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Implementation of Budget Effectiveness Regarding Extension Workers' Competence in The Execution of Agricultural Development Programs in West Java Province, Indonesia

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Abstract: This study aims to analyze the implementation of agricultural development policies and the effectiveness of agricultural development budgets in relation to the competence of agricultural extension workers in West Java Province. The study is motivated by a persistent gap between formulated policies and their field implementation, as well as the suboptimal development of extension workers' competence. An explanatory sequential approach was employed to gain a comprehensive, valid, and objective understanding. Data collection techniques included surveys, interviews, observations, and document analysis. Measurement results and hypothesis testing indicate that the implementation of agricultural development policies has a positive and significant impact on the competence of agricultural extension workers. Similarly, the effectiveness of agricultural development budgets has a positive and significant impact on the competence of agricultural extension workers. Both the implementation of agricultural development policies and the effectiveness of agricultural development budgets positively and significantly influence the competence of agricultural extension workers. The findings reveal that the success of agricultural development in West Java is determined not only by the extent of government policy and budgetary support but also by the effectiveness of agricultural extension workers in disseminating information, providing guidance and program supervision, and empowering farmers.

Keywords: Implementation of agricultural development policies, Effectiveness of agricultural development budgets, Competency of agricultural extension workers

INTRODUCTION

Agricultural development plays a strategic role in achieving food security, alleviating poverty, and fostering inclusive economic growth in Indonesia. As a nation with an agrarian structure where the majority of the population relies on the agricultural sector for their livelihoods, the transformation of agriculture serves as a key pillar in driving the real economy

and building national economic self-reliance—a process supported by an agricultural land area of 36,817,086 hectares.

Despite the vastness of the agricultural sector, progress has not kept pace; the sector continues to face complex challenges, such as low productivity, limited farmer access to technological innovations, financing, and markets, as well as the limited capacity of farmers—the primary drivers of development in this sector—regarding human resources (Syahyuti, 2014; BPS, 2023).

In terms of economic development theory, Todaro and Smith (2015) state that economic growth is determined not only by physical capital accumulation but also relies heavily on improving the quality of human resources. From an agricultural development perspective, Mosher (1966) emphasizes that agricultural development requires two key forces: the provision of modern agricultural technology and the presence of extension agents capable of educating farmers to adopt that technology effectively. Consequently, the success of agricultural development is closely linked to the availability of modern information systems—such as social media—and the presence and capacity of agricultural extension agents acting as agents of change for farmers.

Agricultural extension is not merely an activity for conveying technical information; rather, it is a process of non-formal education aimed at enhancing farmers' knowledge, skills, and attitudes, thereby enabling them to solve problems and develop their businesses independently (Van den Ban & Hawkins, 1996). According to Röling (1988), an effective extension system functions as an information and learning system that fosters interaction among technology, institutions, and agricultural development stakeholders. Agricultural extension workers serve as the central link in this system, acting as a bridge between research findings and the realities of farmers' lives.

In Indonesia, the functions and roles of agricultural extension workers are regulated by Law Number 16 of 2006 concerning the Agricultural, Fishery, and Forestry Extension System. This law affirms that extension workers are responsible for facilitating the learning process for farmers to enhance their capacity, productivity, and self-reliance. Consequently, extension workers are key actors in ensuring the success of agricultural development programs, ranging from technology dissemination to the implementation of government assistance policies.

Beyond the issue of quantity, quality is also a matter of serious concern, particularly regarding technical competence, communication skills, and capabilities in management and community empowerment. Competence—or individual capability—is a fundamental factor in fulfilling the role of agricultural extension workers. Generally, this competence encompasses technical aspects (knowledge), managerial skills, experience, and education. Competence is a key determinant of performance—alongside motivation and independence (Sapar et al., 2018)—and is an integral component of an agricultural extension worker's performance (Chandhana et al., 2022).

Article 21 of Law No. 16 of 2006 concerning the Agricultural, Fishery, and Forestry Extension System mandates that central and regional governments enhance the competence of extension workers through education and training; however, opportunities for human resource development via such means remain limited. Furthermore, Article 70, paragraph (2) of Law No. 5 of 2014 concerning the State Civil Apparatus (ASN) stipulates that ASN competence development is to be carried out through education, training, seminars, courses, and advanced training programs. This is reinforced by Presidential Regulation No. 35 of 2022 concerning the Strengthening of Agricultural Extension Functions; Article 14 thereof outlines the roles of central and regional governments in enhancing the competence of agricultural extension workers.

Wibowo and Haryanto (2020) identify extension worker characteristics—specifically the number of agricultural training sessions attended—as factors influencing performance.

Similarly, Okwoche et al. (2021) state that training has a significant positive impact on the performance of agricultural extension workers. Saleh et al. (2018) add that research indicates a need for training across various areas of the agricultural sector. Extensive training programs enable extension workers to operate efficiently and effectively (Al-Zahrani et al., 2020). Finally, Sapar et al. (2018) affirm that extension worker competence is a key factor influencing the performance of agricultural extension workers. Regular professional and technical training, along with the hiring of more extension agents, will enhance the capacity and efficiency of extension service delivery (Al-Zahrani et al., 2020).

In the context of West Java Province—a region that contributes significantly to national food production and includes cities serving as satellite areas for the capital, Jakarta—the challenges facing agricultural development are diverse. Issues ranging from urbanization, land-use conversion, and land ownership fragmentation to environmental degradation require responses through adaptive and inclusive development strategies. Amidst this complexity, the role of agricultural extension workers is crucial, particularly in guiding farmers toward more modern and sustainable agribusiness systems. Unfortunately, program implementation in the region faces obstacles, including low budget utilization effectiveness, limited farmer group capacity, and a lack of monitoring regarding program impact.

This was highlighted by Ir. Entang Sastraatmadja—Chair of the Expert Council for the West Java chapter of the Indonesian Farmers Association (HKTI) and a member of the Agriculture and Rural Development Expert Council Forum of the Sunda Deliberative Assembly (MMS)—who noted that the area of rice fields in West Java is shrinking; the total area dropped from 936,529 hectares in 2014 to 898,711 hectares in 2018 (MajmusSunda News, July 10, 2025). Echoing Entang Sastraatmadja's observations, research by Aulia et al. (2024) indicates that, based on data from 2017 to 2021, rice field acreage decreased from 1,332 hectares to 1,276 hectares, with an average annual conversion rate of -4.32%. The most significant land conversion occurred in 2019, when 16 hectares of rice fields were transformed into residential areas.

Various studies underscore the importance of agricultural extension in enhancing farmers' well-being. Syam et al. (2019) state that agricultural extension agents play a crucial role in guiding farmers to improve their skills; this guidance is expected to foster high rates of agricultural technology adoption, thereby boosting production yields and improving the welfare of farmers and their families. Meanwhile, Swanson and Rajalahti (2010) emphasize that effective extension services are those integrated with research systems, policies, and farming stakeholders. This implies that the success of extension services depends not only on the technical competence of the agents but also on institutional design, farmer participation, and adequate policy support. Agricultural extension systems need to encourage farmers' active participation in the planning, implementation, and monitoring of extension programs. To achieve this level of participation, extension organizations need to formally adopt decentralization and pluralism—shifting control over specific program planning and management functions to local extension systems, private sector entities, farmer organizations, and educational institutions where the programs are actually carried out (Jadallah et al., 2021).

Human Capital Theory, developed by Becker (cited in Irawan et al., 2021): This theory posits that investment in employee development—such as education and training—is equivalent to investment in physical capital. Consequently, enhancing an individual's skills and knowledge increases both their productivity and their economic value to the organization.

Motivation Theory, developed by Maslow (cited in Irawan et al., 2021): This theory encompasses various approaches to understanding the factors that drive individual behavior toward achieving specific goals. A prominent example is Abraham Maslow's Hierarchy of Needs, which asserts that individuals must satisfy basic needs before they can progress to higher-level needs.

Adult Learning Theory (Andragogy), developed by Knowles (cited in Irawan et al., 2021): This theory represents an approach to adult education that focuses on the unique characteristics of adult learners, such as distinct motivations, richer life experiences, and a goal-oriented mindset. Andragogy emphasizes experience-based learning, direct relevance to real life, and active participation in the learning process.

Competency Theory, developed by Boyatzis (cited in Irawan et al., 2021): This theory highlights the importance of developing specific skills and knowledge to achieve desired outcomes in particular jobs. It encompasses the identification, development, and assessment of competencies required for various roles within an organization.

Research by Sapar (2014) indicates that the performance of agricultural extension workers has a positive and significant influence on farmers' competence. Similarly, a study by Pranata (2023) identified the role of agricultural extension workers in enhancing farmers' competence to improve Arabica coffee quality in Kerinci Regency. Kusumaningrum (2023) found that the role of the extension worker as an advisor enhances the competence of wetland rice farmers regarding cultivation aspects; conversely, their roles as motivators, dynamic agents, communicators, and facilitators show a highly significant negative relationship with farmers' competence in cultivation and harvesting. Research by Hapsari (2023) demonstrates that the extension communication process can be analyzed through Harold Lasswell's five communication elements: the communicator (agricultural extension workers and other parties conveying the message); the extension message (information tailored to group members' needs); the communication medium or channel (interpersonal communication); and the communication effect, which was rated positively by members of KWT Lestari. The impact of extension activities on the competence of KWT Lestari members was assessed across cognitive, affective, and psychomotor dimensions. Agricultural extension activities at KWT Lestari were found to have a positive impact on enhancing the competence of the group's members.

METHOD

The explanatory sequential design is a data collection method that begins with quantitative data collection, followed by qualitative data collection to help analyze the quantitative findings; consequently, research results using this design serve to explain a general overview (generalization). The exploratory sequential design involves data collection that starts with qualitative data and is followed by quantitative data collection. The purpose of collecting qualitative data in the first stage is to explore the existing phenomenon, while the second stage involves quantitative data collection to explain the relationships between variables identified in the qualitative data. Sugiyono (2021) states that the explanatory sequential approach combines quantitative and qualitative methods for use within a single study, resulting in data that is more comprehensive, valid, reliable, and objective: collection and analysis of quantitative data in the first stage, followed by a second stage involving qualitative data to deepen understanding of or explain the quantitative results

This study draws its population from agricultural extension workers in the West Java province, comprising 4,699 individuals. In this study, a sample of 98 respondents was drawn from the extension workers. Respondents are research subjects who serve as the primary source of data—specifically, individuals asked to provide information, opinions, or responses regarding research instruments (such as questionnaires, interviews, or observations). The respondents for this study consist of extension workers and farmers located in the province of West Java.

This study employs a probability sampling method using the simple random sampling technique. According to Sugiyono (2021), probability sampling is a sampling technique that

provides an equal chance for every element (member) of the population to be selected as a sample member. Data analysis employed descriptive analysis and regression.

RESULTS AND DISCUSSION

1. Agricultural Development Policy Implementation Variable (X1)

Data processing using SPSS yielded the total score calculations for respondents' responses regarding Agricultural Development Policy Implementation (X1), based on the indicators presented in Table 1, below.

Table 1. Total Indicator Scores Based on Statements for the Agricultural Development Policy Implementation Variable (X1)

No	Indicator	SA	A	SD	D	DSD	Total
1	Communication	710	872	66	-		1.648
2	Resources	690	900	84	2		1.676
3	Disposition	650	920	90	4		1.664
4	Bureaucratic structure	620	956	81	4		1.661
Total		2.670	3.648	321	10		6.649

Table 1, can be explained as follows regarding the Agricultural Development Policy Implementation variable (X1): the response trends show a total score of 3,648 for "Agree," 2,670 for "Strongly Agree," 321 for "Somewhat Disagree," 10 for "Disagree," and 0 for "Strongly Disagree." It is concluded that, based on total scores, the dominant response trend for this variable is "Agree" (3,648), while the lowest trends are "Disagree" and "Strongly Disagree" (both with a score of 0).

2. Agricultural Development Budget Effectiveness Variable (X2)

The results of data processing using SPSS obtained a calculation of the total score of answers to respondents' statements regarding the Effectiveness of the Agricultural Development Budget (X2) based on the indicators in Table 2, as follows:

Table 2. Total Indicator Scores Based on Statements for the Agricultural Development Budget Effectiveness Variable (X2)

No	Indicator	SA	A	SD	D	DSD	Total
1	Sound policies	560	932	138	2	-	1.632
2	Thorough planning	465	1.004	144	-	-	1.613
3	Precise program formulation	490	984	141	2	-	1.617
4	Availability of work facilities and infrastructure	440	968	171	8	1	1.588
5	Effective and efficient implementation	505	968	141	4	-	1.618
6	Educational supervision and control systems	560	980	102	2	-	1.644
Total		3.020	5.836	837	18	1	9.712

Table 2, indicates the following regarding the Agricultural Development Budget Effectiveness variable (X2): the response trend shows that the "Agree" category received the highest total score (5,836), followed by "Strongly Agree" (3,020), "Somewhat Disagree" (837), "Disagree" (18), and "Strongly Disagree" (1). It is concluded that, based on the total scores, the prevailing trend in respondent answers regarding the Agricultural Development Budget

Effectiveness variable is "Agree" (total score of 5,836), while the least frequent response is "Strongly Disagree" (total score of 1).

3. Agricultural Extension Worker Competence Variable (Y)

Data processing using SPSS yielded the total score calculations for respondents' responses regarding Agricultural Extension Worker Competence (Y), based on the indicators presented in Table 3, below.

Table 3. Total Indicator Scores Based on Statements for the Agricultural Extension Worker Competence Variable (Y)

No	Indicator	SA	A	SD	D	DSD	Total
1	Knowledge	515	944	147	8	-	1.614
2	Skills	440	1.004	147	8	-	1.599
3	Traits	380	1.032	156	10	1	1.579
4	Social roles	340	984	222	8	-	1.554
5	Self-image	450	936	189	10	-	1.585
6	Motives	225	996	270	12	-	1.503
Total		2.350	5.896	1.131	56	1	9.434

Table 3, can be explained as follows regarding the Agricultural Extension Worker Competence variable (Y): the response trends show a total score of 3,628 for the "Agree" category and 2,089 for the "Strongly Agree" category, while the "Somewhat Disagree" category received a total score of 822; the "Disagree" and "Strongly Disagree" categories each received a total score of 0. It is concluded that, based on total scores, the prevailing trend in respondent answers regarding the Agricultural Extension Worker Competence variable was "Agree" (total score of 3,628), while the lowest-scoring categories were "Disagree" and "Strongly Disagree" (total score of 0).

1. The Implementation of Agricultural Development Policy (X1) Influences the Competence of Agricultural Extension Workers (Y)

Table 4. Regression Equation Y = 51.366 + 0.659X1

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	51.366	7.499		6.850	.000					
Policy Implementation (X1)	.659	.110	.523	6.019	.000	.523	.523	.523	1.000	1.000

a. Dependent Variable: Extension Worker Competence (Y)

Based on Table 4, research findings regarding the Implementation of Agricultural Development Policy (X1) and the Competence of Agricultural Extension Workers (Y), the regression equation obtained is Y = 51.366 + 0.659X1. The correlation coefficient is 0.523, indicating a coefficient of determination of 27.4%. The results show a calculated t-value (6.019) greater than the t-table value (2.3658) and a significance value (0.000) less than 0.05. This indicates that the simple regression equation demonstrates a significant influence of Agricultural Development Policy Implementation (X1) on Agricultural Extension Worker Competence (Y). This implies that the implementation of agricultural development policies can enhance the competence of agricultural extension workers—who serve as implementers of agricultural development programs—in West Java Province, Indonesia. The study concludes

that the Implementation of Agricultural Development Policy has a positive and significant effect on the Competence of Agricultural Extension Workers.

This aligns with observations and interview data; informants explained that the Ministry of Agriculture (through the Center for Agricultural Training) and the West Java Provincial Agriculture Office have implemented various programs to enhance extension worker competence. These initiatives include Functional Position Competence Improvement Training, technology-based training (blended learning), Food Brigade mentoring workshops, and professional certification and financial literacy programs, as well as participation in Ministry-organized events such as Entrepreneurship Seminars.

These findings indicate that the implementation of agricultural development policies—through initiatives such as competency enhancement training for functional agricultural extension workers, technology-based training (blended learning), Food Brigade mentoring workshops, professional certification, financial literacy programs, and entrepreneurship seminars—will further boost the competence of agricultural extension workers in West Java. By emphasizing dominant indicators like resources and strengthening or improving weaker indicators like communication, the competence of these extension workers will be significantly enhanced.

This aligns with the theory cited by Dessler (in Irawan et al., 2021), which defines Human Resource Development as an organizational effort to improve employee skills and knowledge through various programs such as training, career development, and education, with the ultimate goal of enhancing both individual and organizational performance. Similarly, Gauzali (in Kadarisman, 2013) explains that human resource development is an essential organizational activity designed to ensure that employees' knowledge, abilities, and skills align with the demands of their work.

A high level of competence among extension workers will positively impact agricultural development in West Java. Agricultural extension workers play multifaceted roles—acting as educators, farmer mentors, motivators, facilitators, agents of change, information liaisons, and developers of farmer institutions. Through these roles, they provide farmers with knowledge regarding cultivation techniques, fertilizer application, pest and disease control, and the use of modern agricultural machinery, all of which serve to increase production yields.

2. There is an effect of Agricultural Development Budget Effectiveness (X2) on Agricultural Extension Worker Competence (Y)

Table 5. Regression Equation Y = 48.401 + 0.483X2

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1 (Constant)	48.401	8.414		5.753	.000					
Budget Effectiveness (X2)	.483	.085	.504	5.714	.000	.504	.504	.504	1.000	1.000

a. Dependent Variable: Extension Worker Competence (Y)

Based on Table 5, research findings regarding the relationship between Agricultural Development Budget Effectiveness (X2) and Agricultural Extension Worker Competence (Y) yielded a regression equation of Y = 48,401 + 0.483X2. A correlation coefficient of 0.504 was obtained, indicating a coefficient of determination of 24.6%. The results show that the calculated t-value (5.714) is greater than the t-table value (2.3658) and the significance value (0.000) is less than 0.05. This indicates that the simple regression equation demonstrates a

significant influence of Agricultural Development Budget Effectiveness (X2) on Agricultural Extension Worker Competence (Y). This implies that the effectiveness of the agricultural development budget can enhance the competence of agricultural extension workers—who serve as implementers of agricultural development programs—in West Java Province, Indonesia.

This aligns with observations and interview data; informants explained that the agricultural development budget is allocated for extension worker operations and honoraria, central-regional synergy programs, and technical training to improve agricultural competence. Such training includes technical and entrepreneurial guidance, as well as instruction on mastering modern agricultural machinery (such as combine harvester technology), balanced fertilization, and the utilization of digital technology. Quantitative research results and information from informants regarding the utilization of the Agricultural Development Budget indicate that the effectiveness of this budget has a positive and significant impact on the competence of agricultural extension workers.

These findings suggest that the provision and utilization of the agricultural development budget have yielded highly significant results. Data from Statistics Indonesia (BPS) for West Java Province show the following rice production figures: 9.43 million tons in 2022 (an increase from the previous year); 9.14 million tons in 2023 (a 3.07% decrease from the previous year due to weather dynamics); 8.63 million tons in 2024 (a low point representing a 5.58% decrease from the previous year due to the impact of El Niño); and 10.23 million tons in 2025 (a significant increase of 18.54% from the previous year).

Thus, the effectiveness of the agricultural development budget in West Java Province will enhance the competence of agricultural extension workers, ultimately boosting agricultural development in the region. Effectiveness can be further improved by emphasizing dominant indicators—such as educational supervision and control systems—and strengthening or rectifying weaker indicators, such as the availability of work facilities and infrastructure; this approach will elevate extension worker competence and ensure the effective allocation and utilization of the agricultural development budget.

This aligns with Barnard (cited in Suyadi, 1997), who stated, "When a specific desired end is attained we shall say that the action is effective. When the unsought consequences are unimportant or trivial, the action is efficient." According to Barnard, an activity is considered effective if its planned objectives are realized. Meanwhile, Soekarno (1986) defined effectiveness as the achievement of desired goals or results, regardless of the resources—such as labor, time, cost, mental effort, or tools—expended in the process. This implies that the concept of effectiveness focuses solely on the desired outcome or objective.

A high level of extension worker competence relies heavily on the agricultural budget provided by the Ministry of Agriculture and/or the West Java Provincial Agriculture Office. With this budget support, the West Java Agriculture Office can implement policies through various programs that positively impact the province's agricultural development—such as increasing food production, modernizing agriculture, protecting sustainable food agricultural land (LP2B), developing sustainable farming practices, strengthening human resources, and facilitating farmer regeneration. Given the available budget and the role of extension workers, farmers can gain the knowledge needed to develop modern agriculture through mechanization, digitalization, and strengthened extension systems. Modernization efforts aim to boost productivity, improve farmers' work efficiency, and enhance the competitiveness of agricultural produce.

3. *There is an influence of Agricultural Development Policy Implementation (X1) and Agricultural Development Budget Effectiveness (X2) on Agricultural Extension Worker Competence (Y).*

Table 6. Multiple Regression Equation Y = 40.690 + 0.426X1 + 0.2681X2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	40.690	8.489		4.793	.000					
	Policy Implementation (X1)	.426	.143	.338	2.986	.004	.523	.293	.253	.560	1.784
	Budget Effectiveness (X2)	.268	.109	.280	2.471	.015	.504	.246	.209	.560	1.784

a. Dependent Variable: Extension Worker Competence (Y)

Based on Table 6, the research results regarding Agricultural Development Policy Implementation (X1) and Agricultural Development Budget Effectiveness (X2) in relation to Agricultural Extension Worker Competence (Y), the regression equation obtained is Y = 40.690 + 0.426X1 + 0.268X2. The correlation value is 0.564, indicating a coefficient of determination of 31.8%. The calculations indicate that F-calculated (22.131) > F-table (0.99; 2; 96) (6.9065) and the significance level (0.000) < (0.05). Thus, it can be concluded that the multiple regression equation Y = 40.690 + 0.426X1 + 0.2681X2 is statistically significant. These results demonstrate that the influence of Agricultural Development Policy Implementation (X1) and Agricultural Development Budget Effectiveness (X2) on Agricultural Extension Worker Competence (Y) is positive, significant, and represents a moderately strong relationship. This implies that the implementation of agricultural development policies and the provision of agricultural development budget support by the Ministry of Agriculture can enhance the competence of agricultural extension workers—who serve as implementers of agricultural development programs—in West Java Province, Indonesia.

The research findings indicate that Agricultural Development Policy Implementation and Agricultural Development Budget Effectiveness have a positive and significant influence on Agricultural Extension Worker Competence. These findings suggest that the implementation of agricultural development policies, alongside the effective provision and utilization of agricultural development budgets by both the Ministry of Agriculture and the West Java Provincial Agriculture Office, will improve the competence of agricultural extension workers, ultimately fostering agricultural development in West Java Province. The implementation of agricultural development policies and the provision of necessary funding are expected to foster an agricultural system that is advanced, self-reliant, modern, competitive, and sustainable; this, in turn, should support the achievement of food self-sufficiency in West Java Province while making a tangible contribution to national food security and the improvement of public welfare.

4. *Implementation of agricultural development policies and support for agricultural development budgets in increasing the competency of agricultural instructors as implementers of agricultural development programs in West Java Province.*

Based on data from the Central Statistics Agency (BPS), rice production in West Java Province during the 2020–2025 period shows fluctuating conditions. In 2020 West Java rice production was recorded at 9.02 million tons and increased to 9.11 million tons in 2021. Furthermore, in 2022 rice production increased again to reach 9.43 million tons. The increase in production during this period shows that the West Java agricultural sector is still able to maintain food production capacity amidst various challenges in agricultural development.

However, in 2023 rice production will decrease to 9.14 million tons and will decrease again in 2024 to around 8.63 million tons. This decline in production shows that there is pressure on the agricultural sector, especially due to climate change, the El-Nino phenomenon, drought, floods, attacks by plant pests (OPT), as well as the conversion of agricultural land. This condition resulted in a decrease in planting area and harvest area which had a direct impact on total rice production in West Java.

This phenomenon of decreasing production shows that agricultural development in West Java is still facing various structural and technical challenges. Apart from environmental factors, the low adoption of technological innovation, limited access to production facilities, and inadequate assistance to farmers are also factors that influence agricultural production achievements. Therefore, it is necessary to strengthen agricultural development strategies that are more integrated and sustainable.

Interestingly, in 2025 West Java rice production will increase very significantly to reach around 10.23 million tons. This increase shows a recovery in the performance of the agricultural sector as well as an indication that various agricultural development programs are starting to have a positive impact on increasing regional food production. This condition can be influenced by improving climatic conditions, increasing planting area, optimizing the use of agricultural production facilities, and increasing adoption of cultivation technology by farmers.

Agricultural development in West Java is implemented through various strategic programs, including the provision of agricultural facilities and infrastructure, the development of organic farming, the strengthening of farmer institutions, human resource development, and agricultural extension services—which serve as a primary instrument for enhancing farmers' capacity. Agricultural extension plays a crucial role in the success of regional agricultural development programs, as extension workers are responsible for disseminating information, technology, and policies, as well as fostering a shift in farmers' mindsets toward modern agriculture. The Strategic Plan of the West Java Food Crops and Horticulture Agency emphasizes that changing farmers' mindsets and raising awareness regarding modern agriculture constitute one of the key challenges for future agricultural development (West Java Distanhorti Strategic Plan, 2025).

Furthermore, agricultural development in West Java continues to face various strategic issues, such as low commodity productivity, suboptimal agricultural economic activities across the upstream-to-downstream value chain, disruption of agricultural ecosystems, shrinking agricultural land areas, a lack of generational renewal among farmers, limited access to capital, and low adoption of agricultural technology (West Java Distanhorti Strategic Plan, 2025). These conditions indicate that successful agricultural development requires strengthening the capacity of agricultural extension workers—acting as agents of change in the field—to bridge the gap between government policy objectives and the actual needs of farmers.

Overall, the success of agricultural development in West Java is not only determined by the amount of government policy and budget support, but is also greatly influenced by the effectiveness of the role of agricultural instructors in carrying out outreach, mentoring, program supervision and farmer empowerment. Agricultural extension workers are important actors in bridging agricultural development policies with implementation at the field level so that various agricultural development programs can be accepted, understood and implemented by farmers optimally. Therefore, strengthening capacity, budget support and policies for agricultural extension institutions are important factors in realizing sustainable agricultural development in West Java Province.

A model or strengthening strategy to enhance the competence of agricultural extension workers in supporting effective agricultural development in West Java Province

Given the state of agricultural development in West Java Province, the competence of agricultural extension workers must be strengthened in a systematic, integrated, and sustainable manner. This ensures they can effectively fulfill their roles as facilitators, educators, communicators, and agents of change in modern agricultural development. Key strengthening strategies include:

1. Strengthening Modern Agricultural Technical Competence

Training and capacity building for agricultural extension workers need to be enhanced to ensure they possess strong technical competence regarding modern cultivation practices, the use of superior seeds, balanced fertilizer management, pest and disease control (OPT), agricultural mechanization, and the implementation of sustainable, eco-friendly farming. Necessary measures to strengthen modern agricultural technical competence include: 1) Providing continuous technical training; 2) Participating in competency-certified training programs; 3) Engaging in internships focused on modern agricultural technology; 4) Participating in field schools and demonstration plots (demplots); and 5) Collaborating with universities and agricultural research institutions. This strengthening strategy is crucial and aligns with the 2025 Strategic Plan of the West Java Department of Agriculture and Horticulture (Distanhorti), which directs West Java's agricultural development toward modernization, increased productivity, and the strengthening of regional food security.

2. Strengthening Digital Competence and Technological Innovation

In the digital era, the transformation toward modern agriculture requires extension workers to utilize digital technology in their extension activities. Therefore, strategies to strengthen digital competence and technological innovation are essential, such as: 1) Participating in training on the use of digital agricultural applications; 2) Improving information technology literacy through the provision of adequate literacy facilities and infrastructure; 3) Utilizing social media as a tool for educating modern farmers; 4) Using market price and weather information systems; and 5) Developing smart farming-based extension services. Digital competencies enable extension workers to accelerate information dissemination, enhance the efficiency of their guidance and support, and expand farmers' access to agricultural innovations.

3. Strengthening Communication and Social Facilitation Competencies

Agricultural extension workers serve not only as conveyors of technical information but also as motivators and drivers of behavioral change among farmers. Therefore, it is necessary to strengthen communication and social facilitation competencies through measures such as: 1) providing training in humanistic communication; 2) enhancing skills in facilitating farmer groups; 3) building capacity in community empowerment techniques; 4) improving mediation and problem-solving capabilities; and 5) adopting participatory approaches in extension activities. These strategies for strengthening communication and social facilitation competencies aim to enhance extension workers' ability to build trust, increase farmer participation, and accelerate the adoption of agricultural innovations at the field level.

4. Strengthening Agricultural Extension Institutions

The effectiveness of extension services is heavily influenced by the existence and strength of institutional governance. Consequently, strategies to strengthen agricultural extension institutions are required, such as: 1) revitalizing Agricultural Extension Centers (BPP); 2) improving coordination among agricultural agencies; 3) strengthening the networks linking extension workers with farmer groups and farmer group associations (Gapoktan); 4)

providing necessary extension facilities and infrastructure; and 5) bolstering performance-based budget support for extension services.

5. Strengthening Competence in Climate Change Adaptation and Sustainable Agriculture

The challenges posed by climate change require agricultural extension workers to possess skills in adaptation and agricultural risk mitigation. Therefore, strategies to strengthen competence in climate change adaptation and sustainable agriculture are essential, involving: 1) Enrolling extension workers in training on climate-adaptive agriculture; 2) Enhancing their capabilities in Integrated Pest Management (IPM); 3) Developing their skills in organic farming; 4) Providing education on environmental and agro-ecosystem conservation; and 5) Improving their capacity for agricultural disaster mitigation. These strategies for strengthening competence in climate change adaptation and sustainable agriculture are crucial for supporting sustainable agricultural development and maintaining food production stability in West Java.

6. Collaborative Model for Strengthening Extension Worker Competence

A model for empowering agricultural extension workers in West Java can be developed through a collaborative, penta-helix-based approach involving: 1) Local government; 2) Higher education institutions; 3) Research entities; 4) The private sector/agro-industry; and 5) Farmer communities and the general public. Through this collaborative model, strengthening the competence of extension workers ceases to be solely the government's responsibility; instead, it becomes a collective effort to support innovative, productive, and sustainable agricultural development. Robust agricultural extension institutions will support the optimization of extension services as the spearhead of regional agricultural development.

CONCLUSION

1. The results of the measurement and testing of the first hypothesis indicate that the implementation of agricultural development policy (X1) has a significant effect on the competence of agricultural extension workers (Y). A positive effect of 0.523 was observed, representing a strong relationship, with a calculated t-value (6.019) exceeding the t-table value (2.3658) and a significance level of 0.000 (< 0.05). This influence demonstrates the existence of a causal relationship mechanism involving the implementation of agricultural development policy (X1)—positioned as the independent variable. This relationship implies that if the implementation of agricultural development policy (X1) is enhanced or increases, such an increase is simultaneously accompanied by an improvement in the competence of agricultural extension workers (Y)—who serve as implementers of agricultural development programs in West Java Province; thus, the first hypothesis is accepted.

2. The results of the measurement and testing of the second hypothesis indicate that the effectiveness of the agricultural development budget (X2) has a significant effect on the competence of agricultural extension workers (Y). A significant positive effect of 0.504 was observed, representing a strong relationship, with a calculated t-value (5.714) exceeding the t-table value (2.3658) and a significance level of 0.000 (< 0.05). This influence demonstrates the existence of a causal relationship mechanism involving the effectiveness of the agricultural development budget (X2)—positioned as the independent variable. This relationship implies that if the effectiveness of the agricultural development budget (X2) is enhanced or increases, such an increase is simultaneously accompanied by an improvement in the competence of agricultural extension workers (Y)—who serve as implementers of agricultural development programs in West Java Province; thus, the second hypothesis is accepted.

3. The results of the measurement and testing of the third hypothesis indicate that the implementation of agricultural development policy (X1) and the effectiveness of the agricultural development budget (X2) jointly exert a significant influence on the competence of agricultural extension workers (Y); this is evidenced by a positive influence coefficient of 0.564 and an F-calculated value (22.131) exceeding the F-table value (6.9065), with a significance level of 0.000 (< 0.05). This influence signifies the existence of a causal relationship mechanism involving the implementation of agricultural development policy (X1) and the effectiveness of the agricultural development budget (X2)—both positioned as independent variables—and the competence of agricultural extension workers (Y). This relationship implies that if the implementation of agricultural development policy (X1) and the effectiveness of the agricultural development budget (X2) are simultaneously enhanced or improved, such improvements are accompanied by a simultaneous increase in the competence of agricultural extension workers (Y)—who serve as the implementers of agricultural development programs in West Java Province—thereby confirming the acceptance of the third hypothesis.

4. The success of agricultural development in West Java is determined not only by the extent of government policy and budgetary support but is also significantly influenced by the effectiveness of agricultural extension workers in disseminating information, providing guidance, overseeing program implementation, and empowering farmers. Agricultural extension workers play a crucial role in bridging agricultural development policies with field-level implementation, ensuring that various agricultural development programs are accepted, understood, and optimally executed by farmers. Therefore, strengthening the capacity of agricultural extension institutions—along with providing the necessary budgetary and policy support—is a vital factor in achieving sustainable agricultural development in West Java Province.

5. Strengthening the competencies of agricultural extension workers must be carried out in a systematic, integrated, and sustainable manner to enable them to effectively fulfill their roles as facilitators, educators, communicators, and agents of change within modern agricultural development.

Based on the research conclusions, the following recommendations are offered to benefits:

1. Given the research findings regarding the contribution of agricultural development policy implementation (X1) to the competence of agricultural extension workers (Y)—who serve as implementers of agricultural development programs in West Java Province—this contribution should be further enhanced. This can be achieved by focusing on dominant factors, such as the resource indicator within the policy implementation variable and the knowledge indicator within the extension worker competence variable, as well as by identifying additional indicators that could strengthen the relationship between policy implementation (X1) and extension worker competence (Y).

2. Given the research findings regarding the contribution of agricultural development budget effectiveness (X2) to the competence of agricultural extension workers (Y)—who serve as implementers of agricultural development programs in West Java Province—this contribution should be further enhanced. This can be achieved by focusing on dominant factors, such as the indicator for educational supervision and control systems within the budget effectiveness variable and the knowledge indicator within the extension worker

competence variable, as well as by identifying additional indicators that could strengthen the relationship between budget effectiveness (X2) and extension worker competence (Y).

3. Given the research findings regarding the joint contribution of agricultural development policy implementation (X1) and agricultural development budget effectiveness (X2) to the competence of agricultural extension workers (Y)—who serve as implementers of agricultural development programs in West Java Province—this contribution should be further enhanced. This can be achieved by focusing on the dominant factors across the three variables studied, as well as by identifying additional indicators that could strengthen the joint relationship between policy implementation (X1) and budget effectiveness (X2) and the competence of agricultural extension workers (Y).

4. This phenomenon of declining production indicates that agricultural development in West Java continues to face various structural and technical challenges. In addition to environmental factors, low adoption of technological innovations, limited access to production inputs, and suboptimal support for farmers also influence agricultural production outcomes. Therefore, it is necessary to strengthen agricultural development strategies to make them more integrated and sustainable; key measures to reinforce these strategies include:

   a. Strengthening Modern Agricultural Technical Competence:
      1) Providing continuous technical training;
      2) Facilitating participation in competency-certified training for extension workers;
      3) Facilitating participation in modern agricultural technology internships;
      4) Facilitating participation in field schools and demonstration plots (demplots); and
      5) Collaborating with universities and agricultural research institutions.
   b. Strengthening Digital Competence and Technological Innovation:
      1) Facilitating training on the use of digital agricultural applications;
      2) Improving information technology literacy through the provision of adequate literacy facilities and infrastructure;
      3) Utilizing social media as a tool for educating modern farmers;
      4) Using market price and weather information systems; and
      5) Developing smart farming-based extension services.
   c. Strengthening Communication and Social Assistance Competence:
      1) Providing training in humanistic communication;
      2) Improving farmer group facilitation skills;
      3) Implementing community empowerment techniques;
      4) Improving mediation and problem-solving skills; and
      5) Adopting participatory approaches in extension services.
   d. Strengthening Agricultural Extension Institutions:
      1) Revitalizing Agricultural Extension Centers (BPP);
      2) Improving coordination among agricultural agencies;
      3) Strengthening the extension worker network with farmer groups and farmer group associations (Gapoktan);
      4) Providing extension facilities and infrastructure; and
      5) Strengthening performance-based budget support for extension services.
   e. Strengthening Competence in Climate Change Adaptation and Sustainable Agriculture:
      1) Involving extension workers in climate-adaptive agriculture training;
      2) Strengthening extension workers' capabilities in Integrated Pest Management (IPM);
      3) Enhancing extension workers' capabilities in organic farming development;

4) Providing education on environmental and agro-ecosystem conservation; and
5) Improving extension workers' capabilities in agricultural disaster mitigation.

f. Collaborative Model for Strengthening Extension Worker Competence:
1) Local government;
2) Universities;
3) Research institutions;
4) Private sector/agro-industry; and
5) Farmer communities and the general public.

REFERENCES

Abdul, Rachman Saleh (2018). Pengaruh Disiplin Kerja, Motivasi Kerja, Etos Kerja dan Lingkungan Kerja terhadap Produktivitas Kerja Karyawan Bagian Produksi di PT. Inko Java Semarang. STIE AMA Salatiga.

Al-Rahmi, W. M., Alzahrani, A. I., Yahaya, N., Alalwan, N., & Kamin, Y. B. (2020). Digital communication: Information and communication technology (ICT) usage for education sustainability. *Sustainability*, 12(12), 5052. https://doi.org/10.3390/su1212505.

Aulia, A. A. (2021). Edukasi dan produktivitas masyarakat di masa pandemi. LP2M UIN SGD Bandung.

Badan Penyuluhan dan Pengembangan Sumber Daya Manusia Pertanian. (2025). Rencana Strategis BPPSDMP Tahun 2025–2029. Kementerian Pertanian Republik Indonesia, Jakarta.

Badan Pusat Statistik. (2023). Statistik Indonesia 2023. Jakarta: Badan Pusat Statistik.

Dinas Tanaman Pangan dan Hortikultura Provinsi Jawa Barat. (2024). Laporan Tahunan Dinas Tanaman Pangan dan Hortikultura Provinsi Jawa Barat.

Dinas Tanaman Pangan dan Hortikultura Provinsi Jawa Barat. (2025). Laporan Kinerja Instansi Pemerintah (LKIP) Dinas Tanaman Pangan dan Hortikultura Provinsi Jawa Barat Tahun 2025.

Dinas Tanaman Pangan dan Hortikultura Provinsi Jawa Barat. (2025). Rencana Strategis Dinas Tanaman Pangan dan Hortikultura Provinsi Jawa Barat Tahun 2025–2029. Pemerintah Provinsi Jawa Barat, Bandung.

Erian Eka Pranata, Gunarif Taib, Asmawi, (2023). Analisis Peran Penyuluh Pertanian Dalam Peningkatan Kompetensi Petani Dalam Rangka Peningkatan Mutu Kopi Arabika Di Kabupaten Kerinci. *Jurnal Pertanian Agros* Vol.25 No.3, Juli 2023:2053-2063. e-ISSN 2528-1488, p-ISSN 1411-0172

Hepi Hapsari, Azimah Nur Rahmah, Elsha Munziah, Eti Suminartika, (2023). Analisis Proses Komunikasi Penyuluhan Pertanian Dalam Peningkatan Kompetensi Petani. (Studi Kasus Kelompok Wanita Tani Lestari, Desa Cibodas, Kecamatan Kutawaringin, Kabupaten Bandung, Jawa Barat). *Jurnal Ilmiah Mahasiswa Agroinfo Galuh* Volume 10, Nomor 1, Januari 2023 ISSN nomor *2356-4903* (P-ISSN) dan 2579-8359 (E-ISSN).

Irawan, dkk, (2021). Pengembangan Sumber Daya Manusia Yang Berkelanjutan (Strategi untuk Meningkatkan Keterampilan dan Kompetensi dalam Organisasi). CV. Eureka Media Aksara.

Jadallah, H. et al. (2021) 'Construction Industry Training Assessment Framework', 7(August), pp. 1

Kadarisman. (2013). Manajemen Motivasi. Jakarta: Rajawali Pers.

M, M., Syam, H., & L, L. (2019). Peran Penyuluh Pertanian terhadap Peningkatan Kompetensi Petani dalam Aktivitas Kelompok Tani di Desa Rea Kecamatan Binuang Kabupaten Polewali Mandar. Universitas Negeri Makassar.

Mohamad Ikbal Bahua. (2018). Peran Kompetensi Penyuluh Pertanian pada Keterampilan Petani Bawang Merah. *Agriekonomika.* Volume 7, Nomor 2, 2018. p-ISSN 2301-9948 | e-ISSN 2407-6260

Nikolaidou, E., & Okwoche, P. (2023). Determinants of government debt in Sub-Saharan African countries: The role of conflict, governance, and economic factors. *Peace Economics, Peace Science and Public Policy*, *29*(2), 145-170.

Nur Saudah Al Arifa Dewi. 2024. Strategi Peningkatan Kapasitas Sumber Daya Manusia Petani Muda Wonosobo Dalam Pemasaran Hasil Pertanian. *Jurnal Pertanian Agros* Vol.26 No.1, April 2024. ISSN. 2301-9948

Peraturan Presiden Nomor 35 Tahun 2022, tentang Penguatan Fungsi Penyuluhan Pertanian

Prawirosentono, Suyadi. (1997). Kebijakan Kinerja Karyawan. Yogyakarta: BPFE.

Rahmawati, Mahludin, B., & Bahua, M. I. (2019). Peran Kinerja Penyuluh dan Efektivitas Pelaksanaan Penyuluhan pada Program Intensifikasi Jagung. *Jurnal Sosial Ekonomi Pertanian,* 15(1), 56–70.

Resicha, P. (2016). Peran Penyuluh Pertanian dalam Pengembangan Kelompok Tani di Nagari Sungai Pua Kecamatan Sungai Pua Kabupaten Agam. Universitas Andalas.

Röling, N. G. (1988). Extension science: Information systems in agricultural development. Cambridge University Press.

Sapar, Muhammad Yusuf Q, dan Haedar, (2014). Hubungan Kinerja Penyuluh Pertanian Dengan Kompetensi Petani Kakao Dalam Peningkatan Produktivitas Kakao Di Kota Palopo, Kabupaten Luwu, Luwu Utara Dan Luwu Timur. *Jurnal Ekonomi Pembangunan*, ISSN 2339-1529, Vol. 01 No. 02 Juli 2014

Sattaka, P., Pattaratuma, S., & Attawipakpaisan, G. (2018). Agricultural Extension Services to Foster Production Sustainability For Food And Cultural Security Of Glutinous Rice Farmers In Vietnam. *Kasetsart Journal of Social Sciences,* 38(1): 74-80

Soekarno, W. (1986). Teori dan Praktik Senam Dasar. Yogyakarta: PT Intan Pariwara.

Sugiyono. (2021). Metode Penelitian Kuantitatif, Kualitatif, dan R&D (Edisi ke-2). Bandung: Alfabeta.

Swanson and Rajalahti (2010). Strengthening agricultural extension and advisory systems: Procedures for assessing, transforming, and evaluating extension systems. Agriculture and Rural Development Discussion Paper 45. *The International Bank for Reconstruction and Development / The World Bank.*

Swanson, B. E, Bentz, R. P., Sofranko, A. J. (2018). *Improving agricultural extension: A reference manual*. Rome: Food and Agriculture Organization of the United Nations

Syahyuti. (2014). Kelembagaan Petani dalam Mendukung Usaha Tani Berkelanjutan. Forum Penelitian Agro Ekonomi, 32(2), 99–116.

Syam, N., Boceng, A., Jufri, N., & Suharman. (2019). Effect of Trichoderma and organic fertilizers on vegetative growth of black Pepper (*Piper nigrum* L.) under field conditions. *IOP Conference Series: Earth and Environmental Science*, 260(1).

Todaro, M.P. dan Smith, S. (2015). Pembangunan Ekonomi. Edisi 11. Penerbit Erlangga, Jakarta.

Undang-Undang No 19 Tahun 2013 tentang Perlindungan dan Pemberdayaan Petani

Undang-Undang Nomor 16 Tahun 2006 tentang Sistem Penyuluhan Pertanian, Perikanan, dan Kehutanan

Undang-Undang Nomor 5 Tahun 2014 tentang Aparatur Sipil Negara (ASN),

Van den Ban, A. W., & Hawkins, H. S. (1996). Agricultural Extension (2nd ed.). Blackwell Science.

Wa Ode Putri Nabilah, Musadar Mappasomba, dan Salahuddin, (2024). Peran Penyuluh Pertanian Dalam Meningkatkan Kapasitas Petani Padi Sawah Di Kelurahan Ngkaring-Ngkaring Kecamatan Bungi Kota Baubau. *Jurnal Ilmiah Penyuluhan Dan*

Pengembangan Masyarakat. 2024: 4 (2): 206 – 215. Issn: 2775-7145 (Online), Issn: 3030-9298 (Cetak)

Wibowo. (2020). *Manajemen Kinerja*. Jakarta: PT. Raja Grafindo Persada

Widyawati Kusumaningrum, Marten Pangli, Yulinda Tanari, (2023). Peningkatan Kompetensi Petani Padi Sawah Melalui Peranan Penyuluh Pertanian Di Kecamatan Tojo Kabupaten Tojo Una-Una. *Jurnal Bioindustri Vol.5 No. 2, Bulan Mei 2023.*