

# DIGITAL COMMUNICATION IN AGRICULTURAL EXTENSION IN THE ERA OF THE INDUSTRIAL REVOLUTION 4.0

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## ABSTRACT

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### Original research



*The research starting from the acceleration of digital di-era technology in the industrial revolution 4.0 is undeniable and, especially for field agricultural extension workers is the spearhead of the success of agricultural development in the regions. The purpose of this study is to analyze how digital communication can be useful in agricultural extension in the era of revolution 4.0, the methodology used is descriptive qualitative, data collection through observation, interviews and documentation, primary data sources of 14 people and secondary data sources such as reference books, internet searching, and field studies. The results of the study that the extension system is a system of delivering innovations from technological sources to users (farmers) using various approaches and existing methods according to conditions, so that innovations can be utilized by users to increase income and welfare. The agricultural extension system can use the approach of: (1) agro-ecosystem; (2) territory; (3) agribusiness; (4) institutional; and (5) welfare. The extension system approach is more directed at growing the regional economy (local economy) so that it can reach all life activities in the social system.*

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## 1. INTRODUCTION

The Ministry of Agriculture wants to foster the enthusiasm of young people to continue the relay of agricultural entrepreneurship in Indonesia, and also develop the use of internet technology to support the production of agricultural products to meet the growing market demand (Ridha & Wahyu 2017; Harniati & Anwarudin 2018)

The Agricultural Human Resources Extension and Development Agency (BPPSUMBER DAYA MANUSAP) implements the millennial farmer program through an extension institution, namely the Rural and Independent Agriculture Training Center (P4S) (Barani & Tambora, 2023). It is an institution that provides agricultural training in rural areas using the principles of

democracy, self-help, business development, and integration. The existence of P4S spread across each region makes the farmer program millennials can be implemented equally. This can make the training, counseling and empowerment carried out will be effective because each region has its own character to be carried out by the Millennial Farmer program (Dumasari, et al., 2022). Counseling is the right way to develop and improving human resources so that farmers can continue to develop (Budiman et al., 2022). One of the areas that still makes agriculture the main livelihood is Nganjuk Regency although the demand continues to decline. The reason for this decline in interest is that agriculture has not much yield. The existence of slashers who directly buy agricultural products at very low prices decreases the interest of farmers. The empowerment carried out by the local government is

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mostly in the form of providing capital in the form of materials and tool assistance. The development of communication patterns in agricultural extension in Indonesia written by Sadono (2014), explained although declining interest and declining economic output of farmers, the farmer sector is still a job for most of the population in Indonesia. In addition, it became a production granary in the country's foreign exchange earnings for non-oil and gas exports. Agriculture is also a bulwark for the national economy during the economic crisis. Entering the industrial revolution 4.0 that combines technology and the internet, becomes a challenge for the world of agriculture (Ane & Yasmin, 2019; Zambon et al., 2019).

Farmers must continue to compete to produce agricultural products and be able to meet market demand. This challenge must be carried out by empowering farmers to become farmers who are able to compete in this era so that farmers must be able and able to process and produce their agricultural products by combining technology and the internet.

Through Ministerial Regulation Number 4 of 2019 concerning Guidelines for the Movement for The Development of Agricultural Human Resources Towards Food Barns 2045, it is explained that millennial farming is farmers aged 19-30 years and/or farmers who are adaptive to technology and innovation (Hariani et al., 2022). Millennial farmers don't just stick to age. Millennial farmers take precedence is what their mindset is. So, millennial farmers are not only intended to have human resources aged 19-30 years.

The interest of the Millennial Farmer program is to create smart and digital farming (Utami, 2022). This is considered important because human resources are not eternal in the sense that there will be an expiration period. In the Millennial Farmer program, the millennial generation creates an agricultural system based on smart and digital farming which can later become a regeneration and also transmit an agricultural system that is more effective, environmentally friendly and also has good results in quality & quantity. Millennial Agriculture is a development effort carried out by the government to farmers. For this reason, in analyzing the existing communication patterns, this study uses development communication theory. Communication is very important in development so it is necessary to understand the elements of SMRCE communication (Source, Message, Receiver, Channel, and Effect) that must be applied in development. Communication patterns regarding agricultural extension have been carried out first, such as research conducted by Darmawan et al. 2020. This study looked at how the communication patterns carried out by PPL in conducting counseling to clove farmers in Wa ode Buri Village, North Buton. The communication pattern found is the application of one-way, two-way and multidirectional communication patterns (Darmawan et al., 2020).

Nunung Nurhayati in his research on the Communication Patterns of the Indramayu Agricultural

Extension Center in efforts to disseminate agricultural information concluded that the delivery of messages was carried out formally and informally.

In addition, the form of delivery from the Extension Center to farmers or vice versa is vertical. Instead, horizontal delivery is used for fellow farmers or fellow extension workers. Unclear dissemination of information, inadequate facilities and infrastructure, differences in perception and perspective make obstacles in the dissemination of information.

In addition, this research also reviews the empowerment of farmers such as research conducted by Universitas Brawijaya. This study concluded that the empowerment carried out in Betet Village has been better to realize food security.

Farmers have more knowledge so that their agricultural output also increases. Support from the government with subsidies for aid and seeds. The obstacles that occur are the low quality of human resources and limited tools. This study was conducted to analyze the communication model carried out by P4S as an extension institution in conducting counseling for the Millennial Farmer program.

Development communication includes the function and role of communication in message exchange activities with reciprocity between the community and the government starting with the planning, implementation and evaluation of a development. In a narrow sense, development communication is a way of conveying ideas and skills of a development that arises from the initiative with the target of its builders, namely the community in order to understand, accept, and participate in development.

First, self-sufficiency, that is, having the ability to meet or meet basic needs. Second, the price, which is the freedom of oneself from oppression and not being taken advantage of by the other party. Third, freedom where a person is able to choose solutions to improve the quality of life so as to realize prosperity. Development will cause social changes so that communication has an important role.

This is because communication has a role in changing a person's way of thinking, attitudes, and actions in solving social problems. However, if communication is hampered, it will make the development process cause inequality. The facts of developed countries are like the difference between villages and cities, the gap between poor and rich.

This will have an impact on how a person thinks, behaves, behaves, and opinions. For this reason, communication is very important in development so it is necessary to understand the elements of SMRCE communication (Source, Message, Receiver, Channel, and Effect) that must be applied in development. Agricultural communication is the activity of exchanging messages between people that have a relationship between agricultural activities, personally and between groups.

Usually, it has a common nature by using symbols in its delivery, and can generally be found in agricultural

extension activities. The two have a relationship that cannot be let go. Agricultural communication is a science that is not only needed by farmers so that non-farmer communities also need knowledge. In agricultural extension workers need to find and study agricultural communications to be conveyed to farmers. Therefore, it is mandatory for an extension worker to understand carefully about agricultural communication. The basic functions of communication include 3 parts that are factors that cause why humans need to communicate, namely: 1) human desire to control their environment. Through communication, humans can know the opportunities that exist to be utilized, maintained, and avoided in things that threaten the surrounding nature, 2) human efforts to be able to adapt to their environment. The process of continuation of a society actually depends on how the community can adapt to its environment, and 3) efforts to transform the socialization heritage (Cangara, 2011).

In general, the consequences or results of communication can include 3 aspects, namely: 1) Cognitive, which concerns awareness and knowledge, 2) Affective, that is, it concerns attitudes or feelings and emotions, 3) Conative or psychomotor, that is, it concerns behavior or action. The assumptions used in the philosophy of agricultural extension are based on three things, namely: 1) counseling is an educational process that brings about the changes expected by a person or community, 2) counseling is a democratic process that is carried out by not forcing something to the farming community, and 3) counseling is a continuous process.

Counseling activities are defined by various understandings, such as: dissemination of information, lighting or explanations, non-formal education, behavior change, social engineering, marketing innovations (technical and social), social change (behavior, individuals, values, relationships between individuals, institutions), community empowerment (community empowerment) and community strengthening.

The goal and objective of agricultural extension is the realization of farmers who have independence and freedom in using messages and information in the form of technology, as well as new things in improving their farming business so that it becomes more productive, efficient and profitable (better business) so that a better life will be achieved, and in the end the creation of conditions for people whose lives are prosperous (better community). The goal and objective of agricultural extension is the realization of farmers who have independence and freedom in using messages and information in the form of technology, as well as new things in improving their farming business so that it becomes more productive, efficient and profitable (better business) so that a better life will be achieved, and in the end the creation of conditions for people whose lives are prosperous (better community).

## 2. LITERATUR REVIEW

It is said to be minimal because communication activities are not only informative, namely so that others understand and know, but also persuasive, that is, so that others are willing to accept an understanding or belief, do an action or activity.

Communication is the process of conveying understanding between individuals. Human society can exist, due to the human capacity to convey the intentions, desires, feelings, knowledge, and experiences of one person to another. In essence, communication is a behavior, where a source conveys a message to the recipient with the aim of influencing the behavior of the recipient.

Meanwhile, the definition of communication media can simply be interpreted as a medium used to convey communication messages.

Then regarding the theoretical foundations used in the research, the author uses the theory of diffusion of innovations developed by Everett M. Rogers. According to Gouws and Van Rheede van Oudtshoorn (2011) defines diffusion as the process by which an innovation is communicated through a certain channel within a certain period of time among the members of a social system. Diffusion is a special type of communication related to the dissemination of messages as new ideas. In the context of communication diffusion innovation is a special part that of the existing communication process because the information exchanged is innovation. The theory of diffusion of innovation is a model that describes the activity of new information exchange that takes place with the aim of the process of adopting innovation in the audience.

Conventionally, the role of counseling is only limited to the ability to convey innovations and influence the targets of counseling through certain methods or engineering techniques, until they adopt the innovations delivered. However, in its development, an extension worker must also be able to become a bridge between the government or the extension institutions he represents and the target community.

In connection with the role and responsibility of extension workers introduced that there are 3 (three) roles of counseling consisting of activities such as, self-disbursement with the target community, encouraging the community to make changes, tabulating relations with the target community. The three kinds of designs, bridged into several more detailed roles: 1) Development of the need to make changes, 2) Encourage the community to make changes, 3) Tabulate the relationship between extension workers or government agencies and the target community. Relating to the role of extension workers, each extension worker (agriculture) must be able to carry out dual roles such as: 1) The teacher is someone who is able to be a reflection or role model, able to change the behavior, attitudes, knowledge and skills of the target

community. 2) The analyzer is to observe every situation (natural resources, community behavior, ability of funds and existing institutions) and be able to see problems and provide solutions for the target community. 3) Advisors choose the most appropriate alternative. technically can be implemented, economically advantageous and acceptable to the social and cultural values of the local community. 4) Organizers are able to maintain good relations with the target community (especially the figures).

In the digital era, digital capabilities are the main prerequisites in order to compete in the long term, but various institutions and companies want to go digital who do not understand the best way to organize organizations in the automation process and develop the infrastructure and talents needed in managing digital information, both development, development, and maintenance of online services. The field of digital competence is fivefold: 1. Information: identify, find, retrieve, store, organize and analyze digital information, assess its relevance and purpose. 2. Communication: communicating in a digital environment, sharing resources through online tools, connecting with others and collaborating through digital tools, interacting with and participating in communities and networks, cross-cultural awareness. 3. Content Creation: Create and edit new content (from word processors to images and videos); integrate and recompose previous knowledge and content; produce creative expression, media output, and programming; dealing with and applying intellectual property rights and licenses. 4. Safety: personal protection, data protection, digital identity protection, security measures, safe and continuous use. 5. Problem solving: identifying digital needs and resources, making informed decisions that are the most appropriate digital tools according to goals or needs, solving conceptual problems through digital means, creatively using technology, solving technical problems, updating oneself and the competence of others.

Considering that this study is closely related to cybersecurity, the competencies discussed are related to security (Ferrari et al., 2013) including four competencies related to security, namely 1. Protecting devices, to protect devices themselves and understand risks and threats online and to know about safety and security measures, 2. Protecting personal data, to understand the general terms of service, active protection of personal data, understanding the privacy of others, protecting oneself from fraud and online and cyber threats, 3. Protecting health, to avoid the health risks associated with the use of technology in terms of threats to physical and psychological well-being, 4. Protecting the environment, to be aware of the impact of ICT on the environment.

In the global talks that 2020 enters the digital and automation era. Data obtained from the results of the 2025 HR survey states that every individual needs efforts to prepare themselves with abilities that cannot be easily replaced by machines and robots. The view of humans is irreplaceable by the rise of automation

because robots or machines will run according to instructions or programs created by humans. According to a survey conducted (Dell Technologies, 2019) of global business leaders, the era of partnerships between humans and machines in 2030 as many as 54% of people will absorb and manage information in very different ways. For policymakers, business leaders, and individual workers around the world, the task is at hand to prepare for a more automated future by emphasizing new skills and improving training (Manyika et al., 2017).

The emergence of the definition of types of cybersecurity (Reid & Van Niekerk, 2014) is due to the fact that today all Internet and ICT users are required to have a basic level of cybersecurity awareness and knowledge to carry out daily activities. This is a necessity in handling cybersecurity issues in the digital age. This condition requires coordination and cooperation nationally and internationally, in the government, community, and private sectors.

It is not enough to handle information security solutions only within the organization. Information security does not only apply to the use of information in personal contexts and the world has become increasingly more and more information-oriented (Reid & Van Niekerk, 2014). Cybersecurity is a collection of tools, policies, security concepts, security protection, guidelines, risk management approaches, actions, training, best practices, assurance, and technologies that can be used to protect the cyber environment and user asset organizations (Abuaddous et al., 2014). The organization's assets include connected computing devices, personnel, infrastructure, applications, services, telecommunications systems, and the totality of information transmitted and/or stored in cyberspace. In general the purpose of cybersecurity is availability, integrity (which can include data authenticity and undeniability), and confidentiality (International Telecommunication Union, 2008). The research "Definition of Cybersecurity Gaps and overlaps in standardization" (ENISA, 2017) provides the important context necessary to understand the term cybersecurity and its use. Other cybersecurity domains are communication security, operations security, information security, physical security, public/national security. On the other hand in cybersecurity governance always consider these domains. Organizing information governance activities only from an information security perspective is not enough. The most common objectives of cyberattacks can be system scrambles, system destruction, data leaks, or attempting that the attacked system cannot function (İlhan, 2015).

Digital communication is the transmission of electronic information that has been digitally encoded, such as for storage and processing by a computer. In the development of digital communication technology, not only using computers in sending and receiving information but has developed in such a way using android, which also functions as a cell phone. Realizing these conditions, it is now our duty for academics and

national development stakeholders to build the concept of synergy of extension and development communication in realizing a dignified, just and prosperous community life. This paper discusses how synergies are built and how academic, political, strategic and technical implications in development.

In the current conditions, there are at least three reasons for the importance of synergy of Extension and Development Counseling, (1) Similarity of goals, (2) Complementary roles in development, and (3) The development of communication technology innovation in a society with diverse access to digital communication, has the potential to have an impact on inequality. First, there is a similarity of goals, counseling and communication both aim to occur behavioral changes, both cognitive, affective and psychomotor / conative, only different in their pressure, namely counseling in addition to these three aspects, especially on changes in conative aspects. Second, counseling is responsible in addition to changes in behavior of knowledge, attitudes and skills, but also on attitudes/actions (conative) and application (adoption) in life as a skilled/skilled (skills). Communication makes people smart and insightful, while counseling makes people smart and innovative in their lives. Smart means, in addition to being smart, they are also good at using their hearts so that they become more wise and wise in implementing new ideas, as well as technological innovations.

Third, the very rapid development in digital technology innovation has turned out to cause a gap in human capacity in development. This is because access to information through digital technology is uneven, so there is a gap with individuals who are less able to access and or are less able to digest information from digital media with those who are better able to access digital communication. The word development in Development Counseling, binds the science of Communication and Extension Science in strengthening human capital (Individuality) and social capital (sociality) to realize the welfare of individuals, families and communities, as well as the environment through the process of human and social empowerment until independent. The synergy of Extension and Development Communication lies in the realization of independence.

Communication and Development Counseling is a combination of three domains of theories: (1) communication, (2) counseling and (3) development. The synergy of the three is the realization of harmony between people and society that is smart, independent, just and prosperous. The potential for social conflict is managed intelligently and optimally through conducive integration in resource and environmental management. The contribution of communication theories in development is "enlightening", that is, producing smart people with insight, expanding alternative life choices, expanding the mastery of innovative information, the importance of synergy of the role of communication

technology development in development (digital communication and conventional communication), strengthening communication networks/cooperation, strengthening social capital and so on. The contribution of counseling theories in 3 developments is "educating", educating freedom of action ethically, changing behavior with a heart, strengthening attitudes to be increasingly innovative productive, emphasizing wisdom and policies in acting, building human capital (individuality), leadership, social entrepreneurship attitudes and other positive attitudes. Both communication and counseling are tied up in the context of development.

An alternative term for counseling in Dutch, the word *voorlichting* is used which means to give light to help someone find their way. This term was used during the colonial period for the Dutch colonies, although counseling was actually needed by both parties. Indonesia, for example, follows the Dutch way by using the word counseling, while Malaysia, which is influenced by English, uses the word development. English and German respectively term it as giving advice or *Beratung* which means an expert can give clues, From various views there are still found some similarities in perception, one of them, namely that "counseling is the involvement of a person to communicate information consciously with the aim of helping others give opinions so that they can make the right decisions" Here it can be seen that there is a connection between communication and counseling. The source of communication is the party who sent the message or information. In agricultural extension, this source can be extension workers or reforming agents. In the context of development counseling education, competency competencies are needed related to the three synergy keywords "Communication, Counseling, and Development".

The vision of development extension education is related to "The production of competent development researchers, educators and communicators to create an independent, dignified (ethical) society that is prosperous and just". This is realized by developing synergy of communication and counseling systems in equitable development education. In Development, this "Human Development Education" should be a prerequisite for the realization of an intelligent, dignified, just and prosperous society.

So the mission of development counseling education concerns at least three things, namely: (1) Realizing people and communities are smart, dignified, prosperous in justice. Education that produces Science and Technology for the development of human resources and graduates who are competent in participatory social engineering in human development (human capital) and social development (Social capital) in society; (2) Develop synergy of communication systems and extension systems in actual (appropriate) development. Producing graduates with the main competencies to synergize communication systems and

development counseling systems that are adaptive to technological developments and changes in the actual strategic environment (appropriate). (3) Produce competent researchers, educators and development communicators. Producing competent graduates as researchers, extension workers / educators and development communicators in realizing a just prosperous society through the development of science and technology, socio-preneurs and participatory actions that educate people's lives.

The implications of such a vision and mission, several courses, with a level of depth in accordance with the level of competence (Indonesian National Work Competency Standard), are interesting to be discussed and considered in the three perspectives of Counseling, Communication and Development, namely: (1) Counseling, at least covering related theories: Philosophy and Theories of Development Counseling, Development Extension System, Philosophy and Adult Education, Leadership, Social Institutions and Group Management/Social Organizations, Training Management and Integrated Quality Management, Cyber Extension, Socio-preneur and Partnerships, Preparation and Participatory Evaluation of Extension Programs, Counseling Methods and Techniques, Social Change and Development of Human Resources (Human Capital) and Social Capital (2) Communication, at least includes related theories: Philosophy and Theory of Development Communication, Development Communication Systems and Networks, Communication and Social Change, Cross-Cultural Communication and Management of Potential Social Conflicts, Innovation Communication, Digital and Conventional Communication, Group and Organizational Communication, (3) Development, at least includes theories: Development paradigm development, Local Economic Institutions and Local Wisdom, Fulfillment of Human Needs, Quality of Life Development and Development Indicators, and Sustainable Development.

In addition to these courses, it is necessary to strengthen local content in accordance with the advantages of each institution providing development counseling education.

### **2.1 Elements of Communication in Counseling.**

A communication process will be able to take place properly if there are elements that are one unit. There are at least 3 elements of communication, namely: 1). Source/communicator (source/sender) The source of communication is the party who sent the message or information. In agricultural extension, this source can be extension workers or reforming agents. 2). Message (message), Message is information addressed to the recipient. In agricultural counseling, this message can be in the form of counseling materials. The message used in agricultural extension is based on the targeted needs of men and women. 3). Recipient / communicant (receiver), The recipient is the party who receives messages or information, that is, the party who is

expected to change both his behavior and personality. In agricultural counseling, the recipients or targets are farmers (main actors) and business actors and their families. Because the agricultural extension process can be carried out using various methods, techniques and media, the element of communication increases. 4). Channel (channel), Channel is the path through which the message that the source conveys to the recipient. Channels include the use of methods and techniques as well as the use of media that are relevant to the purpose, objectives and nature of the message.

In general, the more senses that are stimulated through various media, the more effective the communication process in agricultural extension. The use of methods, techniques and media for agricultural extension in addition to increasing the understanding of the target to the message conveyed, to encourage the activity and creativity of the target as well as the growth of self-confidence. 5). Effect, the effect of communication is the recipient's response to the messages received and is feedback for the communicator / source of the messages conveyed.

The effect of communication is in the form of changes that are expected to occur in the target as a result of the communication process. The expected changes involve changes in behavior (knowledge, skills, and attitudes), as well as changes in the target personality (independence, toughness, ability to cooperate, self-confidence, the ability to put oneself in a strong bargaining position, etc.). The effects of communication are immediately known, for example changes in knowledge and skills, but some indirect means that it takes a long time such as changes in attitudes and personality. In two-way traffic communication, communicators can get feedback directly compared to unidirectional communication.

### **2.2 Development, Empowerment and Independence Counseling.**

Independence is the culmination of the poses of empowerment in the counseling process. Through Development Counseling, individuals or communities must experience strengthening empowerment in realizing the quality of life of themselves, their families, communities and the environment. The context of Indonesia is in line with the ideals of the nation and the national goals contained in the Preamble to the 1945 Constitution, namely realizing just and dignified prosperity. This is in line with Law No. 16 of 2006 concerning the Agricultural, Fisheries and Forestry Extension System and Law No. 13 of 2009 concerning The Protection and Empowerment of Farmers.

Independence is the culmination of one's empowerment. A person's independence is characterized by high filterability, competitiveness and sanding power in his life behavior. The development of this level of empowerment can occur even from the most helpless (dependent), to empowered (independent) and the peak to independent (interdependent). The individual or

society's helplessness occurs when his life depends on the role of the other party, less able to adapt to changes in his strategic environment. Empowered individuals or societies are characterized by high filterability and competitiveness. A person's filtering power is getting higher in line with the breadth of insight and intelligence he has. While a person's competitiveness is characterized by the high ability to manage businesses or resources in his life effectively, efficiently and with quality.

A person's ability to partner, network synergistically with other parties in their lives. The essence of this sanding power is trust, mutual reliability, mutual strengthening, mutual trust and this is the basic material for building social capital in their living environment. Development counseling is inseparable from efforts to realize welfare in a dignified manner. Law Number 11 of 2009 concerning Social Welfare mandates that the implementation of social welfare in Indonesia includes (1) Social rehabilitation, with the refunctionalization of the social functions of citizens, (2) Social security, namely guaranteed efforts to meet basic needs, (3) Social empowerment, so that the community is able to meet basic needs, and (4) Social protection, so that people avoid the risk of shocks and social vulnerabilities. All of these approaches are relevant to extension activities, especially the social empowerment approach. This approach is very relevant to the principles and philosophies of counseling.

The purpose of implementing social welfare (Law Number 11 of 2009 article 3) is to improve the level of welfare, achieve independence, increase social resilience, improve the ability, concern and social responsibility of the business world as well as the ability of the community's ability and concern institutionally. The principles of social welfare implementation are solidarity, justice, expediency, integration, partnership, openness, accountability, participation, professionalism, and sustainability (Law Number 11 of 2009 article 2). This is in line with the principle of counseling as stated in Law No. 16 of 2006 article 2 democracy, benefits, equality, integration, balance, openness, cooperation, participatory, partnership, sustainability, justice, equity and responsibility.

After going through studies related to counseling and community empowerment practices came to the understanding that in the context of community empowerment the philosophy of counseling is basically "to develop the empowerment of non-formal education participants in an adaptive, participatory, dialogical and synergistic manner to realize human capital and social capital into an increasingly qualified, independent and dignified livelihood".

In empowerment, there is a meaning that the philosophy of counseling is a planned effort (Sumardjo, 2016): 1. Developing the empowerment of participants means liberating citizens of society from ingenuity of ignorance (cognitive), incompetence (psychomotor-conative) and unpreparedness (affective) adapting to

actual life and or liberating from the domination of others. 2. Develop an adult education process (andragogy) for community members, namely meaningful non-formal education as an effort to improve the quality of behavior through learning outside formal schools. 3. Developing adaptive abilities to be increasingly anticipatory, actual, dynamic, with a dialogical communication approach so as to be able to develop a synthesis of various solutions and innovations, as well as participatory (voluntary change) and synergistic there is a convergence of interests with social partners. 4. Developing human capital to be competent and increasingly professional, as well as social capital, namely realizing an empowered and independent society (better community). 5. Improving the quality of life that is increasingly prosperous (to improve their level of living). 6. Realizing individual independence (interdependent) by strengthening filtering power (smart and moral), competitiveness (effective, efficient and quality), and sanding power (sovereign and synergistic in partnership). 7. Realizing a dignified human being and society (sovereign, prosperous, just and civilized). This view is in line with the philosophy of counseling presented by Kelsey and Hearne (1955) in (Sumardjo, 2015; 2016) the following: "The Philosophy of extension is based on the importance of individual in the promotion of progress for rural people and for the nation". The philosophy of counseling is based on the interests of individuals in order to develop progress for rural communities and the state. The philosophy is basically "To help people to help themselves through educational means to improve their level of living". Helping people in helping themselves with education as a means to improve their lives.

The value system that underlies (guides) counseling is basically client empowerment, the importance of future life (anticipatory), and trust (optimism) in the future. An important belief (belief) that exists in extension workers about the nature of reality is to have a systemic perspective (thinking systems that are holistic, not partial), rational and non deterministic. Extension workers should believe in knowledge and learn that knowledge is acquired and transmitted i.e. that learning is context-bound (philosophically idealistic, realistic and pragmatic) and that learning is an active, adative and actual process.

An extension worker or every person involved in empowerment at least has an idealistic, realist and pragmatic philosophy, which is to have a clear picture of the future, based on the reality of life and has benefits for his life and future. Idealistic philosophy is the belief that truth exists in ideals, goals or logical conditions that can be realized, so that everyone needs to have a foresight of the ideal future that he believes can be realized.

Realistic philosophy is the belief that truth exists in the reality of life. Pragmatic philosophy is the belief that everyone believes the truth to exist in something that is

considered beneficial to real life. Community empowerment is basically a process of developing the potential and abilities of individuals / communities so as to strengthen their capacity, to solve the problems they face so that they are able to meet the integrity of their lives.

Community empowerment is carried out through learning/ educational activities and other efforts (for example helping the provision of certain facilities), aimed at improving their ability and willingness to act to overcome the problems and threats they face in everyday life. Learning activities are an active effort of a person aimed at developing insights, knowledge, skills and mental attitudes that have an impact on the growth of the ability to act intelligently in solving problems and meeting their needs.

### **3. RESEARCH METODOLOGY**

The research method used in this study is descriptive qualitative, namely research conducted on independent variables, namely without making comparisons or connecting with other variables.

The way this description comes from interviews, observations, including quotations and summaries from documents.

Primary Data is data in the form of verbal or verbally spoken words, gestures, or behaviors carried out by a trustworthy subject, in this case it is a research subject (informant) with regard to the variables studied. and secondary data is data obtained from graphic documents, photo photos, films, video recordings, objects, and others that can enrich the primary data. Secondary data collection through data obtained from library materials, among others, comes from documents or data regarding laws and regulations, Decrees (SK), journals, the internet, books, literature, and other sources.

Interviews Interviews were conducted at the SibayakLingga Farmer Group to get the problems experienced by the farmer group. Researchers visit the site in person whether the counseling is carried out or not.

### **4. RESEARCH METODOLOGY**

Agricultural extension is defined as an out-of-school education system for farming families in rural areas, where they learn while doing to be willing, know and be able to solve the problems they face properly, profitably and satisfactorily. Or in other words, agricultural extension activities are an activity of conveying information to others, with the expectation that the person can change their behavior by willing to carry out the information conveyed.

Meanwhile, Law of the Republic of Indonesia Number 16 of 2006 concerning the Agricultural, Fisheries and Forestry Extension System (SP3K) states that the agricultural extension system is a whole series of developing the abilities, knowledge, skills and attitudes of the main actors (agricultural activity actors) and business actors through counseling. Therefore, the law states that Agricultural Extension is a learning process for the main actors (agricultural activity actors) and business actors so that they are willing and able to help and organize themselves in accessing market information, technology, capital, and other resources, as an effort to increase productivity, business efficiency, income, and welfare, as well as increase awareness in preserving environmental functions.

Because agricultural extension activities are learning activities, it cannot be separated from interaction and communication activities with each other between farmers and agricultural extension workers. Therefore, communication is an important factor that can support the achievement of counseling goals either in technology transfer or other efforts so that farmers can farm and live better.

#### **4.1 Aspects of the Communication Process.**

Judging from the process, counseling is communication in the sense of the word there are two components, namely humans, one as a messenger or communicator and the other as a message recipient or communicant. In this process the agricultural extension officer acts as a communicator (messenger), while the farmer is a communicant (recipient of the message). The difference between communication and counseling lies in the purpose, where the purpose of communication is general, while the purpose of counseling is special, namely to improve the knowledge, attitudes and skills of farmers as the target. The goal will be achieved when there is an understandable and two-way communication.

But it could happen misunderstandings in communication, where the message cannot be understood by the recipient of the message well. This is due to the presence of factors inhibiting communication between the sender and recipient of the message. There are factors that hinder communication that can be grouped into four main problems, namely: 1) problems in developing messages; 2) problems in the delivery of messages; 3) problems in receiving messages; 4) problems in interpreting messages.

Avoiding all of this, in agricultural counseling it is necessary to plan in advance, so that the agricultural extension process to help farmers achieve their goals can be carried out properly, by eliminating the inhibiting factors that are most likely to occur in communication. It seems that the role of communication is very large in extension activities, which will affect from planning to implementation and evaluation.

Extension workers as communicators are messengers, while the target in this case is called communicants very much that is influenced by their background, both



individually and in groups. For the extension workers themselves, are they ready to communicate from sharing aspects, whether the message they carry is in accordance with what the target wants as well as the channel or media they do is appropriate or is it appropriate for the method they use. However, the most important element in making this behavior change is the occurrence of good communication between the messenger, namely the extension officer, and the recipient of the message is the person who is expected to change his behavior.

#### Aspects of Communication Objectives.

Detailing the existence of three objectives in communication which in practice are often carried out together with different weights of emphasis on the three goals, namely: 1) Informative, providing news information, 2) Persuasive, coaxing and 3) Entertainment, providing entertainment. In the context of agricultural extension activities, it always contains these three kinds of goals even though the levels are not always the same. This is because the main purpose of counseling is to educate. That is, influencing others to be willing to accept / carry out the information they convey happily. Nonetheless the weight of "entertainment" must be kept from always being dominant, so that the information provided can be conveyed in larger portions so as to allow the target to obtain it quite completely and clearly.

We are currently in the digital era 4.0. An era where a lot of information is obtained by utilizing information and communication technology. Existing information can now be conveyed with the help of digital technology that is developing rapidly, information that used to be obtained through face-to-face and manually can now be disseminated through technology. With the digitalization of technology today, counseling will be more effective and efficient. Agricultural extension workers must be able to utilize information technology to increase the enthusiasm of farmers in order to increase agricultural productivity. Extension workers must take advantage of technological innovations that have developed well.

Minister of Agriculture (Mentan) SyahrulYsinLimpo (SYL) asked the millennial generation of agriculture to take advantage of the new paradigm of the digital world in developing farming. "Agriculture is no longer the same as agriculture in the past. In the digital era like now, the agricultural sector is also adapting to technology 4.0 to answer the challenges ahead. Dedi said agricultural extension workers must be able to utilize information technology to increase the enthusiasm of farmers in order to increase agricultural productivity. Extension workers must take advantage of technological innovations that have developed well. "The characteristic of successful extension workers is extension workers who can increase productivity in their respective target areas by utilizing cultivation innovations."

Meanwhile, Rizali Anshar, an agricultural extension worker from South Kalimantan Province, has utilized digital technology by conducting counseling media through video. In the MSPP activity, Rizali shared tips on how to make counseling videos so that they can be accepted and understood by farmers and stakeholders in agriculture. One of them is for the selection of material in the video based on events that are viral or are being hotly discussed. The type of video chosen should be consistent, if from the beginning you choose a video about ornamental plants then the video made should always be about ornamental plants.

Rizali explained that what affect video quality is voice quality and body language. With an excited voice, it will make people watching more excited. But even though you have used a good voice, you still have to use good body language too. "There is a special technique in making videos on Youtube so that the videos made are more watched by the public in this case, especially farmers. There is such a thing as a youtube algorithm that can cause more viewers.", There are fatal errors in making videos including Misdirected content, Less interesting content, Focus on tools, Adsense, Inconsistent.

#### **4.2 Security Education, Training, and Awareness (SETA) Program**

The Security Education, Training, and Awareness (SETA) Program can be defined as an education and training program designed to reduce the number of cybersecurity breaches that occur due to an individual's lack of awareness of cybersecurity. The SETA program can also be defined as a program that targets all users in an organization to help them become more aware of the principles of information security for their work. The SETA program also helps organizations deal with the risk of compromise due to employees' ignorance of how to perform secure IT-based tasks. This is important for every employee to understand cybersecurity because implementing the SETA program requires participation and motivation (Caballero, 2017).

The SETA program in its application consists of three stages which are a series of training, namely the level of awareness (awerness), the level of training (training), and the level of education (education). The implementation of the SETA Program begins with a basic level that is general to all users in this case all existing employees with the aim of building awareness so as to be able to create a culture of cybersecurity awareness throughout the organization and needs to be conveyed to all users focusing on individual accountability.

Ultimately, the higher the level of risk managed by individuals, the higher the level of awareness and training they should get. The cybersecurity education level is usually implemented in a formal education built to teach all the basic concepts necessary to build a career in information security. Already many among

universities and colleges have begun to create curricula that offer bachelor's and master's degrees on information security.

#### **4.3 Training Needs Analysis**

Training needs analysis is an early stage in the training process and involves mechanisms to determine whether training will indeed be able to overcome previously identified problems (Bansal & Prakash Tripathi, 2017). Basically, the purpose of training can be defined if the analysis of training needs is carried out systematically related to development in the organization that is carried out professionally. Therefore, the analysis of training needs begins by defining the gap between what employees know and can do and what they and organizations expect to be able to do, which can be filled with training. Training activities are ensured from the analysis of training needs in order to get the relevance of the target participants and to improve the quality of their performance based on the skills or types of skills needed.

Each training activity requires an analysis of training needs to recognize what, where, how, as well as when it will be implemented. Success.

#### **4.4 Extension Challenges in Disseminating Information Technology.**

Farmers in Indonesia are generally in the lower middle class, with socio-cultural conditions that are still firmly held, especially those who live in rural areas. The characteristics of farmers who are still strongly holding culture require a slower process of receiving innovation. This remains a challenge for agricultural extension workers in delivering new technologies. Small holder farmers generally have a risk averter nature, they are the ones who will bear the risk of what happens by implementing an innovation. Once they are sure of the results that will be obtained if the technology is adopted then the next step is the application of technology. The level of education of elderly farmers is currently relatively low, and most of them are still active in their farming business.

Narrow land ownership is a determining factor for consideration to face risks. The high number of smallholder farmers is a challenge that must be considered in disseminating a new technology. The Function of Extension Workers in Effective and Efficient Dissemination The principle of agricultural extension is to communicate properly, correctly and effectively. Working in the world of counseling must have good communication skills.

Communication is not only in verbal form, but non-verbally by means of codes or lambing. Communication in a language that is easy to understand so that the message or information conveyed can be easily understood. The gestures of the recipient of the information can be a clue as to whether an information is acceptable, for example, facial expression with a

blank look or shaking your head or nodding indicates a lack of understanding with the information being heard. Information that is conveyed prolongedly with the expression of uncommon terms, causes the listener of the information to feel tired and become unfocused. They will chat on their own, no longer concentrating on listening.

Agricultural extension activities must be effectively able to organize counseling with methods that are in accordance with the target, time, place, object (material) and subject (participant). The material presented is in accordance with information needs, this requires initial communication before carrying out counseling. Support counseling media such as posters, videos including using electronic social media that can support conveying information quickly.

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#### **4.5 Institutional and Agricultural Extension Systems**

Full authority in the district/city government to make changes to the extension institutions that are united with the Agriculture Office, resulting in the implementation of agricultural extension services stagnating. The extension system consists of methods, approaches and institutions or organizations. The macro extension system consists of two parts, namely the delivery system and the receiving/adoption system.

Institutional counseling is an important factor in the extension system; without the institution of counseling, the implementation of counseling cannot run. The position and role of extension institutions is to organize extension programs by disseminating technology from technology sources to users (farmers) or clients in the social system. Therefore, extension institutions starting from the central, provincial, district/city, sub-district and village levels must establish a relationship of coordination, integration and synchronization of programs, both functionally and operationally in the implementation of agricultural extension

The agricultural extension system consists of two main categories, namely the delivery system and the acquisition system. The delivery system is the delivery of technological information to farmers based on the needs and goals of the organization. Meanwhile, the acquisition system in agricultural extension is very different. The main idea is that groups of farmers, can organize in any way, so that they can reach out outside their villages to obtain the necessary information.

These organizations are generally smaller, such as farmer associations, small farmer groups, or cooperation

groups in the village. For the extension system to be successful, it must be controlled by the target group, by influencing the agricultural research agenda and the policies of the central government.

The development of today's agriculture, especially with regard to counseling clients, no longer distinguishes based on the specific category of farmer groups targeted, but must reach all layers of farmers; ranging from small farmers, farm workers/farmers who do not own land, peasant women and young peasants (Campbell and Baker in FAO, 1997). There are four main factors that need to be considered in finding or providing an extension framework for the development of technology that suits the needs of the target group and clients. These factors are zone-agroecology, access to resources, gender, age of farmers and tribal groups.

Zne-agroecology is an important factor that needs to be identified such as bio-physical, land type, soil fertility, rainfall patterns, slope and altitude of the place will affect the development of location-specific technology. Such bio-physical factors can influence the adoption of technology. Therefore, in client system counseling, these indicators need to be considered in the delivery of information on technological innovations.

The access to resources factor is to explain the socioeconomic factors that distinguish the access of one farmer from another to other farmers to production factors such as land tenure status (area, owner, trapper, tenant, pawn), capital (source of capital, loan, credit, how to obtain credit, how to grow capital), labor (family labor, outside the family / wages, availability of costs, communal), inputs (availability of seeds, fertilizers and medicines), market (place, price, warehouse, transportation, distance), ability to use technology and information (availability of extension services, suitability of technology).

#### **4.6 Human Resources of Agricultural Extension Workers Who Compete In The Digital Age**

Based on Law No.16 of 2006, extension workers are distinguished in 3 (three) categories, namely (1) Civil Servant Extension Officers; (2) Private extension workers ; (3) Self-help extension workers. In general, the three categories of extension workers have no different functions. As a delivery of information on innovative technology to assist farmers in technology escorts, so that it becomes an understanding of the application stages. Being an extension worker with a higher level of education than a farmer does not mean that he is greater than a farmer. The basic principle of agricultural extension is to learn together to solve problems in farming, our big role is to facilitate farmers to get technological information, as well as its application.

Access to information on social media in the modern era as it is now is more diverse and varied. The Internet is accessible to all walks of life, wide open to various information. Digital technology that continues to

develop, provides the widest opportunities for us to be able to take advantage of both obtaining information and disseminating information quickly in an unlimited space. This facility can be used for extension workers in carrying out the role and function of extension workers to become a learning medium and help solve problems. As an extension worker in charge of BPTP, he is required to always strive to increase capacity to face such rapid technological developments. In the digital era that has various conveniences.

The government continues to facilitate the improvement of the human resource capacity of Agricultural Extension Workers in order to carry out their duties properly. With the provision of knowledge, extension workers must also cultivate creativity and ideas that can provide solutions to agricultural problems in the field. The experience of extension workers in the field combined with the results of research or assessment will provide the right solution and have a positive impact. Digital Products That Can Be Utilized by Extension Workers The basic principle of counseling is efficient and effective communication, the use of communication media is very supportive in disseminating information technology in the digital era.

The use of digital products or the internet in conveying and disseminating technological information more effectively and efficiently by utilizing social media such as Twitter, Facebook, Instagram, Youtube, Google, Whatsapp, Telegram, LinkedIn, Line and various other types of social media. The creation of effective and efficient counseling media has been equipped with a variety that is easy to download either through an Android smartphone or on a laptop or notebook. The trend of counseling that follows the current current digital developments that are classic such as radio broadcasts can already use applications via the internet.

Video clips or films of short duration can be used as a form of media that has a wide spectrum, meaning that it can be easily understood by viewers of various age and education levels. Making it is currently relatively easy because many menu menus are easy to operate because they already use symbols in the form of images. Recording a video clip does not have to use a special camera. Communication equipment such as smart phones have been equipped with photo camera features and video cameras. The editing process can be done easily just by using the application that can be downloaded.

The challenge for extension workers in this digital era is the ability to keep pace with technological developments, which have changed in a relatively short period of time. As an extension worker, you have to read a lot and study the changes that occur. Change is usually the cause of the emergence of new problems, because the existence of information systems that are no longer limited by time and space, can cause unexpected impacts. As an agricultural extension officer who carries out the task of disseminating agricultural technology, conveying new information to farmers. Creativity is

needed to face problems for which there is no solution based on the results of research and studies. Of course, it needs to be supported by the knowledge of extension workers, experience in the field, level of education, hard work and discipline.

A communication process certainly needs to run effectively so that the content of the message is conveyed properly and the purpose of the process can be achieved. Likewise with the agricultural communication process, efforts need to be made so that the process runs effectively. The process of conveying messages in agricultural communication needs to pay attention to various aspects such as attitudes, thoughts, and feelings of the recipient of the message to be able to equalize meaning.

Basically, the process of agricultural communication (especially in agricultural extension) has several stages, namely: 1) Creating awareness, that is, efforts made to attract attention and raise awareness of the recipients of the message (farmers) regarding the existence of something new. 2) Evocative of feelings, that is, an attempt to cause a feeling of opening up in the farmer of something new, which was already realized at the previous stage. So that the farmers have the willingness to know and learn more. 3) Arouse desire, that is, an effort to cultivate a desire in farmers to do new things that are conveyed in agricultural extension activities. 4) Convincing, that is, an attempt to convince the farmers to be sure, not to hesitate, and not to be afraid to do new things. 5) Mobilizing, that is, efforts made to encourage farmers to do new ways or things that are taught, and be able to practice them in a sustainable manner.

Agricultural communication, it is necessary to pay further attention to how the approach is carried out so that the communication process runs effectively. Here are the approach methods that can be done to make agricultural communication run effectively: Group approach method, which is a method of providing agricultural counseling by grouping farmers based on the location of their residence, or paddy fields. (Also

read: Philosophy of Communication) Mass approach method, which is a method of providing counseling that is carried out mass and can reach a wider target by using mass media such as television, newspapers, and so forth. (Also read: Gender Communication) The individual approach method, which is a method of approach by communicating directly to the target such as dialogue with farmers. That way, the information conveyed is more targeted and directed even though it cannot immediately reach many people give importance that they really.

## 5. CONCLUSION

era digital is appropriate for agricultural farmers to be able to use digital media as a medium for the innovative dissemination of agriculture on social media. The extension system is a system of delivering innovations from technological sources to users (farmers) using various existing approaches and methods that are in accordance with client conditions and social systems, so that innovation can be utilized by users to increase income and welfare. The main components of the extension system consist of three sub-systems, namely the client sub-system, the change sub-system and the research sub-system. The research sub-system does not play a direct role in seeding technological innovations but as a supplier of technology (generating system).

The extension approach in the future is no longer designed as a partial concept but concerns all aspects of rural agribusiness activities, but must be able to be realized in operational activities carried out thoroughly, integrated and coordinated from all development actors.

Agricultural extension systems can use the approaches of: (1) agro-ecosystems; (2) territory; (3) agribusiness; (4) institutional; and (5) welfare. The extension system approach is more directed at the growth of the regional economy (local economy) so that it can reach all client life activities in the social system.

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