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Legowo 2:1 Row Rice Planting System Field School as an Effort to Increase Rice (Oriza Sativa) Production

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ABSTRACT

This study aims to analyze on farmer groups through Field Schools. The research uses a quantitative approach. This research was conducted in the Sindang Kerta area, West Bandung Regency, purposively, with the large number of farmers who attended field schools. Using census method, respondents were farmers from farmer groups who attended field schools, totaling 90 farmers.. Data collection was carried out using questionnaires and direct interviews., This study used 2 types of variables, namely free variables and bound variables, each of the variables studied was a free variable 1 (X1) is the institutional or dynamic of farmer groups, the free variable 2 (X2) is a row legowo 2:1 rice planting system, and the bound variable is an increase in rice production produced (Y). The data obtained were analyzed using SEM PLS. The results of the description of the farmer group institution show that the average value is >4.01, which means that the farmer group institution is very good, Based on the values of path coefficients or path coefficients, the resulting structural equation is as follows: Y = 0.631 X1 – 0.152 X2 which means that group institutions have a positive effect while the legowo row 2:1 planting system has less influence on the production of rice produced.

Keywords: *Planting system, farmer group, yields*

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INTRODUCTION

Communication in agricultural counseling is related to how to communicate with small farmers with all the limitations they have, so that the message conveyed through extension communication can be well received, absorbed and subsequently applied in their farming business . Field School is one of the extension methods as a way of communicating intensively with farmer groups in order to diffuse the innovation of a technology . Field schools are carried out by involving Field Agricultural Extension Officers as facilitators, field school activities are carried out through periodic meetings by a group of farmers which begins with discussing the problems at hand, followed by brainstorming, sharing experiences, about alternatives and choosing the most effective and efficient ways of solving problems in accordance with the resources owned, field school follow-up is a commitment schedule, location, materials, and practices to be carried out . The agricultural extension department in Pakistan promotes modern wheat production technology to achieve

higher production before the start of the season through extension education programs (Al-Zahrani et al., 2019).

Agriculture is the backbone of the village economy, most farmers produce agricultural products for their own needs, own home consumption and the production system is not market-oriented . The low status of agricultural market oriented is the impact of weak institutional performance such as less effective agricultural extension practices . Research in Ethiopia is about the influence of extension services to change farming for market orientation, the results of research show that agricultural extension services have a positive effect, although the effect is not strong enough (Girma and Kuma, 2022), this shows that there is still a need for counseling services for farmer groups . In the current era, extension workers need training related to information technology to facilitate counseling whose impact is to get access to information related to agriculture that can improve the standard of living of farmers (Owolabi and Yekinni, 2022). The implementation of counseling can be carried out on line or off line, farmers who access agricultural extension services on line have a higher probability of adopting most of the practices of crop rotation, contour plowing and manure application , (Danso-Abbeam, 2022), Meanwhile, off-line counseling is carried out if it requires direct practice on agricultural land. Rural advisory services, in environments with agriculture-based livelihoods to cope with weather changes and shocks negatively impact agricultural activities (Azzarri and Nico, 2022).

A farmer group is a group of farmers who start the same goal, by forming a farmer group it is hoped that this institution will be recognized for its existence, fostered, developed in order to increase its farming business and have an impact on improving its welfare. Farmer groups are divided into 4, namely novice farmer groups, advanced farmer groups, intermediate farmer groups and main farmer groups with differences in organizational dynamics. A novice farmer group is a group with the simplest organizational dynamics that requires coaching in order for the farmer group to develop . Coaching through field schools is a method that can be done gradually, continuously, in the development of farming businesses. The task of extension workers is to convey the results of innovation to farmer groups, the results of innovations from research institutions aimed at increasing the production of agricultural businesses, efforts to involve extension workers in delivering innovations are more important (Cook et al., 2021).

The problem of the food crop subsector, especially rice, is that there is still a productivity gap at the farmer level, compared to the potential that can be achieved by farmers. . The causes include the use of high-yielding variety seeds that have high production potential and are certified at the farmer level is still not optimal, the use of fertilizers that are not balanced and efficient, the use of organic fertilizers that are not yet popular .The innovation of legowo row 2:1 rice planting system, is one way to increase rice crop production, the implementation of this innovation needs to be tested through field schools to a group of novice farmers . Legowo row 2:1 planting system is a planting system by emptying plants every 2 rows of rice plants, with the aim of providing sunlight space into the plant, facilitating the flow of irrigation water, reducing the number of plants so that nutrient competition is reduced and each plant gets optimal nutrients, reducing environmental humidity so that pest diseases are reduced, and the impact of rice production will be maximized.

Public policies that promote the growth of food crop productivity can be more effective in achieving economic and poverty alleviation. The simulation results show that the growth of agricultural productivity can increase overall economic growth, reduce trade deficits and enable an increase in household income as well as government income , (Ayisi Nyarko and Kozári, 2021).

The results of innovations needed by farmers can be conveyed through extension activities that use various methods and techniques of counseling, therefore the competence of extension workers and the capture power of farmer groups must support each other . As a result of research in Ghana, the need for capacity building of extension workers includes the development of technical skills of extension workers,

improvement of communication skills, improvement of knowledge and operationalization of smart agriculture such as soil moisture conservation methods, and training in information communication technology (ICT), skill development in field demonstrations and project monitoring and evaluation continue to be improved so that the innovation diffusion process can continue , (Antwi-Agyei and Stringer, 2021).

This study aims to analyze : 1) The influence of the farmer groups imstitutional and the legowo row 2:1 rice planting system on increasing rice production, 2) The influence of the farmer groups institution on increasing rice production produced, 3) The effect of the implementation of the jajar legowo row 2:1 rice planting system on the production of rice produced.

RESEARCH METHODS

The research uses a quantitative approach, and a type of explanatory research type survey research that highlights the causal relationship between research variables and tests the hypotheses formulated. This research was conducted in the Sindang Kerta area, West Bandung Regency, purposively taking into account the large number of farmers who attended field schools. Respondents were farmers from farmer groups who attended field schools, using a saturated sample (census), so the number of respondents was 90 farmers, with a total rice field area planted with rice as much as 2,396 ha. Data collection was carried out using questionnaires and direct interviews. This study used 2 types of variables, namely free variables and bound variables, each of the variables studied was a free variable 1 (X1) is the institutional or dynamic of farmer groups, the free variable 2 (X2) is the rice planting system of legowo row 2:1 , and the bound variable is the increase in rice production produced (Y) . Data measurement is carried out using the Likert scale, namely 5 (Excellent), 4 (Good), 3 (Good enough), 2 (not good) and 1 (Not good).

The following is presented the operationalization of variable parameters in this study as listed in table 1 below :

Table 1. Operationalization of variables

No	Variable	Definition	Indicator
1.	Farmer Institutions	The farmer institution are a formal institution (organization) and institutions / norms related to farmers	- group cooperation - group goals - group management - group function - grouping ease - group dynamics
2.	Legowo row 2:1 planting system	Is a planting method with a system of adjusting the distance or space between rows or between clumps. Legowo row 2:1 i.e. every 2 rows of plants in the blank 1 row	- Object of jajar legowo row 2:1 - Benefits of the jajar legowo row 2:1 system - Make maintenance easier - Reduces pest infestation
3.	Increased Rice Crop Production	Increasing the amount of yield obtained in the rice cultivation farming business after receiving legowo planting sytem treatment	- Addition of the number of panicles - Pithy and seed-filled - Grain Weight Addition - Its lack of empty panicles

The data obtained were analyzed using SEM PLS, namely the Structural Equation Model with Partial Least Square, with a picture of the relationship model can be seen below :

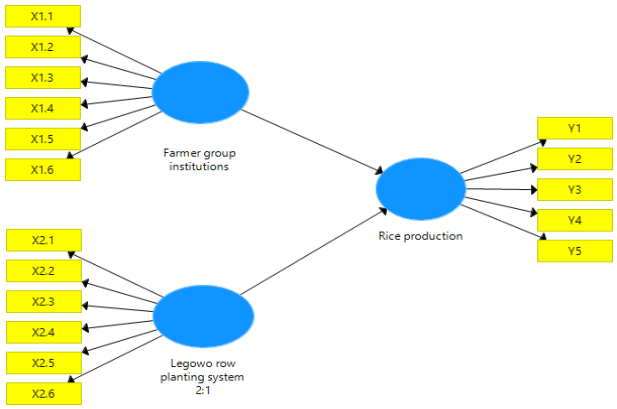


Figure 1. Model of Relationships Between Research Variables

Proposed hypothesis :

H0 = The institution of farmer groups and planting systems in legowo row 2:1 does not affect the increase in rice production

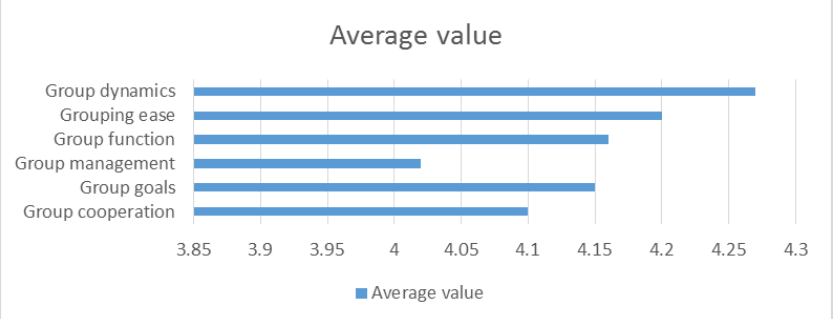
H1 = The institutionalization of farmer groups and planting systems in legowo row 2:1 affects the increase in rice production

Data analysis refers to the identification of problems and results obtained from implementing the SEM PLS model, as follows: 1) Describe the results of calculating the influence of farmer group institutions and the Jajar Legowo 2:1 rice planting system on the increase in rice production produced, simultaneously, 2) Describe the influence of farmer group institutions on increasing rice production, 3) Describe the effect of implementing the Jajar Legowo 2:1 rice planting system on the resulting rice production.

RESULTS AND DISCUSSION

Overview of research locations and institutions of farmer groups. The study site is at an altitude of 221-864 m above sea level, the soil slope is between 5-35%, the land type is latosol 25%, Podzolic red yellow 15% and alluvial 60%, rainfall 1542 mm and climate according to the classification Oldeman Zone C2, average air temperature 27o C with humidity 60-85% . Deep soil is divided into several types, one of the types is alluvial soil, which is soil formed from sedimentation processes, both on land and in waters . This soil will then undergo weathering with very varying levels of fertility, it depends on the forming nutrients and the basic material of the soil itself, at the study site formed from limestone mountains with alkaline properties.The results of observations related to the institution of farmer groups are presented on the curve below :

Table 2. Average institutional value of farmer groups



Value range 1-1.8 (not good); 1.81-2.4 (less good) ; 2.41 – 3.20 (good enough) ; 3.21-4.0 (good) ; > 4.01 (excellent). The observation results showed that all the variables studied had an average value of > 4.01 which means that farmer group cooperation, group goals, group management, group function, ease of grouping and group dynamics are very good, the dynamics of farmer groups develop, the spirit of participating in field lectures or counseling is very good and active.

Validity test results. Validity tests are carried out on variable indicators by calculating the value of the loading factor, the indicator is valid if the loading factor value is >0.5. The results of the analysis using Smart PLS software in the first iteration are as follows:

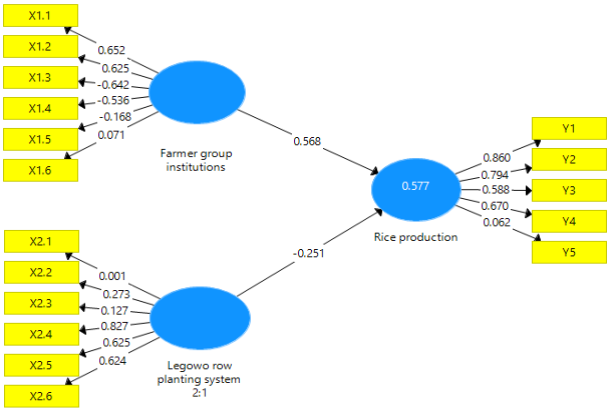


Figure 2. Loading Factor values on indicators in the first iteration

The results of the first iteration show that there are several indicators with a loading factor value of < 0.5. This indicates that the indicators are invalid and excluded from the model. Furthermore, the calculation of the loading factor is carried out in the second iteration. The results can be seen in the following image :

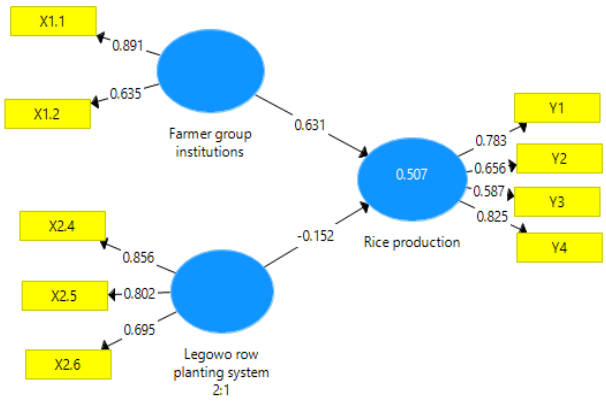


Figure 3. Results of the 2nd iteration

All variables are valid, namely X1.1, X1.2, X2.4, X2.5, X2.6, Y1, Y2, Y3 and Y4. So that further analysis can be carried out

Reliability Test. The results of the reliability test by looking at the Composite Reliability Coefficient value, show that the indicators used to measure the three variables in the second iteration are reliable. Composite Reliability Coefficient value > 0.7

Construct Reliability and Validity

Matrix	Cronbach's Alpha	rho_A	Composite Reliability

	Composite Reliability
Farmer group institutions	0.744
Legowo row planting system 2:1	0.829
Rice production	0.808

Figure 4. Construct Reliability and Validity

The composite reliability value of 0.6 – 0.7 is considered to have good reliability, and Cronbach's expected alpha value is above 0.7, thus the data is meeting the Reliability test. Thus the analysis process can be continued. All tests have been carried out to find out the important, stable and accountable variables.

Simultaneous Effect of Group Dynamics and Legowo row 2:1 Planting System on Increasing Rice Production. The simultaneous influence of farmer institutions and the Legowo row 2:1 planting system on increasing production is seen based on the R2 value, the better the strength of the relationship.

R Square

Matrix	R Square	R Square Adjusted

	R Square	R Square Adjus...
Rice production	0.507	0.490

Figure 5. Simultaneous influence of farmer institutions and the Legowo

The calculation results show that the value of R2 = 0.507. R Square values of 0.75, 0.50, and 0.25 indicate that the model is strong, moderate, and weak, the results of the analysis produce a value of 0.507 meaning that the relationship between group dynamics and the legowo row 2:1 planting system to the rice production produced is moderate, namely an increase in rice production by 50.7. Field school activities are carried out off line, face-to-face and planting practices with a legowo row 2:1 system in an area of 200 M^2 . The presence of farmers is very high because they want to know the new rice cultivation technology, agricultural extension workers use ICT (on line) for personal communication, but not (off line) especially for extension practice activities, (Ayisi Nyarko and Kozári, 2021). And in extension activities, increasing the participation of women as extension advisors can help change the position of agricultural extension to more effectively facilitate programs that have a better impact in order to reduce hunger and improve food security (Adebayo and Worth, 2022).

Hypothesis test results. The results of the hypothesis test against the value of R2 are as follows:

R Square

Mean, STDEV, T-Values, P-Values	Confidence Intervals	Confidence Intervals Bias Corrected	Samples

	Original Sampl...	Sample Mean (...	Standard Devia...	T Statistics (|O/STDE...	P Values
Rice production	0.507	0.557	0.091	5.583	0.000

Figure 6. Results of the hypothesis test against

This p value of < 0.05 indicates that the Dynamics of Farmer Groups and the Legowo 2:1 Planting System simultaneously have an influence on increasing rice production in the medium category .

The readiness of farmers, the readiness of extension workers, the presence of infrastructure, management support, cultural support affect the level of adoption of innovations and communication technologies (Purnomo et al., 2020). The economic and social motivation of farmers is very high in carrying out cultivation, while the factors of age, education, experience have no effect on the way of cultivation, therefore farmer groups are very interested in practiced cultivation because it can increase production and improve the economy (Lantarsih et al., 2022).

Participation in farmer groups has a positive effect on the adoption of innovations . The results show the important role of social interaction in the diffusion of innovation in sustainable agriculture, advanced farmer social groups have an impact on better institutions (Yang and Wang, 2022). Institutional innovations, training and natural resource management practices, such as rice with direct seeds, rodent control, and removal of toxic iron, have a considerable impact on the economic welfare of rice farmers (Mishra et al., 2022).

Partial influence of farmer group dynamics on increasing rice production. Partial influences were analyzed to determine the influence of each free variable, namely group dynamics and the legowo row 2:1 planting system, the results of the anaisis were as follows:

Path Coefficients

Matrix | Path Coefficients

	Farmer group institutions	Legowo row planting system 2:1	Rice production
Farmer group i...			0.631
Legowo row pl...			-0.152
Rice production			

Figure 7. Influence of each free variable

Based on the values of path coefficients, the resulting structural equation is as follows :
$Y = 0, 631\ X_1 – 0,152\ X_2$

The value of the path coefficient of the Farmer Institution in this case the farmer group is 0.631. this means that every increase in the dynamics of farmer groups (field school result skills) one unit can increase rice production by 0.631 units, field schools carried out for 5 months have succeeded in increasing the skills and production of rice produced. In northern Ghana the results showed a statistically significant influence of agricultural extension on agricultural adoption and income (Anang et al., 2020). Attention must be paid to building and maintaining trust in farmers from an early age so that the planning and implementation stages of agricultural extension can run according to the extension model (Salehi et al., 2021), the perspective of competence and motivation positively affects the performance of extension workers, so that their counseling activities are successful (Nataliningsih, Gijanto Purbo Suseno, Sugiyanto, 2020). A group develops and advances due to the similarity of perceptions between the farmer group and the extension workers who foster it. In the Kingdom of Saudi Arabia, the role of extension workers is very important to promote innovative technologies as well as create awareness among the farming community with regard to the promotion of traditional crops, hydroponics and greenhouse farming, seawater harvesting, investment in bio-salinity research and rainwater harvesting in order to meet the kingdom's food security, (Fiaz et al., 2018).

Vietnam Supporting extension services were found to be very active and comprehensive, playing a key role in encouraging sustainable production and helping to ensure food security and local culture in Vietnam (Ayisi Nyarko and Kozári, 2021). Future counseling is on line based, therefore extension workers

must continue to improve their competence, research results show that extension workers have a positive perception of online counseling (Yaghoubi, 2009). Future extension is oriented towards environmentally friendly agriculture hence the need for new awareness and orientation programs to educate farmers and extension workers, highlighting environmentally friendly agricultural practices (Shayaa Al-Shayaa et al., 2021). Other extension materials include technical training to farmers through increasing access to agricultural extension services, equipping farmers with tractor operations and other agricultural equipment, and facilitating access to output markets that benefit farmers. (Appiah-Twumasi et al., 2022).

The results of the hypothesis test for the path coefficient are as follows:

Path Coefficients

Mean, STDEV, T-Values, P-Values | Confidence Intervals | Confidence Intervals Bias Corrected | Samples

	Original Sampl...	Sample Mean ...	Standard Devia...	T Statistics (|O/...	P Values
Farmer group institutions -> Rice production	0.631	0.632	0.103	6.139	0.000
Legowo row planting system 2:1 -> Rice production	-0.152	-0.178	0.137	1.106	0.269

Figure 8. Results of the hypothesis test

Based on the table above, the p value for the dynamics of the farmer group is 0.000 < 0.05. Thus, it means that there is a positive influence between farmer group institutions and increasing rice production.

The results of the study in Ghana, recommend that stakeholders who introduce new technologies to smallholders, coupled with training on the development of attractive marketing packages combined with videos and images to educate farmers about new products, to accelerate adoption , This is done so that the results of innovation can be marketed, and increase the income of farmers (Ayisi et al., 2022)

Partial effect of legowo 2 jajar planting system on increasing rice production. Based on the same output as the previous calculation and from the structural equation it can be seen that the value of the path coefficient for the Legowo row 2:1 planting system is – 0.152. The results of hypothesis testing of the p value value obtained a value of 0.290 > 0.05, so it can be concluded that there is no influence between the Legowo row 2:1 planting system on increasing rice production. The results of observations in the field showed that at this location with the type of alluvial soil derived from limestone mountain, the impact of alkaline soil, fertilizer is less absorbed so that the empty planting distance of 1 row does not have an impact on the addition of clumps or panicles produced so that rice production does not increase. Farmers have implemented field school results, namely legowo row 2:1 planting system, but the results are less significant due to environmental factors.

Agricultural development, extension and policy, namely ADOPT (Adoption and Prediction of Diffusion Results) is an extension method that makes it easier for farmers to adopt an innovative result and can predict the result of adoption. ADOPT provides diffusion curve predictions from practice and sensitivity analysis of factors affecting the speed and peak rate of adoption. ADOPT is designed to improve conceptual understanding and consideration of the adoption process by those involved in research, development, extension and agricultural policy (Kuehne et al., 2017).

The implementation of the Blue Gold program measuring the efficiency and production levels of Boro rice in Bangladesh resulted in findings showing that the average technical efficiency levels of participants and non-participants were 95% and 82% , (Biswas et al., 2021) This shows that a program for farmers has a less, moderate and good success rate, therefore repeated implementation can continuously improve the skills of farmers mastering the new technology . The competence of extension workers needs to be improved, capacity building such as developing technical skills of extension workers, improving communication skills, increasing knowledge and use of climate-smart agricultural interventions such as soil moisture conservation methods, and information communication technology (ICT) training to provide counseling advice on climate

change. Other needs include developing skills in field demonstrations and monitoring in project evaluations (Antwi-Agyei and Stringer, 2021).

In sub-Saharan Africa, the participation of farmers in irrigation schemes and row planting technology, exerts a significant influence on rice productivity, therefore governments and various institutions in Africa should train more extension workers, given the significant impact they have on the adoption of agricultural technology and productivity. Follow-up plans for the adoption of agricultural technology and access to extension services in developing countries should adopt an empirical approach that takes endogenicity into account and reduces the negative impacts , (Fiaz et al., 2018).

In Pakistan, of the farmers who have access to counseling, only half have utilized the knowledge/technology provided by extension workers . Overall, small-scale farmers who used extension services produced better yields compared to medium and large-scale farmers. (Baloch and Thapa, 2018). Permintaan layanan penyuluhan dan intensitas penggunaan hasil penyuluhan berpengaruh terhadap produksi dan pendapatan petani oleh karena itu pemerintah harus menyediakan input pertanian dan layanan penyuluhan yang intensif The demand for extension services and the intensity of the use of extension products affect the production and income of farmers, therefore the government must provide agricultural inputs and intensive extension services , (Sumo et al., 2022).

CONCLUSION AND SUGGESTION

Conclusion

The institution of farmer groups and the jajar legowo row 2:1 planting system have an effect on increasing rice production. The institution of farmer groups has a positive effect on increasing rice production. The jajar legowo row 2:1 planting system has less effect on increasing rice production.

Sugestion

Further research to measure the level of efficiency in the implementation of the jajar legowo row 2:1 planting system. Coaching farmer groups in fostering cooperation with other groups and the industrial world for the development of group dynamics. Development of extension workers' competencies in preparing themselves for online counseling.

REFERENCE

Adebayo, J.A., and S.H. Worth. 2022. Women as extension advisors. Res. Glob. 5(September): 100100. doi: 10.1016/j.resglo.2022.100100.

Al-Zahrani, K.H., A.Q. Khan, M.B. Baig, M. Mubushar, and A.H. Herab. 2019. Perceptions of wheat farmers toward agricultural extension services for realizing sustainable biological yields. Saudi J. Biol. Sci. 26(7): 1503–1508. doi: 10.1016/j.sjbs.2019.02.002.

Anang, B.T., S. Bäckman, and T. Sipiläinen. 2020. Adoption and income effects of agricultural extension in northern Ghana. Sci. African 7: e00219. doi: 10.1016/j.sciaf.2019.e00219.

Antwi-Agyei, P., and L.C. Stringer. 2021. Improving the effectiveness of agricultural extension services in supporting farmers to adapt to climate change: Insights from northeastern Ghana. Clim. Risk Manag. 32(May 2020): 100304. doi: 10.1016/j.crm.2021.100304.

Appiah-Twumasi, M., S.A. Donkoh, and I.G.K. Ansah. 2022. Innovations in smallholder agricultural financing and economic efficiency of maize production in Ghana's northern region. Heliyon 8(12): e12087. doi: 10.1016/j.heliyon.2022.e12087.

Ayisi, D.N., J. Kozári, and T. Krisztina. 2022. Do smallholder farmers belong to the same adopter category? An assessment of smallholder farmers innovation adopter categories in Ghana. Heliyon 8(8). doi: 10.1016/j.heliyon.2022.e10421.

Ayisi Nyarko, D., and J. Kozári. 2021. Information and communication technologies (ICTs) usage among agricultural extension officers and its impact on extension delivery in Ghana. J. Saudi Soc. Agric. Sci. 20(3): 164–172. doi: 10.1016/j.jssas.2021.01.002.

Azzarri, C., and G. Nico. 2022. Sex-disaggregated agricultural extension and weather variability in Africa south of the Sahara. World Dev. 155: 105897. doi: 10.1016/j.worlddev.2022.105897.

Baloch, M.A., and G.B. Thapa. 2018. The effect of agricultural extension services: Date farmers' case in Balochistan, Pakistan. J. Saudi Soc. Agric. Sci. 17(3): 282–289. doi: 10.1016/j.jssas.2016.05.007.

Biswas, B., B. Mallick, A. Roy, and Z. Sultana. 2021. Impact of agriculture extension services on technical efficiency of rural paddy farmers in southwest Bangladesh. Environ. Challenges 5(August): 100261. doi: 10.1016/j.envc.2021.100261.

Cook, B.R., P. Satizábal, and J. Curnow. 2021. Humanising agricultural extension: A review. World Dev. 140: 105337. doi: 10.1016/j.worlddev.2020.105337.

Danso-Abbeam, G. 2022. Do agricultural extension services promote adoption of soil and water conservation practices? Evidence from Northern Ghana. J. Agric. Food Res. 10(September): 100381. doi: 10.1016/j.jafr.2022.100381.

Fiaz, S., M.A. Noor, and F.O. Aldosri. 2018. Achieving food security in the Kingdom of Saudi Arabia through innovation: Potential role of agricultural extension. J. Saudi Soc. Agric. Sci. 17(4): 365–375. doi: 10.1016/j.jssas.2016.09.001.

Girma, Y., and B. Kuma. 2022. A meta analysis on the effect of agricultural extension on farmers' market participation in Ethiopia. J. Agric. Food Res. 7: 100253. doi: 10.1016/j.jafr.2021.100253.

Kuehne, G., R. Llewellyn, D.J. Pannell, R. Wilkinson, P. Dolling, et al. 2017. Predicting farmer uptake of new agricultural practices: A tool for research, extension and policy. Agric. Syst. 156(August 2016): 115–125. doi: 10.1016/j.agsy.2017.06.007.

Lantarsih, R., S. Manggala, K. Kadarso, and S. Subeni. 2022. Motivation of Farmer Group Members in Cultivating Organic Vegetables. J. AGRISEP Kaji. Masal. Sos. Ekon. Pertan. dan Agribisnis 21(2): 349–366. doi: 10.31186/jagrisep.21.2.349-366.

Mishra, A.K., V.O. Pede, A. Arouna, R. Labarta, R. Andrade, et al. 2022. Helping feed the world with rice innovations: CGIAR research adoption and socioeconomic impact on farmers. Glob. Food Sec. 33(November 2021): 100628. doi: 10.1016/j.gfs.2022.100628.

Nataliningsih, Gijanto Purbo Suseno, Sugiyanto, and F.K.G. 2020. Agricultural Extension Performance Reviewed From the Perspective of Competence, Motivation and Work Environment. Int. J. Psychosoc. Rehabil. 24(6): 12187–12194. doi: 10.37200/IJPR.

Owolabi, A.O., and O.T. Yekinni. 2022. Utilisation of information and communication technologies for agricultural extension service delivery in public and non-public organisations in southwestern Nigeria. Heliyon 8(9): e10676. doi: 10.1016/j.heliyon.2022.e10676.

Purnomo, S.H., A.I. Sari, S. Emawati, E.T. Rahayu, and R.P. Triaswati. 2020. Agriculture Extension Officers' Attitude and Readiness in Using Information and Communication Technology in Indonesia. Russ. J. Agric. Socio-Economic Sci. 100(4): 3–9. doi: 10.18551/rjoas.2020-04.01.

Salehi, M., E. Abbasi, M. Bijani, and M.R. Shahpasand. 2021. Evaluation of agricultural extension model sites approach in Iran. J. Saudi Soc. Agric. Sci. 20(8): 506–518. doi: 10.1016/j.jssas.2021.06.002.

Shayaa Al-Shayaa, M., M. Al-Wabel, A.H. Herab, A. Sallam, M. Barjees Baig, et al. 2021. Environmental issues in relation to agricultural practices and attitudes of farmers: A case study from Saudi Arabia. Saudi J. Biol. Sci. 28(1): 1080–1087. doi: 10.1016/j.sjbs.2020.11.026.

Sumo, T. V., C. Ritho, and P. Irungu. 2022. Effect of farmer socio-economic characteristics on extension services demand and its intensity of use in post-conflict Liberia. Heliyon 8(12): e12268. doi: 10.1016/j.heliyon.2022.e12268.

Yaghoubi, J. 2009. Assessment of agricultural extension and education graduate students' perceptions of e-learning in Iran. Procedia - Soc. Behav. Sci. 1(1): 1914–1918. doi: 10.1016/j.sbspro.2009.01.336.

Yang, W., and L. Wang. 2022. Impact of farmer group participation on the adoption of sustainable farming practices—spatial analysis of New Zealand dairy farmers. Ann. Public Coop. Econ. (December). doi: 10.1111/apce.12404.