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Farmers attitude toward the 'gotong royong' extension communication model in the implementation of conservation agriculture at Camplong-2 village of Kupang district, West Timor - Indonesia

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Conservation agriculture (CA) is actually promoting agricultural practices to be able to adapt to climate change is erratic in the past few years. The CA is a farming technique that utilizes the resources of agriculture wisely, not just take the result alone but focus on saving of water and soil humidity to meet the needs of the plants. Therefore, this innovation is considered the right way to minimize the impact of climate change on dry land. Although innovation proved to be superior, but implementation depends on how the effectiveness of the extension communication model delivered by extension officers to farmers. The extension communication is done effectively will be able to increase the motivation and participation of farmers in implementing innovation. Initially study showed that the CA was successfully adopted by farmers of Camplong-2 village. This research aims to analyze the extension communication model that applied and to analyze the farmer's attitude towards extension communication model was applied. Data were analyzed descriptively using the Likert scale approach and SPSS computed. Results are; 1) extension communication model used by field workers in implementing the CA was a local wisdom extension communication called the 'gotong royong' extension communication model that collaboration among the AEW, FAO field worker and researcher in which they have built consensus along with farmers to determined information, time and kind of activities in running the Participatory Training and FFS for CA. This approach had increased adaptation and adoption of CA innovation by farmers. 2) farmer's attitude towards the 'gotong royong' extension communications model was at favorable up to strongly favorable level that acknowledged by 82.6% farmers with an average score of 4.2 or the maximum percentage achieved score of 84%.

Keywords: attitude, innovation, communication extension model, conservation agriculture, 'gotong royong'

INTRODUCTION

The latest days, the impact of global warming has affected the production of agriculture due to it reduces water availability and soil fertilization. The Conservation agriculture (CA) is the innovation created by FAO to practices agriculture not only to

take product but also to conserve water in the ground and soil fertility. Therefore, this innovation is considered the right way to overcome those problems.

The Conservation agriculture (CA) is a farming technique that utilizes the resources of agriculture

wisely, not just take the result alone but also strives to maintain and conservation agricultural resources to keep the stability and sustainability of agricultural productivity. The main focus of this technique is 'saving' of water and soil humidity meet the needs of the plants (Levis, et al., 2018). Conservation agriculture is actually promoting agricultural practices are smart to be able to adapt to climate change is erratic in the past few years. This practices that are developed aiming to improve conditions of physical, chemical, and biological soil so that it can support and enhance sustainable land productivity (Anonymous, 2018).

In practice, (FAO, 2018) mention that conservation agriculture systems consist of three main principles, namely; 1) tillage limited. Tillage limited intended to minimize disruption to the soil wether to physical, chemical, and biological of soil. Physically, the tillage was done perfectly will impact the destruction of soil structure so that it will lead to soil particles and humidity easily drift carried by water. In biology, when ground reversed, micro and macro-organisms that do not need air (an-aerobic organisms) will be in the open air space causing them to die. Likewise, micro and macro-organisms that require air will sink in the ground causing them to die anyway. Likewise, micro and macro-organisms that require air will sink in the ground causing them to die anyway. While chemically, tillage is perfect cause volatile soil nutrient will be lost and the burning of organic matter of the soil. Tillage limited, among others with 'tugal' directly without sports ground, hoes on the hole planting, making the groove for planting (ripping), and the creation of a permanent planting hole. 2) Covering of the soil surface. The closure of the ground or soil surface intended to retain soil moisture, reduce erosion, suppress the growth of weeds, increase soil organic matter and encourage lives of macro and microorganisms in the soil. This effort is carried out either with the heading of the plant or the rest of the plants as mulch. 3) Crop rotations with legume Rotation corn plants with legume intended to enhance the content of nitrogen and organic matter of soil as well as other benefits. However, in practice, many farmers still find objectionable with the rotational pattern because they are still oriented on the corn plants as the main food producers (FAO, 2017). Therefore, other approaches that need to be done is through intercropping between beans with corn.

Basically, this kind of farming systems give priority to consideration of the nature of the agro-ecosystem in the cultivation of agriculture to maintain the sustainability of agriculture, water

resources, ecology and the environment. Morrow (1993) conservation agriculture in line with the permanent agriculture that has three ethics i.e. conservation and keeping natural the sustainability, protect the rich soil with nutrient elements, reduce activities that are destructive towards resources of agriculture.

Various studies conducted by the Research Agency of the Ministry of Land Resources for Agriculture of Indonesia (2018) mentioned that with a system of 'cover crop' able to improve: 1) microorganism of soil and nitrogen, 2) increased PH of soil, 3) soil cation capture capabilities and C organic, 4) soil bulge, 5) decrease the weight of the soil type, 6) increase water content and water retention in soil, 7) increases the bacteria and fungi, 8) increases the activity of the microorganisms and respiration, 9) soil color darker, 10) water content of soil higher. Whereas a permanent hole through the system of deposits of organic matter increases and fertility of the soil increases as well as labor-saving for the long term (Anonymous, 2018).

From the socio-economic aspects (Ngongo, et al, 2018) mentioned that the results of research in the area of Lombok, Sumba and Timor, showed that as many as 80% farmers have adopted the system to dig holes, 16% adoption 'cover crop' and 18% of adopting crop rotation. Whereas if viewed from the aspects of productivity, the system is capable of increasing productivity at 44% in Lombok, in Sumba 80% and 88% in Timor. Then, from the aspect of income, his research proved that the farmers in Lombok are able to augment the income as many as 36%, 77% in Timor and 53% in Sumba.

If the views of data research results above, this system should be applied and replicated by other farmers Lombok, Sumba and Timor. The geographical conditions in East Timor is extremely suitable for implementing this system. Soil that is dry and a little rocky should be done depends on the principle of the excavation hole permanent.

There are several districts of the island of Timor has become the location of the application of conservation agriculture, namely Malacca, Kupang and North Midle East (NME) district. For example, in NME district especially at the village of Sule (Subun Tualele), village of Lapeon in Insana West sub district, while in Kupang district is at the village of Camplong-2 of Fatuleu sub district. The local government and and its stakeholders expecting that the principle of agriculture conservation can be replicated into other villages in NTT. The success of the application of this system relies heavily on

the ability of the government in terms of building innovation model of extension communication that appropriate to farmer's condition in NTT.

MATERIALS AND METHODS

A preliminary study results showed that some of the farmers who found their corn production acknowledges that increased sharply enough by using CA innovation. For example, Dermin (pers. comm., October 25, 2018 in Camplong-2) who planting corn *Sri Kandi* can produce corn as much as 280 kg compared to conventional systems only 21 kg for a land area of one acre. Farmer will adapting and adoption a new technology like CA depend on how good the extension worker using the extension communication model in introducing the technology.

In fact, mostly of farmers had implemented successfully of this CA method. Therefore, the problems of this research were; 1) how the extension communication model has been applied in implementing CA innovations so that corn production increased; 2) How the attitude of farmers towards the model of extension communication developed by FAO, local governments and local researchers in applying conservation agriculture?. The purpose of this study were to know the extension communication model was used, and also the attitude of farmers

toward the extension communication model has been used.

RESEARCH METHODS

The research was done from May to June 2019 using quantitative approach because the communication model and farmers attitudes can be observed and measured. The village of Camplong-2 was selected purposive by reason of the application of conservation agriculture in this village has been integrated with the efforts of cattle as well as accompanied intensively by researchers of BPTP NTT and FAO. Also, all farmers who work with the farmers group had applied this method. While the selection of respondents in the census, that is, all members of the *Group Setetes Madu* of 20 farmers and 26 members of *Tuna Muda* Farmer Group. So, the total respondents of this study was 46 people.

The required data in these studies were primary data and secondary data. Primary data are obtained from the results of direct observation and interviews with farmers that using a survey method. Meanwhile, the secondary data obtained from the FAO document as well as FGD and research results about conservation agriculture and communications. Data from the statistics of Camplong-2 village and Kupang regency were also collected..



Figure 1. The Study Site in Kupang Regency in Timor Island in East Nusa Tenggara Province, Indonesia

To answer the first goal then conducted an analysis of the model of communication based on the elements of communication, while to reach second goal, data was descriptively analyzed that use Likert scale approach (Leedy, 1997) and computing by SPSS 20. Based on Likert scale system, farmers attitude was categorized into five levels of attitudes namely score 1 is given to the strongly unfavorable attitude, scores 2 given for unfavorable attitude, score 3 was given to the undecided/neutral/ moderate attitude, score 4 to favorable attitude and score strongly favorable attitude.

RESULTS AND DISCUSSION

From Figure 1 above showed, there are three sources of communication held a 'gotong royong' i.e. Government extension officers called the Agricultural Extension Worker Field (AEW which local called PPL), the companion power of the Food and Agricultural Organization (FAO) field officer, and researchers from BPTP and also farmers had built a harmonious cooperation as a source and receiver of information to implement conservation agriculture innovations on the field of farmers. Companion to the FAO invite PPL and researchers approach by using the channel of farmer's group. Through farmer groups to deliver a message about conservation agriculture innovation. They are aware as well as motivate farmers and then build a mutual agreement to use Farmer Field School (FFS) methods and the Participatory Training (PT) as part of the process of adult education 'learning by doing'. Messages are packed in the form activities method has been successfully accepted by farmers. They have delivered message through four main activities such as speech in front of farmers, discussion, FFS, PT and counseling. These method had considered to farmers problems and needs. These four combined method have an impact on the development of farming integrative between corn and cattle. The results of this research a little bit different to the results of research held by Levis (2017a) in South Central of Timor Regency and the Regency of Kupang that found the extension officers work in a partial and only convey the message of government programs so that communication is only a one the direction in which ignore the issues facing farmers.

Farmer's Attitude Towards The 'Gotong Royong' Extension Communication Model Applied In The Implementation Of Conservation Agriculture

This research results about the attitude of farmers against the 'gotong royong' extension communication models applied in the framework of the application of conservation agriculture in the location showed that in general or as many as 82.6% of farmers being positive or favorable attitude toward the 'gotong royong' extension communications model developed by FAO in the application of conservation agriculture. In the details of the attitude of farmers towards that model presented on Table 1.

Based on data in Table 1 seen that 82.6% percent of respondents have a favorable attitude to strongly favorable toward the 'gotong royong' extension communication model used in conservation agriculture innovations introduced by the officers. In contrast, only six people (13.04%) farmers expressed displeasure towards that model applied because they do not like the government extension officers (AEW = PPL). Furthermore, they said that during this, AEW or 'PPL' never came to the village.

The attitude of farmers who agree to conservation agriculture innovation communication model will become the entry point to farmers to receive conservation agriculture innovations. This result is in line with Levis (2017a) concluded that the biggest factor that affects the behavior of farmers in NTT is attitude. He found that the attitude has a loading factor of 83.2%, it is the highest powerful to change the behavior of farmers to adopt every innovation in this NTT's province. The condition of farmers like this indicates that the implementation of an innovation to farmer in NTT recommended be done using the 'gotong royong' extension communications model. Cooperation with farmers and field officers conduct joint farmer consensus has made farmers happy (Levis, et al., 2018) and also Nurhadi and Kurniawan (2017) who said message content easily understood by the communicant. The results of this research is different with founding by Levis et al., (2017b) that when farmers in Kupang asked his attitude towards the traditional or local food processing called 'jagung katemak' proved that 93 from 123 farmers interviewed, showed unfavorable attitude toward the 'jagung katemak'. In contrast, farmers in Kupang also are more rational when faced with things that are traditional, but it can meet their food needs i.e.

Of these three things can be described as follows:

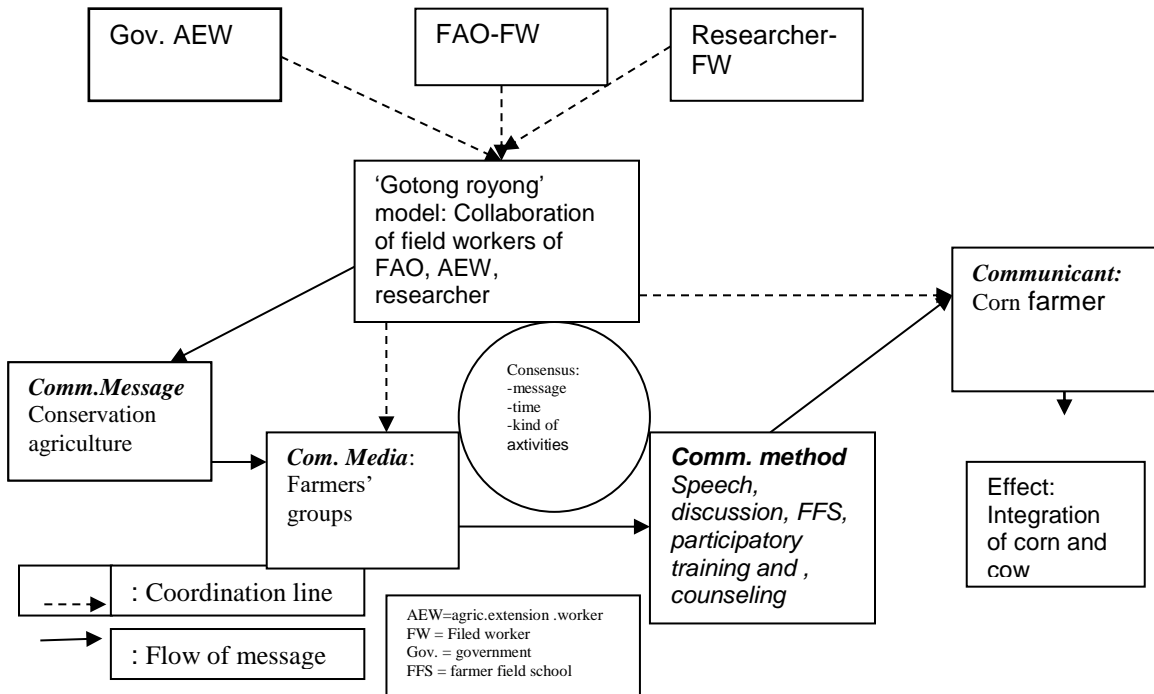


Figure 2. The 'gotong royong' model of extension communication in implementing conservation agriculture to farmers at Campong-2 Village in Kupang Regency in Indonesia, May 2019

Table 1. The Attitude Of Farmers Toward The 'Gotong Royong' Extension Communication Model in The Application of Conservation Agriculture at Camplong-2 village, Year 2019.

No.	Maximum percentage achievement score	Attitude category	Frequency	Percentage
1	≥ 20 - 36	Strongly unfavorable	0	0.00
2	>36 - 52	Unfavorable	6	13.04
3	>52 - 68	Neutral	2	4.35
4	> 68 - 84	Favorable	11	23.91
5	> 84 - 100	Strongly favorable	27	58.69
Total	-	-	46	100

their attitude towards how the ancestral heritage farming system called ' salome ' (Levis, et. al., 2017c).

Farmers Attitude Towards Each Element of The Communications

Farmers Attitude Toward The Source Of Communication

According to the results of this study, that the source of information in this research were AEW,

FAO officer and researcher from BPTP. Research results indicated that farmers acknowledge information about CA comes from extension officers, FAO filed worker and researcher from the Agricultural Technology Research Agency researcher (BPTP) NTT. They are three have become the source of innovation. Reference to Roger and Shoemaker (1961) about the theory of level of innovation adoption, the result of this research as follow. 1) at level of awareness of innovation, as much as 56.52% of farmers or as

many as 26 farmers recognized that information delivered by AEW, 13 people (28.26%) claiming to come from officers of FAO and the rest 15.21% comes from BPTP officer. 2) at level of interest, all farmers acknowledge gained from their friends in the farmer groups. 3) at level of evaluation all farmers or 100% agree that the advantages of the CA comes from FAO officers and the BPTP researcher. 4) at level of trying, adaptation and adoption, farmers gained from FFS and PT which were run in collaboration among the three officers who work with the government called AEW, work with FAO called FAO officer and BPTP researcher.

Extension officers as the main source of information because for the farmers in this region have always hung a hope in farming from the extension officers although AEW never come before this CA program. Later, the existence of AEW become the Central extension officers who are still highly respected and heard by the farmers. Therefore, the source of the communication will work with farmers must be met the standard of competence is needed as suggested by Van den Ban and Hawkins (1996). They suggested the AEW should met standard of competence such as; a) mastering the technical stuff of farming system, b) competence in terms delivered innovation and the process of adoption of innovation, c) competence on participatory training for farmers. The goal of farmer learning process is to change farmer behavior, therefore the field officer should have knowledge all aspect of behavior.

Farmer Attitude Toward to The Message

The message or information about CA was given by PPL, the FAO and escort the researcher BPTP. The message conveyed through dialogue with farmers so the whole or 100% farmer reports are very satisfied with the content of the message conveyed by the officers. In the dialogue has taken place between farmers and the perception of the Equalization of the energy field so that the message about conservation agriculture progress in convergence means that the interests of both parties between farmers and energy field as extension of the three organizations above were highly accommodated. The message presented by the facilitators already meet three main criteria as suggested by Nurhadi and Kurniawan (2017) as follow; a) the message must be delivered in systematic, b) communicators must be able to carry the message that can attract the attention of communicant, c) message content easily understood by the communicant. Furthermore, the process of dialogue between the extension officers

and farmers before the application of CA was in line with the view of John Hickerson, F.J. and Midleton, 1995, Soetrisno, 1988, and Aportadera et al., (1991).

The findings of this research show that the implementation of the 'gotong royong extension communication model carried out in application of this conservation farming activities not in line with the findings of the Levis (2017) that found in carrying out the program sustainability of corn by farmers in West Timor, the message conveyed by extension officers to farmers is not based on an analysis of the problems and needs of farmers and walking in one direction because the extension was implemented based on the system T and V.

Farmer Attitude Toward The Communication Media

The communication media items have a value of loading factor of 0.53 or 53% this means that the influence of the communication media is 53% against the onset of effective communication (Levis, 2017). The results of this research show that there were two media that used in the implementation of conservation agriculture in the study site. First, the media group of farmers where the message conveyed by the officers of the field was presented in the meeting of the Group of farmers. The message was delivered orally and followed by discussions. Second, the media's Garden, where messages are received at the media group of farmers is strengthened when hold a Farmer Filed School and Participatory Training in the garden. The result shows as many as 69% of farmers agree with oral media while 100% of farmers have strongly favorable attitude towards the media of work in the garden. Farmers and fields workers were joint work in the garden planting holes in the excavations in particular and the making of the cover soil. The delivery of the message through the media group managed to foster a sense of sympathy and confidence of farmers against agricultural conservation innovation. The results of this study in accordance with Aportadera, et al (1991) and Sutrisno (1988) which stated that media used will be affecting the effectiveness of the implementation of communication of innovation. If a group of farmers as media of communication was highly influenced farmers attitude to receive innovation. This results supported by the result of research done by Mentari (2012) which concluded that a group of farmers is the external factors that influence the decision of farmers to accept an innovation in agriculture.

Farmer Attitude Toward The Communication Method

Research done (Levis, 2017) by using a method of analysis of WARP-PLS towards the agribusiness development communication mode of corn in the island of Timor, attest to that element of the communication methods extension loading has value of 38.7. That is, the element method can affect the effectiveness of communication of 38.7%. The selection of the right method in communication education in adult education will effect of 38.7% towards the success of a model communication outreach 'mutual' applied. Result of this study showed that the three components of extension workers had used a combination method in transferring of conservation agriculture such as speech, discussion, FFS, PT and counseling.

CONCLUSION

The successful of application of CA innovation in the village of Camplong-2 in Kupang regency was due to; 1) the using of 'gotong royong' extension communication model that suitable to local wisdom that supporting by using media of farmer group and the using of combination method of five activities such as verbal communication, discussion, FFS, PT and counseling ; 2) mostly (82.6% percent) of respondents have an favorable attitude to strongly favorable attitude to the 'gotong royong' extension communication model was used in implementation of CA.

The implication of this result is the government especially the local government of East Nusa Tenggara Province in West Timor when dealing with farmers empowerment might be considered to use the 'gotong royong' extension communication model in which 'gotong royong' as Indonesian ancestral heritage and the use of combination method to accelerate farmers behavior in innovation adaptation and adoption.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

LRL design and conduct research, data collection, data analysis and also manuscript writing. LL designs and conducts research,

reviewing manuscripts and sending manuscripts.

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