers' Competence	**Farmers' Food Access**	
	Coefficient	**Sign**
Knowledge	0.681	0.000
Skill	0.522	0.000
Attitude	0.783	0.000

Based on Table 7, it is understood that the three aspects of extension workers' competence relate significantly (approximately 95%) to farmers' access to food with α = 0.05. With a coefficient value of 0.681 and a significance of 0.000, the correlation between the extension workers' knowledge and food access is substantial. Attitude has the biggest coefficient value among the three competencies; thus, the correlation between attitude and food access is unquestionably strong. The extension workers' skill, however, has a lower coefficient value of 0.522 and a significance value of 0.000. This indicates that although skills indeed affect- the farmers' access to food, they do not have a considerable relation. Hence, it can be concluded that the extension workers have a role in facilitating access for farmers to grow their agricultural produce. The workers acts as a liaison between the target community and the government, entrepreneurs, marketing, and banking (Maake & Antwi, 2022). As an organiser and consultant, the extension workers are accountable to organise and mobilise farmers in distributing their produce as an attempt to support their welfare (Rahmawati et al., 2019).

Food Safety Quality

Food safety quality can be seen from the share of food expenditure, which is the ratio of spending on food to the total expense of a household in a month. A household that has a high share of food expenditure indicates a low level of food safety and vice versa (Yusuf et al., 2018).

DOI: https://doi.org/10.29313/mimbar.v40i1.3642

A large share of food expense illustrates that the household meets the current need for food but is not oriented to the future. If the share value of food expenditure is ≥60%, the household's food availability is not safe. On the other hand, a household's food is secured if the share value of food expenditure is more than 60%. The quality of food safety can be influenced by the farmers' knowledge and skills in cultivating agricultural products. Competent extension workers strengthen the accomplishment of the extension program to create a qualified food safety. The results of the correlation analysis of the extension workers' competence and the quality of food safety are presented in Table 8.

Table 8. The Correlation Analysis of the Agricultural Extension Workers' Competence and the Quality of Food Safety

Workers' Competence	The Quality of Farmers' Food Safety	
	Coefficient	Sign
Knowledge	0.577	0.000
Skill	0.464	0.000
Attitude	0.644	0.000

From Table 8 above, the three competencies of extension workers are generally related to the quality of food safety of farmers at a level of 95% (α = 0.05). Among the three competencies, the workers' attitude has become the major underlying factor associated with food safety. Its coefficient value is 0.644 with a significance of 0.000. The workers' knowledge is the second aspect that considerably correlates to food security with a coefficient value of 0.577. Similar to the previous two aspects (food availability and food aspect), the workers' skill has the least correlation to food safety of the farmers. It has the lowest coefficient value of 0.464. The quality of food safety is created dynamically among stakeholders and agricultural workers. In this condition, feedback from the agricultural extension activities or programs will likely change the farmers' attempt to establish qualified food safety (Chapman & Darby, 2016). A well-prepared material presentation and skill support are key for farmers to reduce their expenditure. A good cooperation between the extension workers and farmers will generate management policy that benefits all parties (Aprillya et al., 2019). Agricultural cultivation can also be the answer to increasing food security. Farmers and stakeholders can work together to produce agricultural innovations in the form of superior products so that it has an impact on improving the economy of the community (Dinn Wahyudin et al., 2023)

Conclusions

The results of the research show that all variables of the extension workers' competence (knowledge, skill, and attitude) have a significant correlation to farmers' food security observed from such aspects as food availability, food access, and food safety. Extension workers indirectly play a significant role in enhancing the food security of farmers' households. They are responsible for sharing information and innovations, which help farmers improve their rice production and overall household food security.Based on the results of this study, the agricultural extension workers are suggested to continuously improve their performance and expertise in facilitating farmers to achieve food security by means of providing information and inventive ideas to enhance the quality of farming. Future researchers can develop sustainable professional models and technology-based training modules, as an effort to improve the competence of extension workers.

References

Afdal Zulhendri, & Henmaidi. (2021). Pengaruh Pendidikan Dan Pelatihan Terhadap Kompetensi Penyuluh Pertanian Di Kabupaten Pasaman. Jurnal Niara, 14(2), 35–43. https://doi.org/10.31849/niara.v14i2.5871

Agyei, P. A., & Stringer, L. C. (2021). Improving the effectiveness of agricultural extension services in supporting farmers to adapt to climate change: Insights from northeastern Ghana. Climate Risk Management, 32(May 2020), 100304. https://doi.org/10.1016/j.crm.2021.100304

Aprillya, M. R., Suryani, E., & Dzulkarnain, A. (2019). System Dynamics Simulation Model to Increase Paddy Production for Food Security. Journal of Information Systems Engineering and Business Intelligence, 5(1), 67. https://doi.org/10.20473/jisebi.5.1.67-75

Ardita, A., DWP, S., & Widjanarko, D. (2017). Kinerja Penyuluh Pertanian Menurut Persepsi Petani: Studi Kasus di Kabupaten Landak. Journal of Vocational and Career Education, 2(1). https://doi.org/10.15294/jvce.v2i1.10908

Arifianto, S., Satmoko, S., & Setiyawan, B. M. (2018). Pengaruh Karakteristik Penyuluh, Kondisi Kerja, Motivasi Terhadap Kinerja Penyuluh Pertanian dan Pada Perilaku Petani Padi di Kabupaten Rembang. Agrisocionomics: Jurnal Sosial Ekonomi Pertanian, 1(2), 166. https://doi.org/10.14710/agrisocionomics.v1i2.1888

Bahua, M. I. (2018). Peran Kompetensi Penyuluh Pertanian pada Keterampilan Petani Bawang Merah. Agriekonomika, 7(2), 112. https://doi.org/10.21107/agriekonomika.v7i2.4489

Bizikova, L., Jungcurt, S., McDougal, K., & Tyler, S. (2020). How can agricultural interventions enhance contribution to food security and SDG 2.1? Global Food Security, 26(March), 100450. https://doi.org/10.1016/j.gfs.2020.100450

Bravo, G. C., Klerkx, L., & Engler, A. (2019). Combinations of bonding, bridging, and linking social capital for farm innovation: How farmers configure different support networks. Journal of Rural Studies, 69. https://doi.org/10.1016/j.jrurstud.2019.04.004

Chapman, A., & Darby, S. (2016). Evaluating sustainable adaptation strategies for vulnerable mega-deltas using system dynamics modelling: Rice agriculture in the Mekong Delta's An Giang Province, Vietnam. Science of the Total Environment, 559, 326–338. https://doi.org/10.1016/j.scitotenv.2016.02.162

Dinn Wahyudin, Setiadi, E., & Evan Firdaus. (2023). Sustainable Agriculture Development Program in Changing the Mindset of Farmers in Cikurubuk Village. MIMBAR : Jurnal Sosial Dan Pembangunan, 79, 378–383. https://doi.org/10.29313/mimbar.v39i2.3327

Forkuor, G., Amponsah, W., Oteng-Darko, P., & Osei, G. (2022). Safeguarding food security through large-scale adoption of agricultural production technologies: The case of greenhouse farming in Ghana. Cleaner Engineering and Technology, 6(March 2021), 100384. https://doi.org/10.1016/j.clet.2021.100384

Hanafiah, M. A., Rasyid, W., & Purwoko, A. (2013). Hubungan Karakteristik, Motivasi dan Kompetensi Terhadap Produktivitas Kerja Penyuluh Pertanian di Kota Bengkulu. Jurnal AGRISEP, 12(1). https://doi.org/10.31186/jagrisep.12.1.69-84

Hanani, N. (2012). Strategi Pencapaian Ketahanan Pangan Keluarga. E-Journal Ekonomi Pertanian, 1(1), 11–18. http://nuhfil.lecture.ub.ac.id/files/2012/12/ketahanan-pangan-keluarga.pdf

Haryanto, Y., Sumardjo, S., Amanah, S., & Tjitropranoto, P. (2018). Efektivitas Peran Penyuluh Swadaya dalam Pemberdayaan Petani di Provinsi Jawa Barat. Jurnal Pengkajian Dan Pengembangan Teknologi Pertanian, 20(2). https://doi.org/10.21082/jpptp.v20n2.2017.p141-154

Hertati, D. (2023). Development of Urban Farming as a Strategy to Support Food Security. MIMBAR : Jurnal Sosial Dan Pembangunan, 10, 108–117. https://doi.org/10.29313/mimbar.v39i1.2099

Humaidi, L., Hubeis, A. V. S., Puspitawati, H., & M Anwas, O. E. (2020). Karakteristik Penyuluh dalam Pemanfaatan Media Sosial sebagai Media Informasi Pertanian. Agrisocionomics: Jurnal Sosial Ekonomi Pertanian, 4(1). https://doi.org/10.14710/agrisocionomics.v4i1.6113

Karabulut, A. A., Crenna, E., Sala, S., & Udias, A. (2018). A proposal for integration of the ecosystem-water-food-land-energy (EWFLE) nexus concept into life cycle assessment: A synthesis matrix system for food security. Journal of Cleaner Production, 172, 3874–3889. https://doi.org/10.1016/j.jclepro.2017.05.092

Khairunnisa, N. F., Saidah, Z., Hapsari, H., & Wulandari, E. (2021). Pengaruh Peran Penyuluh Pertanian terhadap Tingkat Produksi Usahatani Jagung. Jurnal Penyuluhan, 17(2), 113–125. https://doi.org/10.25015/17202133656

Klerkx, L. (2020). Advisory services and transformation, plurality and disruption of agriculture and food systems: towards a new research agenda for agricultural education and extension studies. In Journal of Agricultural Education and Extension (Vol. 26, Issue 2). https://doi.org/10.1080/1389224X.2020.1738046

Listiana, I., Sumardjo, S., Sadono, D., & Tjiptopranoto, P. (2018). Hubungan Kapasitas Penyuluh dengan Kepuasan Petani dalam Kegiatan Penyuluhan. Jurnal Penyuluhan, 14(2). https://doi.org/10.25015/penyuluhan.v14i2.18673

Maake, M. M. S., & Antwi, M. A. (2022). Farmer's perceptions of effectiveness of public agricultural extension services in South Africa: an exploratory analysis of associated factors. Agriculture and Food Security, 11(1). https://doi.org/10.1186/s40066-022-00372-7

 DOI: https://doi.org/10.29313/mimbar.v40i1.3642

Mbeche, R. M., Mose, G. N., & Ateka, J. M. (2022). The influence of privatised agricultural extension on downward accountability to smallholder tea farmers. Journal of Agricultural Education and Extension, 28(3), 341–362. https://doi.org/10.1080/1389224X.2021.1932538

Mulieng, Z. F., Amanah, S., & Asngari, P. S. (2018). Persepsi Petani Terhadap Kompetensi Penyuluh Pertanian Tanaman Pangan di Kabupaten Aceh Utara. Jurnal Penyuluhan, 14(1). https://doi.org/10.25015/penyuluhan.v14i1.17556

Nettle, R., Morton, J. M., McDonald, N., Suryana, M., Birch, D., Nyengo, K., Mbuli, M., Ayre, M., King, B., Paschen, J. A., & Reichelt, N. (2021). Factors associated with farmers' use of fee-for-service advisors in a privatized agricultural extension system. Land Use Policy, 104, 105360. https://doi.org/10.1016/j.landusepol.2021.105360

Nugroho, H. Y. S. H., Indrawati, D. R., Wahyuningrum, N., Adi, R. N., Supangat, A. B., Indrajaya, Y., Putra, P. B., Cahyono, S. A., Nugroho, A. W., Basuki, T. M., Savitri, E., Yuwati, T. W., Narendra, B. H., Sallata, M. K., Allo, M. K., Bisjoe, A. R., Muin, N., Isnan, W., Ansari, F., … Hani, A. (2022). Toward Water, Energy, and Food Security in Rural Indonesia: A Review. Water (Switzerland), 14(10), 1–25. https://doi.org/10.3390/w14101645

Purwatiningsih, N. A., Fatchiya, A., & Mulyandari, R. S. H. (2018). Pemanfaatan Internet dalam Meningkatkan Kinerja Penyuluh Pertanian di Kabupaten Cianjur. Jurnal Penyuluhan, 14(1). https://doi.org/10.25015/penyuluhan.v14i1.17173

Rahmawati, R., Baruwadi, M., & Ikbal Bahua, M. (2019). Peran Kinerja Penyuluh dan Efektivitas Pelaksanaan Penyuluhan Pada Program Intensifikasi Jagung. Jurnal Sosial Ekonomi Pertanian, 15(1). https://doi.org/10.20956/jsep.v15i1.6342

Rusman, R., & Rohman, A. (2017). Development Of Training Curriculum In Improving Community-Based Geological Hazard Mitigation Competency. MIMBAR, Jurnal Sosial Dan Pembangunan, 33(2). https://doi.org/10.29313/mimbar.v33i2.2722

Saptutyningsih, E., Diswandi, D., & Jaung, W. (2020). Does social capital matter in climate change adaptation? A lesson from agricultural sector in Yogyakarta, Indonesia. Land Use Policy, 95(September 2018), 104189. https://doi.org/10.1016/j.landusepol.2019.104189

Sibarani, R., Cepriadi, C., & Kausar, K. (2022). Peran Penyuluh Dalam Keberdayaan Petani Padi Sawah di Desa Belading Kecamatan Sabak Auh Kabupaten Siak. Journal of Agribusiness and Community Empowerment (JACE), 5(2). https://doi.org/10.32530/jace.v5i2.471

Sugino. (2021). Analisis faktor-faktor yang mempengaruhi motivasi penyuluh pertanian di era revolusi industri 4.0. Agromix, 12(1), 7–16. https://doi.org/10.35891/agx.v12i1.2140

Yulida, R., Rosnita, R., Andriani, Y., & Kurnia, D. (2018). Peningkatan Keterampilan Penyuluh Dan Petani Sagu Melalui Pelatihan Pembuatan Media Video Penyuluhan. JPPM (Jurnal Pengabdian Dan Pemberdayaan Masyarakat), 2(1). https://doi.org/10.30595/jppm.v2i1.2055

Yusneli, S., & Tanjung, B. H. (2021). Faktor- Faktor Yang Mempengaruhi Kompetensi Penyuluh Pertanian Di Kabupaten Pasaman. Jurnal Niara, 14(2), 26–34. https://doi.org/10.31849/niara.v14i2.5829

Yusri, M., Tirtayasa, S., Siregar, M. S., & Kartaatmaja, R. S. (2021). A Confirmatory Analysis of Food Security in North Sumatera. Jurnal Manajemen Dan Agribisnis, 18(1), 64–77. https://doi.org/10.17358/jma.18.1.64

Yusuf, M. N., Sulistyowaty, L., Sendjaja, T. P., & Carsono, N. (2018). Food Security Analysis of Household Paddy Farmer in Flooding Area. Journal of Economics and Sustainable Development, 9(8).

Zulhendri, A., & Henmaidi. (2021). Pengaruh Pendidikan Dan Pelatihan Terhadap Kompetensi Penyuluh Pertanian Di Kabupaten Pasaman. Jurnal Niara, 14(2), 35–43. https://doi.org/10.31849/niara.v14i2.5871