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Analysis of Elements in Innovation Communication of Liquid Organic Fertiliser

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Abstract

Organic fertiliser has been widely used by farmers in Jember Regency, one of which is the type of liquid organic fertiliser (LOF) of local microorganisms. Research related to innovation adoption mostly focuses on innovation attributes. 4 other variables affect the speed of innovation adoption besides innovation attributes, namely: (1) type of innovation decision (choice, collective, or authoritarian), (2) communication channels (interpersonal or mass media), (3) social system (norms, degree of network relatedness), and (4) change agent (level of promotion effort). The purpose of this study was to analyse the elements in LOF innovation communication in Jember Regency with descriptive statistics, including: (1) relative profit level; (2) type of innovation decision; (3) communication channels; (4) social system; and (5) change agent. The research is a type of survey research with a quantitative method approach. The data analysis method in this study includes the following stages: (1) determination of scale values, and (2) descriptive statistical analysis. The results of the study showed that the elements in LOF innovation communication in Jember Regency generally show high achievements, so it can be concluded that LOF innovation has received support from farmers in Jember Regency. The elements of communication channels, social systems, and agents of change have achieved very high achievements, while the relative advantages element is already high, and the innovation decision type element is still moderate. Some things that need to be improved are decision-making at the farmer group level to be more democratic and prioritise deliberation. In addition, the relative advantages level can still be increased by overcoming technical constraints in LOF production and application.
Keywords: elements, innovation communication, liquid organic fertiliser

A. Introduction

The life of farmers, in addition to experiencing growth and development in behaviour, also undergoes various behavioural changes in facing and adapting to environmental changes. The role of innovation communication in development is to facilitate the convergence or meeting point of alignment between the desires of the government and the desires of the people in the effort to convey new things (innovation). Innovation communication can be part of the development communication process that can lead to social change. Innovation has the potential to help us overcome and tackle many challenges currently faced by agriculture. Organic fertilisers have been widely used by farmers in Jember Regency, one of which is the type of liquid organic fertiliser (LOF) using local microorganisms (MOL) (Dewi et al. 2019). This fertiliser is made from local organisms found around the farmers, such as goat manure, cow manure, and rotten fruit. Other additional ingredients include young coconut water and palm sugar. So that most farmers can easily make MOL fertiliser and apply it to the crops they cultivate.

Managing agricultural innovation sustainably requires an understanding of all components that influence, and are influenced by, the innovation process, interactions between societal levels, and the power dynamics that shape the direction and outcomes of the innovation process. Farmer groups, as organisations at the farmer level that serve as the gateway for the entry of innovations to farmers, play a very important role in facing these challenges. The condition of farmer groups in Jember Regency, based on data that can show, indicates that most of the existing farmer groups have medium to low capabilities, and assessments have not yet been conducted, so their classification is still unknown. Therefore, effective strategies are needed to improve their classification. This is because the farmer group class reflects aspects of planning ability, organising, implementing activities, controlling and reporting, and developing farmer group leadership. These aspects essentially require innovative communication.

Research related to innovation adoption mostly focuses on the attributes of innovation. According to (Sumardjo et al., 2019), the attributes of innovation include: (1) relative advantage (profitability or relative advantage); (2) cost of innovation; (3) complexity/simplicity; (4) physical compatibility; (5) cultural compatibility; (6) communicability; (7) saving of labour and time; and (8) divisibility/trialability. The more important an innovation is perceived by potential users, the more it will be in demand and the greater the likelihood of its adoption. The more important an innovation is perceived by potential users, the more it will be in demand and have a greater chance of being adopted.

However, according to (Rogers, 2003), 4 other variables influence the speed of innovation adoption besides the attributes of innovation, namely: (1) the type of innovation decision (individual, collective, or authoritative), (2) communication channels (interpersonal or mass media), (3) social system (norms, degree of network interconnectedness), and (4) change agents (promotion effort level). This research will analyse these 5 variables and their influence on the diffusion and adoption of innovation. Diffusion itself is a process in which an innovation is communicated through certain channels over a specific period to other members of a social system. Thus, diffusion is a type of communication process that is distinctive, where the message is an idea, method, or new technology. The impact of innovation communication is a change in behaviour in adopting something new, which is referred to as innovation adoption. So, innovation adoption is the acceptance or implementation of new ideas/concepts, new methods/approaches, and new technologies by individuals or members of a social system, thereby becoming part of the behaviour of the individuals or members of the social system in question. By thoroughly analysing these variables, a model of agricultural innovation communication can be found, and strategies for improving its performance can be formulated to accelerate the adoption of innovation. In other words, a series of communicative interventions is needed, aimed among other things at developing and/or promoting innovations that are expected to help solve problems by various parties (Leeuwis, 2004).

When the innovation process is accessible to consumers and other public stakeholders in the context of open innovation, innovation communication faces new challenges. Innovation communication plays an important role in ensuring that the points of connection between internal and external interests are integrated throughout the innovation process (Bruhn & Ahlers, 2013). This is a complex task and involves coordinating communication and publicity goals, integrating communication instruments, and, most importantly, aligning various target groups. So it takes encouragement from integrated communication to develop a phase-oriented concept for integrated innovation communication that is able to guarantee systematic coordination of the interfaces involved and provide centralised support in driving satisfactory results for the innovation process.

Research related to agricultural innovation needs a comprehensive approach. The study (de Boon et al., 2022) entitled Governing agricultural innovation: A comprehensive framework to support sustainable transitions aims to bring together the strengths of several main approaches (Multi-Level Perspective, Agricultural Innovation System, Responsible Innovation, Innovation Management, Theory of Planned Behaviour) and insights from environmental governance literature into a comprehensive framework. The framework describes seven main components and their interactions: macro context, governance system, immediate context, innovative and adaptive capacity of actors, psychosocial factors, and the innovation process itself. With its

complexity, this study has succeeded in formulating a comprehensive framework for managing agricultural innovation and explaining the interactions between its main components.

Meanwhile, other research related to innovation communication is (Sofyan, 2019), which examines innovation communication strategies in changing the MADURA-3 hybrid corn farming system in Pamekasan Regency. The results of the study illustrate that the innovation communication process is carried out through four stages, namely socialisation, the role of farmer groups, demonstration plots, and mentoring. The forwarding of messages takes place through the context of interpersonal communication channels, groups, opinion leaders, and gethok tular. Furthermore, the pattern of acceptance of innovation by farmers takes place through mentoring, technical guidance and utilisation of farmhouses. So the focus is on the communication process and communication channels, and patterns of innovation adoption. Similar research is (Hardiyanto et al., 2023) on the development of communication in the development of Good Agricultural Practices innovation. This study shows that GAP-based innovation in North Sumatra requires a broader development communication approach. An approach based on local culture and increasing development interaction. Mass media and direct communication are important efforts to be made. GAP-based innovation can improve farmer welfare and security. GAP can encourage sustainable agriculture. Comprehensive participation between stakeholders can accelerate the implementation of GAP. This study focuses on its communication approach. Regarding innovation attributes, Gandasari (2021) in his research showed that there was an influence of innovation attributes on the adoption of two-wheeled hand tractor and water pump innovations. Innovation can be utilised by farmers because it can reduce production costs, make work easier, and increase production. In addition, it is easy to use and test, and the results are easy to see. This study also concluded that farmers' perceptions of the innovation message given are a determining factor in the innovation adoption process. Mentoring and coaching by researchers and extension workers are needed to support the process of accelerating technology. Innovation communication in the agricultural machinery program needs to be adjusted to the characteristics of farmers, level of need, availability of materials and supporting tools in the surrounding area.

Regarding communication channels and adoption decisions, research conducted by Bakti, Zulkarnain, and Mazdalifah (2023) showed that the communication of bioguma sorghum innovation carried out by BPTP North Sumatra through four activities, namely carrying out coordination, involving farmer groups, making demonstration plots, and carrying out technical guidance. These four activities are a centralised diffusion system model, or a centralised diffusion system, which means that the dissemination of innovation is carried out linearly from the central government to farmers. The innovation communication channels used by BPTP North Sumatra are interpersonal, group, audio-visual, and social media communication channels. Of the four channels, interpersonal communication is the most effective channel in changing farmers' attitudes. The other two elements in innovation communication are social systems and change agents. A social system is defined by Rogers (2003) as a set of interrelated units engaged in joint problem solving to achieve common goals. The members or units of a social system can be individuals, informal groups, organisations, and/or subsystems. Each unit in a social system is distinguishable from other units. All members cooperate at least to the extent that they attempt to solve common problems to achieve common goals. This shared goal binds the system together. Diffusion occurs within a social system. The social structure of the system influences the diffusion of innovations in several ways. The social system represents the boundaries through which an innovation spreads. Here we discuss how the social structure of the system affects diffusion, the influence of norms on diffusion, the role of opinion leaders and change agents, types of innovation decisions, and the consequences of innovation. Change agents are individuals who influence client innovation decisions in the direction desired by the change agency. Change agents usually seek to gain adoption of new ideas, but also seek to slow down diffusion and prevent the adoption of undesirable innovations. Change agents often use opinion leaders in a social system as their lieutenants in diffusion activities. The purpose of this study was to analyse the elements in LOF innovation communication in Jember Regency with descriptive statistics covering: (1) relative advantage level; (2) types of innovation decisions; (3) communication channels; (4) social systems, and (5) change agents.

B. Methodology

The research was conducted in April-June 2024 in Jember Regency the considering that it is an area where many farmer groups are in the lower middle class (beginner and advanced classes). The research is a type of survey research with a quantitative method approach (Singarimbun and Effendi 1989). According to its nature, this research is a quantitative research that focuses on collecting quantitative data in the form of numbers to be analysed using statistical analysis (Irianto and Mardikanto, 2010). Determination of the number of samples using the Isaac and Michael Table. There are 1772 farmer groups in Jember Regency, which were taken randomly with a 5% error rate based on class strata proportionally (proportionate stratified random sampling). The result was 290 farmer groups as respondents in this study.

The tool used for data collection was a questionnaire prepared before the field research. This questionnaire was tested first to determine the Likert score based on normal distribution, validity and reliability tests. Because the analysis to be used is parametric statistics, the questionnaire and research measuring instruments were prepared to produce data that was at least interval data. In this study, the measuring instrument used is a psychological scale. The approach used is a response-oriented method proposed by Torgeson (Azwar, 2016).

The data analysis method in this study includes the following stages: (1) determining the scale value, and (2) descriptive statistical analysis. The steps for determining the scale value are as follows (Azwar, 2016): (1) calculating the frequency (f) for each possible answer, (2) calculating the proportion (p) or percentage of each answer frequency, (3) calculating the cumulative proportion (pk), which is the proportion in an answer plus the proportion of all answers to the left, (4) because the pk values are the lower and upper limits of the interval, the next step is to determine the midpoint (pk-mid), which is half the proportion in the answer in question plus pk in the answer to the left, (5) converting the pk-mid values into Z deviation values by looking at the normal deviation table or Z table. This Z value is on an interval scale, (6) shifting the answer with the smallest scale value to zero, by adding the absolute value of the smallest Z value to each Z value, so that the corrected Z value (Zc) is obtained, and (7) rounding the Zc values. The Zc value resulting from this rounding is the scale value, which is the weight or score for each answer choice on each question item. Descriptive statistical analysis was conducted to describe farmer innovation communication to accelerate the adoption of agricultural innovation along with the factors that influence it, including: (1) relative profit level; (2) type of innovation decision; (3) communication channel; (4) social system; and (5) change agent. This analysis was conducted by determining the distribution of research data in the form of percentages and their average value (mean), so that the tendency of respondents' answers related to farmer behaviour in accelerating the adoption of agricultural innovation can be obtained. The tendency of respondents' answers includes: favourable, good (positive) or unfavourable, not good (negative) for all innovation communication and innovation adoption variables.

C. Findings and Discussion

1. Relative Advantage Level of Liquid Organic Fertiliser

The relative advantage of innovation is the degree to which an innovation is perceived as better than the idea it replaces. The level of relative advantage is often expressed as economic advantage, as social prestige, or in other ways. The nature of the innovation determines the specific types of relative advantages (economic, social, and the like) that are important to adopters, although the characteristics of potential adopters can also influence which subdimensions of relative advantage are most important (Rogers, 2003).

The results of the study of farmers in Jember Regency showed an average achievement of the assessment of the relative advantage level of LOF, which was high (66.29%). This result is the average of the respondents' answers to the items arranged to assess the relative advantages of the cognitive, affective and conative aspects. The explanation of each aspect of LOF will show the achievement of each item assessed by the farmers.

In the cognitive aspect, farmers assessed the items of LOF from moderate to very high (Table 1). They rated very high on increasing agricultural land productivity due to LOF (93.61%), as well as on increasing the quality of agricultural products (88.46%) and fertilisation efficiency (87.75%). Meanwhile, for increasing soil fertility, soil sustainability, avoiding environmental pollution and preventing soil poisoning, farmers rated it high. Regarding the application of LOF,

farmers considered it difficult at first because it was different from the chemical fertilisers they usually applied. The feelings of farmers (affective aspect) were happy because they considered LOF to be able to improve soil fertility and be profitable. But they did not feel that LOF could increase their authority in society. Thus, they felt that LOF was technically and economically profitable, but not socially.

In the conative aspect, farmers generally considered LOF to be quite complicated. They felt bothered at the beginning of their application because they had to learn and practice. Compared to the fertilisers they usually use, it was also considered more difficult. However, they will continue to practice so that they can apply LOF and will not stop even though LOF has proven to be unsuccessful. So in the action aspect, farmers have the spirit to work hard in applying LOF. This finding is slightly different from the research from (Effendy & Yunika, 2020), which found that relative advantage, as one of the indicators of innovation attributes, achieved an average value of 3.233 on a scale of 4 (80.82%) or very high. This is because the innovation studied is different, namely the jajar legowo technology, where the results are easier to observe than LOF.

Table 1. Relative Advantages Level of Liquid Organic Fertiliser

No.	Item	Percentage
1.	Liquid organic fertiliser (LOF) increases agricultural land productivity.	93,61%
2.	LOF improves the quality of agricultural products.	88,46%
3.	LOF makes fertilisation economical.	87,75%
4.	LOF increases soil fertility.	70,57%
5.	LOF maintains soil sustainability.	70,00%
6.	LOF prevents environmental pollution.	69,31%
7.	LOF prevents soil poisoning.	68,05%
8.	The application of LOF was initially difficult because of the new fertilisation system.	59,89%
9.	I am happy to apply LOF because it improves soil fertility.	68,74%
10.	I am happy to apply for LOF because it is profitable.	65,17%
11.	I am happy to apply LOF because it can increase authority in the community.	31,49%
12.	I felt bothered when I first applied to LOF because I had to learn and practice.	50,00%
13.	I will continue to apply LOF even though it is more difficult than regular fertilisation.	56,44%
14.	I will continue to practice applying LOF properly.	67,01%
15.	I will stop applying LOF if it is proven to be unsuccessful.	47,82%
	Average	66,29%

2. Types of Innovation Decisions

The current discussion of the innovation decision process is at the farmer group level. When innovation decisions are made by a system, rather than by individuals, the decision-making process becomes more complex because a number of individuals are involved. The innovation process in an organization consists of two general activities: (1) initiation, which consists of all information gathering, conceptualization, and planning for the adoption of an innovation, leading to the decision to adopt, and (2) implementation, which consists of all events, actions, and decisions involved in using the innovation (Rogers 2003). The first two stages together form the initiation of the five stages in the innovation process, namely (1) agenda setting and (2) matching, which is defined as all information gathering, conceptualisation, and planning for the adoption of an innovation, leading to the decision to adopt. While the implementation stage consists of the next three stages, namely: (3) redefining/restructuring, (4) clarifying, and (5) routinising.

In the initiation stage, agenda setting occurs when a general organisational problem is defined that creates a perceived need for an innovation. The agenda-setting process continues in every system, determining what the system will do first, what will be done next, and so on. The agenda-setting stage of an organisation's innovation process consists of (1) identifying and prioritising needs and problems, and (2) searching the organisation's environment for potentially useful innovations to address these organisational problems. The matching stage is defined as the stage in the innovation process in which a problem on the organisation's agenda is matched with

an innovation, and this matching is planned and designed. In this second stage of the innovation process, conceptual matching between the problem and the innovation occurs to determine how well the two fit. In the implementation stage, in the restructuring stage, innovations imported from outside the organisation gradually begin to lose their foreign character. Redefinition/restructuring occurs when the innovation is reimagined to better accommodate the needs and structure of the organisation, and when the organisational structure is modified to fit the innovation. Next comes the clarification stage, which occurs when the innovation is used more widely in an organisation, so that the meaning of the new idea gradually becomes clearer to members of the organisation. Implementing innovations too quickly at the clarification stage can lead to poor outcomes. The final stage is routinization, which occurs when an innovation has become part of the organisation's routine activities and has lost its separate identity. At this stage, the innovation process has been completed.

The results of the study show that the decision-making for the adoption of LOF innovation by farmer groups in Jember Regency is in the moderate category (57.01%) (Table 2). At the agenda-setting stage in the innovation process in a farmer group, they identify and prioritise the needs and problems related to the scarcity of chemical fertilisers that are subsidised by the government. They also look for an organisational environment to find innovations that have the potential to be useful to overcome this organisational problem, and farmer groups are the best choice for them. This can be seen from them making their own adoption decisions, meaning in farmer groups without depending on other groups and innovations. Furthermore, at the stage of matching the problem of fertiliser scarcity from the farmer group agenda, it is adjusted to an alternative innovation, namely liquid organic fertiliser (LOF), and this matching is planned and designed. At this second stage, conceptual matching between fertiliser scarcity and LOF innovation occurs. Most members of the farmer group decide to adopt LOF without depending on the decision of the farmer group, although those who agree are not too many (69.31%) and have been made through deliberation rather than voting.

Table 2. Types of Innovation Decisions in LOF Implementation

No.	Item	Percentage
1.	I decide to adopt LOF myself.	88,38%
2.	The decision to adopt LOF does not depend on other people in the environment.	85,09%
3.	The decision to adopt LOF does not depend on other members of the farmer group.	85,30%
4.	The decision to adopt LOF does not depend on other innovation decisions.	79,77%
5.	The decision to adopt LOF does not depend on the decisions of the farmer group.	83,91%
6.	The decision to adopt LOF is the result of an agreement in the farmer group.	69,31%
7.	The results of the agreement on the decision to adopt LOF are carried out through deliberation.	76,21%
8.	The results of the agreement on the decision to adopt LOF are carried out through voting.	49,43%
9.	All members of the farmer group must implement the decision to adopt LOF.	50,23%
10.	Members of the farmer group who do not implement the decision to adopt LOF will be sanctioned/punished.	29,43%
11.	The decision to adopt LOF is determined by people in power only.	28,62%
12.	The decision to adopt LOF is determined by people who are respected.	26,09%
13.	The decision to adopt LOF is determined by people who are experts only.	35,06%
14.	The decision to adopt LOF is determined by people who have resources only.	34,94%
15.	The decision to adopt LOF is determined by the management of the farmer group only.	33,33%
	Average	57,01%

At the implementation stage, there is a restructuring of LOF innovation, and it slowly begins to lose its foreign character. LOF innovation is recreated to better accommodate the needs and structure of farmer groups, and when the structure in the farmer group is also modified to suit the innovation, especially with the implementers of LOF adoption. Those who agree that LOF must be implemented are still only a few (50.23%). But they do not agree on whether those who do not implement it should face sanctions. The next stage is the clarification stage that occurs when LOF innovation is used more widely, so that the meaning of the new idea gradually becomes clearer to the members of the farmer group. This is shown by the disagreement about whether the adoption of LOF is only decided by people who are powerful, respected, experts, rich or administrators. The last stage is routinization, which occurs when an LOF innovation has become part of the routine activities of the farmer group. And the average result of 57.01% confirms the achievement of farmer group decisions in the Regency in adopting LOF innovation.

3. Communication Channels

A communication channel is a means by which a message is conveyed from one individual to another. The nature of the information exchange relationship between a pair of individuals determines the conditions under which a source will or will not convey an innovation to a recipient and the impact of that transfer (Rogers, 2003). Mass media channels are usually the most rapid and efficient means of informing an audience of potential adopters about the existence of an innovation—that is, of creating awareness-knowledge. Mass media channels are all means of message delivery involving mass media, such as radio, television, newspapers, and so on, that allow one or more individuals to reach a large audience. On the other hand, interpersonal channels are more effective in persuading someone to accept a new idea, especially if the interpersonal channel connects two or more individuals who are similar in socioeconomic status, education, or other important aspects. Interpersonal channels involve face-to-face exchanges between two or more individuals. In addition to mass media and interpersonal communication channels, interactive communication via the Internet has become more important for the spread of certain innovations in recent decades.

The results showed that the use of communication channels in LOF innovation communication by farmer groups in Jember Regency was categorised as very high (89.30%) (Table 3). This is explained by the source of their knowledge about LOF innovations, indeed coming from mass media. They also consider mass media to be able to reach a wide target quickly. So the existence of mass media related to LOF innovations is very important to promote, direct awareness, motivate, and even change the attitudes of farmers to adopt this innovation. Thus, farmer groups in Jember Regency consider mass media as an efficient communication channel in LOF innovation communication.

As for interpersonal communication channels, farmers also consider their function effective in LOF innovation communication. This is evidenced by their explanation that, apart from mass media, they also know about LOF innovations from interpersonal channels that provide two-way information exchange. Through this interpersonal channel, they can also obtain clarification or additional information about LOF. This interpersonal channel is also considered to be able to overcome socio-psychological barriers, persuade them to adopt LOF and promote LOF even though it comes from outside the social environment.

These results are from the research of Hakim et al. (2023) on the Influence of Innovation Characteristics, Communication Channels and Social Systems in the Diffusion of Innovation on Public Interest in the Covid-19 Vaccination Program, which found that the communication channel variable had a determination of 70.2% with R2 = 0.702. Based on these data, it is known that communication channels have an influence on interest of 70.2% with 29.2% influenced by other factors. The communication channels referred to in the study come from the media (mass media) to the closest people or health service officers (intrapersonal channels).

Table 3. Communication Channels in LOF Implementation

No.	Item	Percentage
1.	I learned about LOF innovations from mass media (radio, television, newspapers, etc.)	90,68%
2.	The mass media reaches a wide audience quickly.	87,62%
3.	The mass media can create knowledge about LOF	91,26%
4.	The mass media can disseminate information about LOF	94,94%
5.	The mass media are important for promoting LOF.	93,56%
6.	The mass media are important for directing awareness of LOF.	92,64%
7.	The mass media are important for motivating LOF adoption.	92,41%
8.	The mass media changes weak attitudes.	83,45%
9.	The mass media come from outside the social environment.	78,85%
10.	I learned about LOF innovations from interpersonal channels (directly from other people).	94,02%
11.	The interpersonal channels provide a two-way exchange of information.	93,10%
12.	From these interpersonal channels, I can obtain clarification or additional information about LOF.	94,94%
13.	The interpersonal channels can overcome socio-psychological barriers.	82,30%
14.	The interpersonal channels can persuade me to adopt LOF.	86,21%
15.	The interpersonal channels are important for promoting LOF.	89,43%
16.	The interpersonal channels come from outside the social environment.	83,45%
	Average	89,30%

4. Social Systems

A social system is defined as a set of interrelated units engaged in joint problem solving to achieve a common goal (Rogers 2003). The members or units of a social system can be individuals, informal groups, organisations, and/or subsystems. Each unit in a social system is distinguishable from the other units. All members cooperate at least to the extent that they attempt to solve a common problem to achieve a common goal. This shared goal binds the system together. Diffusion occurs within a social system. The social structure of a system influences the diffusion of innovations in several ways. The social system is the boundary through which innovations spread. Here we discuss how the social structure of a system influences diffusion, the influence of norms on diffusion, the role of opinion leaders and change agents, types of innovation decisions, and the consequences of innovations. Each of these issues involves the relationship between the social system and the diffusion processes that occur within it.

The results of the research data analysis indicate that the social system is an important element in the adoption of LOF innovations. Farmers, on average, gave a very high rating (89.38%) to the role of this social system (Table 4). They acknowledge that the social system, in this case, the farmer group, influences the decision to adopt LOF, which includes a learning system about LOF innovation to solve the problem of fertiliser scarcity. Farmers also acknowledge that the farmer group is a participatory democracy where the decision to adopt LOF from its members represents a consensus voice regarding innovation. This is in accordance with research by Hakim et al. (2023), which found that the social system variable had a determination of 49.3% of community interest in the COVID-19 vaccination program. In the farmer group as a social system, several things are believed to influence the process of adopting LOF innovation. Norms as behavioural patterns established by members of the farmer group influence the decision to adopt LOF, as do socio-cultural values. Likewise, opinion leadership (the extent to which an individual can informally influence the attitudes or open behaviour of others in the desired way and with relative frequency) also influences the decision to adopt LOF. This is because opinion leaders have greater exposure to mass media about LOF than their followers, are more cosmopolitan, have greater contact with extension workers, have greater social participation, have higher socioeconomic status and are more innovative than their followers. When the norms of the social system support change, opinion leaders about LOF will be more innovative. Likewise, the connectedness of individual networks in a social system is positively related to individual innovation in LOF adoption. The potential for information exchange from communication network relationships is negatively related to the level of communication closeness, the level of homophily (the degree of similarity between a pair of communicating individuals). Thus,

individuals tend to connect with others who are close to them in physical distance and who have relatively homophiles social characteristics.

Table 4. Social Systems in LOF Implementation

No.	Item	Percentage
1.	Social systems (collective learning systems in which the experiences of early adopters of an innovation, transmitted through interpersonal networks) influence LOF adoption decisions.	89,68%
2.	The learning system in the social system about LOF adoption solves the fertiliser problem.	88,03%
3.	The social system is a participatory democracy in which the LOF adoption decisions of its members represent a consensus voice regarding the innovation.	87,82%
4.	Norms (patterns of behaviour established by members in a social system) influence LOF adoption decisions.	88,39%
5.	Sociocultural values influence LOF adoption decisions.	90,01%
6.	Opinion leadership (the extent to which an individual can informally influence the attitudes or overt behaviour of others in a desired way and with relative frequency) influences LOF adoption decisions.	87,80%
7.	Opinion leaders have greater exposure to mass media about LOF than their followers.	88,09%
8.	Opinion leaders about LOF are more cosmopolitan (the extent to which an individual is oriented outside the social system) than their followers.	87,44%
9.	Opinion leaders about LOF have greater contact with extension workers than their followers.	89,33%
10.	Opinion leaders about LOF have greater social participation than their followers.	89,23%
11.	Opinion leaders about LOF have higher socioeconomic status than their followers.	93,78%
12.	Opinion leaders about LOF are more innovative than their followers.	89,45%
13.	When the norms of the social system support change, opinion leaders about LOF are more innovative.	89,55%
14.	The connectedness of an individual's network in a social system is positively related to the individual's innovativeness in LOF adoption.	88,19%
15.	The potential for information exchange from communication network relationships is negatively related to the degree of communication closeness.	92,82%
16.	The potential for information exchange from communication network relationships is negatively related to the degree of homophily (the degree of similarity between pairs of communicating individuals).	91,93%
17.	Individuals tend to connect with others who are close to them in physical proximity and who share relatively homophiles social characteristics.	87,92%
	Average	89,38%

5. Agricultural Extension Workers

Agricultural extension workers or change agents are individuals who influence clients' innovation decisions in the direction desired by the change agent (Rogers 2003). Agricultural extension workers usually try to secure the adoption of new ideas, but they can also try to slow down the diffusion process and prevent the adoption of certain innovations with undesirable effects. In general, the role of agricultural extension workers in innovation communication is in a very important category (89.21%). They are considered capable of developing the need for change to LOF among farmers and building information exchange relationships related to LOF adoption. They are also able to diagnose problems that require LOF and create intentions and translate intentions into actions to adopt LOF. Agricultural extension workers stabilise LOF adoption and prevent discontinuation. They can also achieve good relationships with farmers and try to contact farmers regarding LOF adoption. Thus, agricultural extension workers are oriented towards the interests of farmers, not their interests. This role is related to the competencies they

have, which in the study (Yusneli & Tanjung, 2021), consists of seven dimensions, namely: competence in understanding regional potential, innovation communication competence, learning management competence, renewal management competence, training management competence, entrepreneurship development competence and network system guide competence. The results of the study stated that the level of competence of agricultural extension workers in Pasaman Regency was in the moderate category. The factors that influence it are motivation (achievement motivation and work motivation), environment (workload) and self-development of extension workers (learning independence and career development of extension workers).

The LOF innovation diffusion program from agricultural extension workers is considered to meet the needs of farmers. This is because agricultural extension workers empathise with farmers. They are also homophilous (similar) to farmers, have credibility in the eyes of farmers, and work through opinion leaders. Agricultural extension workers improve farmers' ability to evaluate LOF innovations. They are also considered to have contact with farmers who have higher socio-economic status, greater social participation, higher formal education, and who are cosmopolitan (oriented outside the social system). Their efforts are in order to accelerating the process of adopting LOF innovations.

Table 5. Agricultural Extension Workers in LOF Implementation

No.	Item	Percentage
1.	Agricultural extension workers develop the need for change to LOF in farmers.	89,61%
2.	Agricultural extension workers establish information exchange relationships related to LOF adoption.	89,65%
3.	Agricultural extension workers diagnose problems that require LOF.	88,86%
4.	Agricultural extension workers create the intention to change to LOF in farmers.	87,98%
5.	Agricultural extension workers translate the intention into action to adopt LOF.	88,87%
6.	Agricultural extension workers stabilise LOF adoption and prevent discontinuation.	88,57%
7.	Agricultural extension workers can achieve good relationships with farmers.	84,57%
8.	Agricultural extension workers try to contact farmers regarding LOF adoption.	88,97%
9.	Agricultural extension workers are oriented towards the interests of farmers rather than their interests.	84,07%
10.		89,21%
11.	Agricultural extension workers' innovation diffusion programs are by client needs.	86,24%
12.		88,36%
13.	Agricultural extension workers empathise with farmers.	86,92%
14.	Agricultural extension workers are homophily (similar) to farmers.	89,39%
15.	Agricultural extension workers have credibility in the eyes of farmers.	90,21%
16.	Agricultural extension workers work through opinion leaders.	94,26%
17.	Agricultural extension workers improve farmers' ability to evaluate LOF innovations.	93,12%
18.	Agricultural extension workers make contact with farmers with higher socioeconomic status.	93,93%
19.	Agricultural extension workers make contact with farmers with greater social participation.	92,24%
	Average	89,21%

D. Conclusion

The results of the analysis of elements in LOF innovation communication in Jember Regency generally show high achievements. In the elements of communication channels, social systems, and change agents, the achievements are very high (> 80%). While in the relative profit type element, the achievement is high (66.29%), and in the innovation decision type, the achievement

is moderate (57.01%). This achievement shows that LOF innovation has received support from farmers in Jember Regency. For the innovation decision type element, because the achievement is moderate, it is necessary to encourage decision-making at the farmer group level to be more democratic and prioritise deliberation. Meanwhile, the relative profit level element can still be improved by fixing technical constraints in LOF production and application.

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