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Research

The cocoa farming through agricultural extension: Effects on competence and productivity

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ABSTRACT
The non-formal education process aims to support farmers in enhancing their agriculture skills and achieving mutual interdependence. Enhancing the involvement of extension workers is believed to positively influence farming productivity. This study seeks to identify the role of extension in cocoa commodities and to examine the factors affecting the productivity improvement of cocoa farmers. The research was carried out in cocoa-producing areas in Poso Regency. The sample size in this study was determined using Partial Least Square (PLS) analysis, following the minimum requirement of five times the number of research indicators, resulting in a total of 103 respondents. Data were analyzed through descriptive statistics and Structural Equation Modeling (SEM) using the Partial Least Square (PLS) approach with the Smart-PLS program. Factors such as farmer characteristics and the role of extension workers have a significant impact on improving farmer competency. Farmer competency can be improved through the role of extension workers based on the specific needs of cocoa farmers. This increase in competency has a direct impact on increasing farmer production and income. Farmers with higher competency will be able to optimize the use of agricultural inputs, such as the use of fertilizers and pesticides, and be more effective in various processes, such as cultivation, harvesting, post-harvest, processing, and marketing.

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INTRODUCTION

The non-formal education process is intended to support farmers in enhancing their agricultural abilities and fostering mutual interdependence (Managanta, 2018; Managanta, 2020b; Managanta et al., 2019; Managanta et al., 2018a), while also building a filtering system for information, competitiveness, and strengthening partnership (Managanta et al., 2022; Managanta, 2018; Managanta et al., 2018a; Managanta et al., 2018b). Extension agents are

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present to increase farmer competency and capacity (Managanta et al., 2019a; Managanta, 2020b; Bakari et al., 2021). Transferring technology and information (Indraningsih et al., 2010; Indraningsih, 2017), supporting the development of agribusiness or farmer organizations (Rasyid, 2012), and functioning as facilitators, motivators, and communicators (Managanta et al., 2019; Managanta, 2020b). The presence of extension services is essential for sustaining farmers' livelihoods (Amanah, 2007). Weak extension institutions cause the role and function of extension to be constrained. Regional Autonomy Law No. 23 of 2014 gives regional governments the authority to regulate and manage extension so that extension institutions become diverse. Regional autonomy allows regional governments to have the authority to regulate their government (Dayat & Anwarudin 2020). However, agricultural extension implementation policies that are not yet fully optimal, coupled with the integration of extension coordination bodies into district agricultural service work units, have resulted in a decline in instructor motivation. Human resources have also not been optimally directed and assisted to provide adequate agricultural extension (Husodo & Arifin 2009; Marius et al., 2009; Listiana et al., 2018).

In plantation commodities, particularly cocoa, there is a lack of mentoring and institutional support from extension agencies (Hindersah & Suminar, 2019; Managanta et al., 2022). This results in low farmer competence, capacity, and interdependence (Managanta et al., 2022a). Cocoa stands as the primary commodity in Poso Regency. In 2023, the cocoa land area will reach 38,434 hectares with a total production of 23,450 tons, making it the second largest commodity after Parigi Moutong (Central Bureau of Statistics, 2024). This shows that the potential for increasing cocoa commodity productivity in the Poso Regency can be achieved through increasing the role of extension. The importance of renewing productivity is not only related to increasing the amount of production but also improving the quality of human resources (Sumardjo, 2016; Managanta, 2018). Extension workers are responsible for delivering essential information to farmers while also improving their skills and income levels (Khairunnisa et al., 2021; Managanta, 2020a). The important role of extension workers in improving farmers' abilities is the implementation of Law No. 16 of 2006 concerning Agricultural, Fishery, and Forestry Extension Systems. Efforts are needed to increase the role of extension in increasing farmers' abilities (Managanta et al., 2021; Managanta et al., 2018a; Managanta, 2018), as an advisor to increase production (Sundari et al., 2015), and shifting the orientation of extension from an economic growth-based paradigm (growth) toward a people-centered paradigm (people-centered) (Sumardjo, 2016; Sumardjo, 1999).

The concept of the instructor's role as a communicator, facilitator and mediator, organizer, motivator, advisor, and dynamist (Managanta, 2018; Managanta et al., 2019a). Changing the behavior of farmers and their families (Ozor & Cynthia, 2011). The counseling process helps

overcome ignorance (cognitive), unpreparedness (affective), and inability (psychomotor-conative) (Sumardjo, 2016; Sumardjo, 1999). Through a bottom-up approach involving farmers as the main actors (Suvedi, 2011). Helping farmers increase production and marketing (Managanta et al., 2019; Abbas et al., 2009). This research emphasizes the urgency of government involvement in increasing the role of extension from the village level to the central level, especially for cocoa commodities. This aims to ensure that the extension is optimal for cocoa farmers. Extension is an important step to increase the competence of farmers as main actors, including in terms of knowledge, attitudes, and skills. Increasing this competency is needed so that farmers can be more economically independent, improve the welfare of farmers and their families, and realize the sustainability of farming without ignoring environmental aspects. The role of the extension agent is measured as a communicator, facilitator, educator, dynamist, advisor, motivator, and organizer. Increasing support from extension institutions and infrastructure, including the availability of farmer cards and trust in extension workers, is considered important. Therefore, research is needed to identify the factors that influence increasing the competence of cocoa farmers in Poso Regency, Central Sulawesi Province, Indonesia.

METHOD

This research was conducted in cocoa commodity centers, namely Pantangolemba Village and Tangkura, Poso Regency. The research location was chosen deliberately (purposively) because the two villages are centers for the development of cocoa commodities. The research was conducted from 2023 to April 2024. The sampling method was purposive sampling, where respondents were selected based on certain criteria who were part of the cocoa farmer population (Singarimbun & Effendi, 2008; Sugiyono, 2017). The number of samples in this study was determined using Partial Least Square (PLS) analysis, with a minimum of five times the number of research indicators. The number of samples in this study was set at 103 respondents. The minimum sample used in Partial Least Square (PLS) analysis is based on 5 to 10 times the number of parameters available in the model or the number of manifest variables (indicators) of all latent variables (Chin, 2014; Kusnendi, 2008) (Figure 1).

Data was obtained through filling out questionnaires and direct interviews using a question guide that had been tested first on 30 cocoa farmers in Padalembara Village. This question has good validity and reliability values. Apart from that, the research also carried out Focus Group Discussions (FGD) and observations of the activities of farmers and extension workers. Likewise, data is obtained from related services and agencies, such as the Central Statistics Agency, the Agricultural Extension Center, and village offices. The measurement results from ordinal scale data are converted into an interval or ratio scale, namely a value of 0-100, then a transformation process is carried out so that it is suitable to be tested using parametric

statistics (Managanta, 2018; Sumardjo, 1999). Data were analyzed using descriptive statistics and Structural Equation Modeling (SEM) via Partial Least Square (PLS) using the Smart-PLS program. PLS is a technique that is capable of analyzing latent variables, indicator variables, and measurement errors directly (Wiyono, 2011).

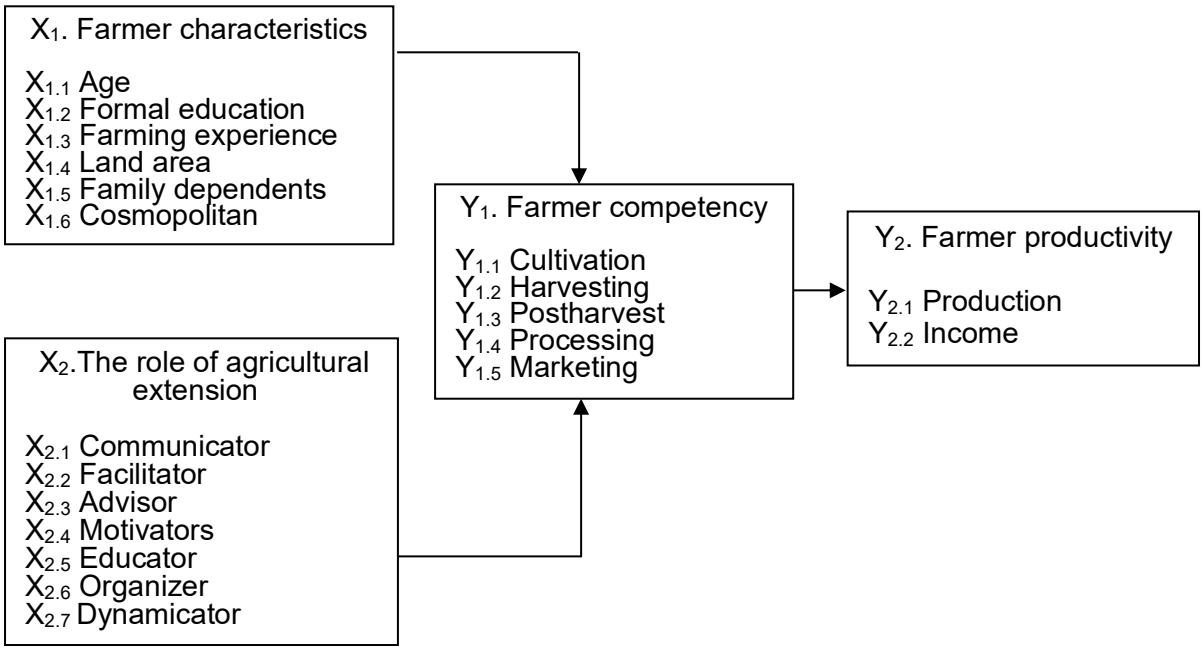

Figure 1. Research variable framework for factors that influence increasing the competence and productivity of cocoa farmers

RESULTS AND DISCUSSION

Characteristics of farmers

Characteristics are traits or characteristics possessed by farmers, which can be observed through their mindset, attitudes, and actions towards the environment. Farmer characteristics include several factors inherent in a farmer (Mandang et al., 2020; Parniati et al., 2022; Managanta et al., 2022). Knowing the characteristics of farmers is important in research to obtain an overview of the conditions and backgrounds of farmers in the research area (Kurniati, 2015). The characteristics of farmers referred to in this study include age, formal education, farming experience, land area, number of family dependents, and cosmopolitanism. The results showed that the average age of cocoa farmers was 47 years, which is included in the middle age category. This age shows that farmers are at a productive age, which can provide high motivation and enthusiasm in running their farming businesses (Setiyowati et al., 2022a). Age at work affects the success of the work. As age increases, farming activities become more limited, while younger ages tend to have stronger physical abilities (Prasetya & Putro., 2019). According to Havighurst (1974), adolescence is under 18

years, early adulthood is between 18-30 years, middle age is between 31-50 years, and old age is over 50 years. Lestari et al. (2022), Parniati et al. (2022), and Ahmad et al. (2024) age is related to the level of productivity in carrying out a job or farming business carried out by farmers.

Education is the level achieved in school and reflects the level of capacity and understanding of farmers regarding various things, including increasing knowledge, skills, and attitudes (Manyamsari & Mujiburrahmad, 2014). Research shows that the average education level of farmers is equivalent to class 1 of high school (10 years). Low levels of education can impact farmers' ability to receive, understand, and apply technical information in cocoa farming. Formal education also plays a role in farmers' capacity to access new knowledge and actively participate in agricultural extension activities. Experience is based on the length of time farmers have been involved in agricultural activities since the beginning. This experience is one way for someone to gain knowledge in an unspecified period (Simamora & Luik, 2019). Farming experience is measured based on how many years respondents have worked as farmers (Riana et al., 2015) and is categorized into new, moderate, long, and very long. Research shows that the average farmer's experience in running a cocoa farming business is in the moderate category, which is 23 years. This experience explains that farmers have been involved in cocoa cultivation for quite a long time, which allows farmers to develop knowledge and skills related to cocoa commodities. Farmers in Poso Regency have similar backgrounds, and the cultivation technique processes used tend not to be much different. Similarities in experience result in a homogeneous approach to cocoa plantation management, which has an impact on the uniformity of production results and the efficiency of cocoa farming as a whole.

Land area is an important factor in the development of agricultural businesses, especially for commodities such as cocoa. Land area not only determines production capacity but also influences business management decisions implemented by farmers. The area of agricultural land is expressed in hectares (Mandang et al., 2020). The results of the study showed that the average area of farmer land is in the narrow category of 1 hectare. Land can affect the improvement of farmer welfare and the sustainability of cocoa farming businesses. According to Hernalius et al. (2018), farmers with larger land can more easily implement innovation compared to farmers with small land because of the use of more effective production units. The number of family dependents is the number of farmers' dependents to meet all household needs. The number of family dependents is always related to the expenditure pattern of a household, this can be seen in everyday life, where if the number of family members increases, expenses also increase (Robain, 2019). Research shows that the average number of dependents is in the low category, which is 3 people. The similarity in the number of family

dependents can identify socio-economic factors that influence cocoa farmer families. A low number of family dependents can reduce the economic burden, this is also a challenge if farmers need more labor from family members to help with cocoa farming activities. Farmers' ability is needed to balance the economic needs of the family with the needs of the cocoa farming business.

Cosmopolitanism is an open attitude of someone who has a broad view of the outside world. The level of knowledge and openness to various information from outside oneself is calculated from the frequency of traveling outside the region, and contact with other individuals or agencies. Cosmopolitanism is characterized by the frequency and distance of travel, and the use of mass media (Managanta, 2018). The results of the study showed that the average cosmopolitanism of farmers was in the low category, with an average of 3 times a year. The results of the interview showed that cocoa farmers in the Poso Regency tended to seek information from fellow farmers in their environment. The low level of cosmopolitanism, or openness to information outside the village, indicates that farmers are more confident in gaining knowledge and experience from local sources that are close and known. The results of the study by Setiyowati et al. (2022b), farmers rely more on farmer groups and extension visits as the main sources of farming information. Limitations in seeking information from outside the village can be an obstacle to innovation and adoption of technology that may be more efficient and profitable. Therefore, the involvement of agricultural extension workers as facilitators and as a source of information for farmers is necessary.

The role of agricultural extension workers

The role of extension workers is measured based on their ability to carry out their duties as communicators, facilitators, advisors, motivators, educators, organizers, and dynamicator. These roles play a very important role in determining the effectiveness of extension workers in helping farmers improve their knowledge, attitudes, and skills, especially in cocoa farming (Managanta et al., 2019a). The role of extension workers as communicators plays an important role in agricultural extension, especially in providing information that is easy for farmers to understand. The success of extension workers not only depend on the knowledge possessed by the extension workers but also on the ability to communicate information that suits the needs of farmers. The results of the study showed that the role of extension workers as communicators was in the moderate category, with an average score of 67. On average, extension workers visited and discussed with farmers once a month and were located in the garden or at the house of the head of the farmer group. This shows that extension workers tend to have carried out their role in conveying information. The good performance of extension workers in communicating with farmers will have an impact on changes in farmer behavior in developing their businesses. Furthermore, extension workers are still more

focused on delivering technical information rather than engaging in two ways dialogue that encourages farmers to share their experiences, constraints, and local knowledge. This one way tendency limits the potential for participatory learning and farmer empowerment (Bahua & Musa, 2017; Marbun et al., 2019). Based on an interview with Y (40 years old), the extension worker, as a communicator, conveys information about the cocoa cultivation process, especially about cocoa plant rejuvenation and pest and disease control procedures. The problem of the high spread of pests and diseases, as well as the lack of control efforts, can have an impact on decreasing cocoa production results (Robiyan et al., 2014). Extension workers as facilitators can be demonstrated through their ability to assist farmers in improving business partnerships, access to capital, and markets, and find solutions to problems faced by farmers. Research shows that the role of extension workers as facilitators is in the moderate category, with an average value of 53. In this case, the cooperation between extension workers and farmers in facilitating farmers' needs is considered quite good.

The role of facilitators carried out by extension workers can help farmers gain access to various farmer needs. According to research by Halimah & Subari (2020), the role of extension workers as facilitators is also considered moderate, because extension workers only provide facilities without providing farmers with an understanding of the importance of utilizing these facilities. Therefore, the role of extension workers as facilitators in Poso Regency still needs to be improved. As facilitators, extension workers are not limited to providing access to resources such as capital, markets, and technology, but also assist farmers in building business partnerships, such as with financial institutions, government, and industry, to strengthen farmers' bargaining position in the market.

Extension workers act as advisors in providing advice on solving problems faced by farmers. The role of extension workers as advisors is categorized as moderate, with an average of 61, indicating that extension workers are quite capable of providing useful advice related to farmer problems. In addition, extension workers also acted as facilitators in connecting farmers with external resources, such as providing information about government programs for cocoa rejuvenation and recommending farmer participation in training. Based on an interview with M.B. (54 years old), the main problem that was quite successfully solved by extension workers was related to cocoa pests and diseases. This is important because learning that is delivered directly can improve farmers competence in overcoming problems faced by farmers. The role of extension workers as motivators is a task that aims to provide enthusiasm to farmers to cultivate cocoa as the main commodity for farmers. The role of extension workers as motivators is categorized as high, with an average score of 76. The high role of extension workers as motivators indicates that extension workers have succeeded in carrying out their duties well, motivating farmers to be active in farmer group activities (Faqih, 2014; Warsana

et al., 2024). Cooperation in farmer groups allows farmers to share experiences and resources to increase cocoa production. Training organized by extension workers, such as grafting techniques and pest and disease control, provides knowledge and skills that can be applied directly by farmers. This not only improves technical skills but also farmers' confidence in managing cocoa land. As educators, extension workers play an important role in improving and strengthening farmer competencies to increase cocoa productivity.

The role of extension workers as educators is in the moderate category, with an average of 69. The role of extension workers as educators can contribute to increasing farmers knowledge regarding fertilization and controlling cocoa pests and diseases. Extension workers as educators are tasked with improving farmers' skills regarding new ideas. In this case, extension workers must be able to educate farmers, educate them, and be able to overcome problems faced by farmers. Extension workers play a role in educating farmers so that their behavior, attitudes, and abilities can be improved. Farmers who have better abilities will directly increase their income (Arifianto et al., 2018; Zulhak et al., 2020). Extension workers as organizers play a role in assisting farmers in coordinating and optimizing farming activities at the farmer group level. With this role, extension workers act as drivers in ensuring that farming activities run effectively and in a coordinated manner. Extension workers as organizers are in the high category with an average of 79. The high score obtained indicates that extension workers are quite successful in assisting and collaborating with farmers in efforts to increase cocoa productivity. Extension workers increase the role of farmer groups, foster groups, and facilitate regular meetings, as well as motivate participatory planning and implementation of group activities. Research by Managanta et al. (2019), states that there are shortcomings in the role of extension workers as organizers, especially in efforts to increase the effectiveness of farmer groups. This shows that even though extension workers have assisted, there are still challenges in ensuring that cocoa farmer groups function optimally in increasing farmer competence.

The role of extension workers as a dynamist is the ability of extension workers to improve the application of agricultural innovations to farmers. This role is categorized as moderate with an average of 68. Extension workers act as dynamists through the application of technology, working with farmers to access new technology and encouraging farmers to use the internet to find information about cocoa. Based on interviews, farmers face difficulties in accessing the internet because not all farmers have Android phones and limited data credit. This difficulty has an impact on farmers' access to agricultural information, cocoa training resources, and cooperation networks such as collaborative projects between the government, the private sector, and cocoa farmers. By strengthening the role of extension workers as dynamists, it is easier to access the information and technology needed to improve yields and welfare. Cocoa

farmers are better prepared to face the challenges of cocoa farming in the future and contribute to the cocoa industry in the Poso Regency.

Competence of cocoa farmers

The competence of a farmer in the agricultural sector shows the behavior of farmers to plan activities to achieve predetermined goals, so competence is closely related to the character possessed by a person (Managanta et al., 2019; Manyamsari & Mujiburrahmad, 2014). The competence of cocoa farmers in terms of cultivation is in the medium category, with an average of 69. Farmer competence in this study was categorized based on very low, low, medium, and high. The cultivation referred to in the study is the ability of farmers in farming, cocoa maintenance, pruning, fertilization, and pest and disease control. The results of the interview showed that farmers had difficulty in obtaining fertilizer, and at the time of fertilization, the fertilizer needed was not available, the price was expensive, and the capital available was limited. Farmers understand the importance of fertilization and possess the knowledge, attitudes, and skills regarding proper timing and dosage. Limited access to fertilizer prevents farmers from optimally implementing fertilization competencies. This can have a direct impact on cocoa productivity, including a decrease in the quality of the harvest. Fertilization is carried out to meet nutrient requirements and increase soil fertility, thereby increasing production, but is limited by high prices and scarcity (Desiana et al., 2013; Risnah et al., 2013).

Harvesting is the ability of farmers to pick fruit and handle the harvest. Farmers' ability in terms of harvesting is in the moderate category, with an average score of 51. Harvesting is carried out by farmers to produce dry cocoa beans. The harvesting process is carried out using a sickle tied to bamboo. According to the research results of Managanta et al. (2019), farmers still use sickles or machetes to harvest fruit at the top of the tree. Suboptimal harvesting techniques can cause damage to the fruit or even cocoa beans, which has an impact on the quality of dry cocoa beans. Training in harvesting techniques is needed with techniques and tools that meet standards, farmers can minimize losses during the harvesting process, and ensure that the cocoa produced meets the standards and quality required by the market. Post-harvest is an important stage in the cocoa production chain that has a direct impact on the final quality of the cocoa beans sold. Post-harvest is a series of activities carried out by farmers from the time the cocoa is harvested to the production of dry cocoa beans. The results of the study showed that the competence of cocoa farming in terms of cocoa post-harvest is in the low category, with an average score of 49. This shows that post-harvest handling by farmers is still not optimal, especially in the fermentation process, which has not been fully carried out. Based on the results of the interview, farmers said that the unpredictable weather caused the drying or drying process of cocoa beans to be less than optimal. Drying that relies on sunlight has many disadvantages, such as dependence on weather conditions, the need for a large

drying area, the risk of dust and dirt contamination, and a large number of scattered dry products (Wisnumurti et al., 2023).

Processing is an activity carried out by farmers to produce ready-to-eat products, such as chocolate, cocoa powder, or cocoa butter. Research shows that farmers' processing ability is in the low category, with an average of 42. The low ability of farmers in processing indicates that the dry cocoa beans produced are only sold in raw form without being processed into ready-to-eat products. No different from the research by Managanta et al. (2019), the low utilization of dry cocoa beans in ready-to-eat products. At the research location, it was found that dry cocoa beans were generally not processed into ready-to-eat products and were limited to the fermentation process of wet cocoa beans. This situation is no different from the results of the study (Ginting et al., 2021). Marketing is an activity carried out by farmers to market their crops to maintain sustainability and improve the welfare of farmer families. Research shows that farmers' competence in marketing is classified as moderate, with an average score of 55. Based on an interview with farmer D.A. (45 years old), marketing is carried out in the form of dry cocoa beans. Before selling their crops, farmers usually look for price information from other farmers. One of the challenges faced by farmers in marketing their crops is the frequent price changes. The role of farmer groups plays an important role in providing market information to farmers. With farmer groups, farmers can share knowledge, experiences, and guidance on the quality of cocoa beans and obtain prices online more easily (Basyir & Jannah, 2017; Wisriani et al., 2021).

Factors influencing the competence and productivity of cocoa farmers

The application of Smart-PLS in the analysis serves to identify the relationship among various factors that affect the competence and productivity of cocoa farmers. Smart-PLS is an appropriate statistical method for analyzing complex models with numerous variables, particularly when dealing with relatively small sample sizes (Figure 2). According to Ghozali (2011) and Chin (2014), evaluating the measurement model (outer model), which includes convergent validity, discriminant validity, and composite reliability, is a crucial step in ensuring that the model is both reliable and valid.

The outer loading value functions as a primary indicator for assessing the strength of each indicator, where higher outer loading values suggest that an indicator significantly contributes to the formation of its corresponding construct. An outer loading is considered high when the value exceeds 0.7, while values ranging from 0.5 to 0.6 are deemed acceptable (Table 1). Through understanding this model, more effective strategies can be developed to sustainably enhance the competence and productivity of cocoa farmers.

The outcomes of the outer model testing represent a crucial phase in SEM analysis using the PLS method, where indicators' validity and reliability are assessed in measuring the construct variables (Chin, 2014; Ghozali, 2011). The results show that the indicators in the study are valid, meaning they have represented the characteristics being measured. The path coefficient value in the structural equation model shows the strength and direction of the relationship between the latent variables studied. Figure 2 explains how variables such as farmer characteristics, the role of extension workers, farmer competence, and farmer productivity are interrelated in the model. How these factors interact and influence each other, and can be used to develop more effective strategies for increasing cocoa farmer productivity.

Table 1. Results of testing the outer model of factors influencing the competence and productivity of cocoa farmers

Construct	Indicator	Outer Loading
Farmer Characteristics	Age	0.869
	Formal education	0.474
	Farming experience	0.790
	Land area	0.570
	Family dependents	0.633
	Cosmopolitan	0.797
Role of Extension Worker	Communicator	0.883
	Facilitator	0.772
	Advisor	0.504
	Motivator	0.678
	Educator	0.845
	Organizer	0.789
	Dynamicator	0.712
Farmer Competence	Cultivation	0.827
	Harvesting	0.892
	Post-harvest	0.789
	Processing	0.565
	Marketing	0.577
Farmer Productivity	Production	0.980
	Income	0.970

Source: data processed, 2025

Table 2. Structural path coefficients between variables

Relationship Between Variables	Path coefficient	Standard deviation	T-statistic	P-value
Characteristics of farmers --> farmer competence	0.294	0.082	2.156	0.043
Role of extension workers --> farmer competence	0.568	0.045	5.458	0.000
Farmer competence --> farmer productivity	0.159	0.067	4.716	0.000

Source: data processed, 2025

The equation model that describes the relationship between exogenous variables (influencing factors) and endogenous variables (influenced results) is as follows: $Y_1=0.294X_1+0.568X_2$ (Table 2).

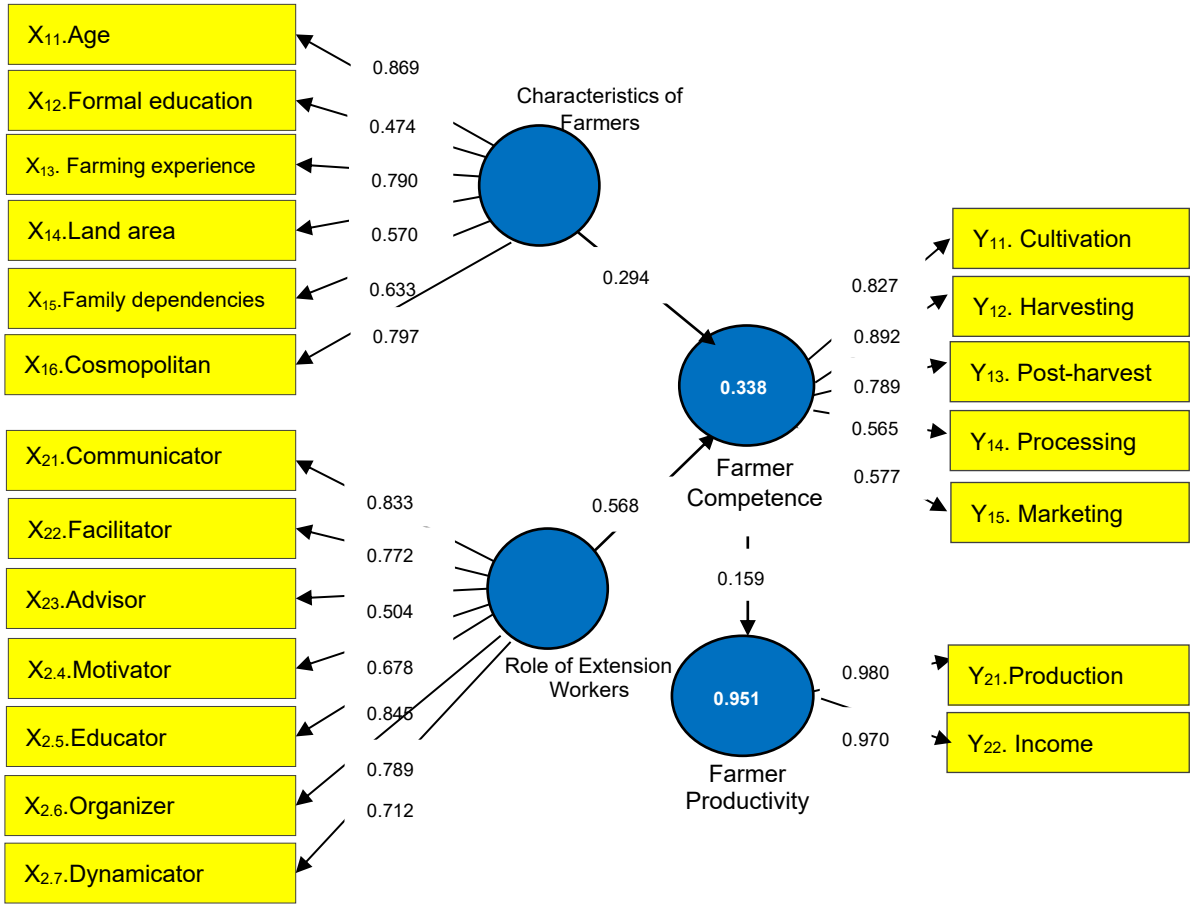

Figure 2. Factors influencing the increase in competence and productivity of cocoa farmers

The results of the Smart-PLS analysis showed that farmer characteristic factors (X_1), namely age, farming experience, cosmopolitanism, family dependents, land area, and formal education, have a positive influence on cocoa farmer competence. This means that the higher or better the characteristics of cocoa farmers, the potential to increase farmer competence. Arita et al. (2022), Managanta et al. (2019b), and Managanta (2020b) stated that farmer characteristics are important in determining changes in farming businesses. Farmers who have good characteristics in developing their businesses can easily solve problems. In addition, the role of extension workers (X_2) has also been shown to have a positive influence on cocoa farmer competence (Y_1). The role of extension workers play an important role in improving farmers' abilities. Effective extension workers can provide information, training, and support that helps farmers develop knowledge, attitudes, and skills. The model explains that to improve the competence of cocoa farmers, not only are farmer characteristic factors needed, but also the support of the role of extension workers. The combination of these two

factors can provide a synergistic effect in improving farmer competence. Managanta et al. (2019a), Bakari et al. (2021), and Managanta et al. (2022a), the role of extension workers plays an important role in the success of farmers in managing cocoa plantations. Extension workers provide education to farmers to improve farmer competence, so that farmers are finally able to become more independent in managing their farming businesses.

The results of the Smart-PLS analysis show that farmer competence (Y_1) has a positive effect on cocoa farmer productivity (Y_2). Where the equation model is as follows $Y_2=0.159Y_1$, the results confirm that farmer competence, both knowledge, attitudes, and skills, affects farmers' ability to increase farmer productivity. This competence also has a direct impact on the effectiveness of work on the farm and the right decision-making related to the cultivation, harvesting, and post-harvest processes, as well as processing and marketing. A higher level of competence allows farmers to be more adaptive to changes in the environment and market so that farmers can maximize the productivity of cocoa farming businesses. Managanta et al. (2019), Iskandar et al. (2021), and Managanta et al. (2022a), competence is part of the individual farmer that cannot be separated from the results of effective work in farming. Competence is needed to increase the productivity and sustainability of farming businesses. Farmer competence tends to be low (Table 2), and this low level of competence can affect farmers' ability to manage cocoa farming businesses, which ultimately reduces cocoa farmers' production and income. The results of the study showed that the average cocoa production in Poso Regency is still low, with only 265 kg of dry beans, far below the potential cocoa production, which can reach 2 tons of dry beans. The level of farmer income, amounting to IDR 458,000, is still lower than the Poso Regency Minimum Wage, which reaches IDR 2,772,644. In-depth interviews with farmers revealed that there are limitations in access to fertilizer, limited capital, and high pest and disease attacks.

CONCLUSION

Factors such as farmer characteristics and the role of extension workers significant impact on improving farmer competency. Extension workers can improve farmer competency can improve farmer competency based on the specific needs of cocoa farmers. This increase in competency has a direct impact on increasing farmer production and income. Farmers with higher competency will be able to optimize the use of agricultural inputs, such as the use of fertilizers and pesticides, and be more effective in various processes, such as cultivation, harvesting, post-harvest, processing, and marketing. Conversely, when farmer competency is low, the ability of farmers to run cocoa farming also decreases, which results in lower production and decreased income. Therefore, increasing farmer competency through targeted extension that is on farmer characteristics is the key to the success of cocoa farming. A holistic approach to agricultural extension, which not only focuses on technology transfer but also on

developing competency and improving the quality of farmers, is very important. Thus, efforts to improve farmer competency will have a significant impact on increasing farmer production and income.

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