

The Effects of Video Message Design to Farmer's Knowledge and Attitude about Good Agricultural Practices (GAP) of Shallots in Banten Province Indonesia

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Abstract: This research aimed to analyze the effect of farmer-to-farmer video design which was manipulated by message sidedness (one and two-sided) to gain knowledge and to change farmer's attitude about Good Agricultural Practice (GAP) of shallots. The samples of the study were ninety six farmers in Gempol Sari village who had not implemented GAP yet. This study applied an experimental design with Solomon four-group design, to find the pre-test sensitization, especially for attitude variable. The results indicated that pre-test sensitization was not significant when testing the experimental messages sidedness to gain knowledge and to change attitude. The farmer-to-farmer video was significantly effective in gaining knowledge. The video contains a one-sided message which was significantly effective in changing attitude about GAP of shallots but has no effect on two-sided message. In addition, characteristics of farmers such as age, education and period of farming are not significantly correlated to knowledge gaining and attitude changing.

Key words: Attitude, knowledge, message sidedness, Solomon design, video, effective

INTRODUCTION

The agriculture competitiveness in this globalization era has forced Indonesian farmers who are main comestible suppliers to compete against big importers that can easily penetrate into our local markets. Other parties do not only urge those farmers but consumers also demand them to provide healthy, safe, qualified and environmentally-friendly comestible. Thus, farmer's agricultural practices have been addressed to sustainable agriculture in intensive agriculture which tried to have more efficiency of land to produce more products and can meet the needs of human today. It is really possible to implement Good Agricultural Practices (GAP) since organic practices in Indonesia have been going very slowly (Mayrowani, 2012). In this research, it is served GAP of shallots which is one of Indonesia's flagship horticulture comodities besides chilies, corns and soybeans.

Based on data released by Horti (2016) the Ministry of Agriculture, the production of shallots from 2011-2015 had a significant increase starting from 893.124 tons/year until 1.229.184 tons/year. Indonesia had exported shallots about 8.000 tons in 2015 to countries like Taiwan, Thailand, Hong Kong, Singapore

and the Philippines. Shallots have become one of the most important needs in every household in Indonesia. The Indonesian government has been developing shallots to many different areas by applying sustainable agriculture. Banten has become one of potential provinces in Indonesia to fulfill the local needs (Anonymous, 2016). There are still many farmers who do not know about the GAP because the number of agricultural extension officers is still deficient. Other causes that very rarely held meetings between farmers to share information/agricultural innovation.

Alternative media to spread the information about agriculture innovation is badly needed. Some researchers have proven that the use of video (audio visual media) is more effective than other learning media such as workshops (Zossou *et al.*, 2009). To persuade farmer's attitude, a sidedness manipulation message is created which consists of one and two-sided messages. Researches about message sidedness are mostly discussed in advertising and marketing. How about in agriculture? Only few researches discuss it, thus the researcher is highly interested in digging up the topic.

Literature review: Mele (2010) developed a farmer-to-farmer video. A new way to improve participatory

methods is farmers who have graduated from Farmer Field School (FFS) shared their learning and innovation with their peers through video. In this research, the designed video will be based on some principles of Zooming-In Zooming-Out (ZIZO) that has been used by Africa Rice Center (WARDA).

First, identify the generic topic of regional relevance. The main way is consulting with various stakeholders with local government, farmer's group or farmers themselves. Another way is reading a report or a research that already exists. Second, develop videos with local actors. Not only involve local farmers to be the object of shooting but also occasionally ask about local circumstances and how they are used to farming because researchers may be inspired by local innovations that can change a few scripts that have been previously planned. A previous research of farmer-to-farmer video research has proven that videos can improve skills and encourage information sharing (Chowdhury *et al.*, 2011) stimulate to innovate influence behavior change (Zossou *et al.*, 2010) and helped to improve multiple livelihood assets (Zossou *et al.*, 2012).

Messages that contain only supporting arguments are labeled one-sided message, those that also address opposing viewpoints are labeled two-sided message (Stiff and Mongeau, 2016). In particular, two-sided messages are more persuasive than one-sided arguments but only if the opposing arguments are refuted. When opposing arguments are raised but not refuted, then one-sided messages are more persuasive (Allen, 1991; Fiske, 1980) argued that negative information is more informative, even if equal in extremity to positive information is given more weight in information integration.

Kao (2011) proven that when high-NFC individuals are under low or moderate time pressure, two-sided messages are more persuasive than one-sided messages; In contrast, one-sided messages are more persuasive than two-sided messages when low-NFC individuals are under low or high time pressure and two-sided messages are more persuasive than one-sided messages when low-NFC individuals are under moderate time pressure. Furthermore, message sidedness and Argument Quality (AQ) are closely related to policy which have a direct impact on attitudes (Kao, 2012). Two-sided messages proved more effective for targets with some high school education whereas one-sided messages were more effective for less educated targets (Hovland *et al.*, 1953). Other research resulted in a two-sided message were more effective than a one-sided message on assessment orientation that they felt more involved in the message and encouraged to reduce the speed of driving. Then, one-sided messages are more effective than two-sided

messages in locomotion orientation (Pierro *et al.*, 2013). The previous research from Cornelis *et al.* (2012) proved that the one-sided message was most effective rather than a two-sided message with refutational or not. Since, strongly issue involved individuals are expected to have elaborated on the two-sided message, refutation does not add any relevant argument they did not consider before. Other research, the two-sided refutational messages may be superior to two-sided non-refutational messages because they clearly show why position is superior to another. The message sources gain a persuasive advantage by making their arguments as complete as possible, so, receivers are not left to fill in the blanks left by an incomplete message (Stiff and Mongeau, 2016).

Purpose of the study: The purposes of this study are to find the effect of video design on farmer's knowledge and attitude, to analyze the difference between one-sided and two-sided message sidedness to gain knowledge and change farmer's attitude. In addition, this study is to indicate the correlation between characteristics with knowledge gaining and farmer's attitude changing about GAP of shallots.

MATERIALS AND METHODS

Video design: The video employed a local actor named Mr. Suherman. He is the leader of Agricultural and Rural Training Center (P4S) in Gempol Sari, Banten who has successfully applied the GAP of shallots. The beginning of video shows the steps of shallots cultivation based on GAP, starting from cultivation seedling, soil preparation, planting, fertilizing, soil maintaining and harvesting (around 6 min). The next part, the one-sided video shows argumentations which support the implementation of GAP, stating some advantages from the economic, health, environment and food safety. Furthermore, the two-sided video, not only contains pros argumentations but also, cons which exposes farmer's challenges and difficulties in implementing the GAP of shallots.

One-sided messages: "Using GAP technique increasing income and gaining crop. Then, it affects the environment because we minimize the residue from agricultural chemicals. Not only to save the environment but also to take care of health for us, farmers. Diseases that affect many farmers such as stroke, high blood are the result of food contaminated with excessive chemicals in fertilizers and pesticides. Therefore, it is must to apply GAP of shallots to keep food safety."

Table 1: Two experiments design on all observation groups

Variables	Groups
One-sided message	Group 1 PSDA
	Pre-test-video-post-test
	Group 2 KSDA
	Pre-test-no video-post-test
	Group 3 PSTA
	No pre-test-video-post-test
	Group 4 KSTA
	No pre-test-no video-post-test
Two-sided message	Group 5 PDDA
	Pre-test-video-post-test
	Group 6 KDDA
	Pre-test-no video-post-test
	Group 7 PDTA
	No pre-test-video-post-test
	Group 8 KDTA
	No pre-test-no video-post-test

Two-sided messages: “Using GAP technique increasing income and gaining crop. Then, it affects the environment because we minimize the residue from agricultural chemicals. Not only to save the environment but also to take care of health for us, farmers. Diseases that affect many farmers such as stroke, high blood are the result of food contaminated with excessive chemicals in fertilizers and pesticides. Therefore, it is must to apply GAP of shallots to keep food safety. Obstacles that many faced during the implementation of GAP, shallots should get more attention from pests and how to eradicate them by using biological agents. After the shallots crop, the land used should be rotated with other plants in this village of biodiversity such as eggplant, cucumber, cabbage, spinach, kale, lettuce and various other leaf vegetables. In the GAP nursery process, the shallot seeds should not be sprayed with fungicide but it is done by fogging on the fireplace while hanging in the para-para (stacks made of bamboo to store the shallots). So, GAP onion is quite difficult to do.”

Research design: This study was treated by true experimental method with Solomon four-group design, consisting of two treatment groups and two control groups with pre-test and without pre-test. The treatment groups were given video shows while the control groups were not. So, there are eight groups of observations that can be shown in Table 1, namely: PSDA (treatment of one-sided messages with pre-test); KSDA (control of one-sided messages with pre-test); PSTA (treatment of one-sided messages without pre-test); KSTA (control of one-sided messages without pre-test); PDDA (treatment of two-sided messages with pre-test); KDDA (control of two-sided messages with pre-test); PDTA (treatment of two-sided messages without pre-test); KDTA (control of two-sided messages without pre-test).

The samples of the study were ninety six farmers in Gempol Sari village, Tangerang Regency, Banten who had

not implemented GAP yet. Then the number was divided into eight groups, so that, there could be twelve farmers in each group. The data were collected using questionnaires interviews with farmers and literature study. The characteristic data of farmers included age, education and period of farming. The evaluation data on the video presentation was presented to the expert consisting of two media experts and a material expert.

The data obtained were analyzed using descriptive statistics. The Solomon four-group design method used meta-analysis of Braver and Braver (1988) starting with 2x2 two ways ANOVA (Analysis of Variance) with treatment factor (video and no video) and test (pre-test and no pre-test) to indicate the sensitization of pre-test. Then ANCOVA (Analysis of Covariance) was used to see the effect of the treatment with pre-test as a covariance. Further tests used were t-test and Z-meta test. Last, correlation test was applied to see the existence of other factors that influenced the effect of treatment.

RESULTS AND DISCUSSION

Farmer’s characteristics: Based on the results of the research shown in Table 2, most of the respondents who sit in each observation group belong to young age category (<39) which is 47.9% and medium age category (39-59) which is 44.8%. After that, the education level of the respondents who belong to each observation group is mostly categorized as low educated (illiterate, not graduated from elementary school, elementary school graduates) which is 56.2%. Lastly, the farming period of the respondents which spreads in each observation group is mostly categorizes as new farmers (<62 months) which is 49%.

Interaction effect: The result of the two-sided variation analysis showed that there was no significant interaction found between the two factors towards knowledge. In the first experiment, the one-sided message video, it was shown by F-value 0.348 < F-table 2.82 at the value Sig. (p) > 0.05. In the second experiment, the two-sided message video, it was shown by F-value 0.004 < F-table 2.82 at the p > 0.05. It means that the effect of the treatment and the test was not correlated one and another against the increase of the farmer’s knowledge. The result was in line with the statement from Bracht and Glass (1968) explained the pretest effect on academic achievement is apparently less prevalent but the results are inconclusive since the studies which have been conducted are not representative of experimental situations where it usually is necessary to use a pre-test.

Table 2: Farmer's characteristic for all observation group

Farmer's characteristics	Farmer's observation group (%)							
	PSDA	KSDA	PSTA	KSTA	PDDA	KDDA	PDTA	KDTA
Age								
Young	41.67	58.33	50.00	33.33	33.33	66.67	41.67	58.33
Middle	41.67	33.33	50.00	58.33	50.00	33.33	50.00	41.67
Old	16.67	8.33	00.00	8.33	16.67	00.00	8.33	00.00
Education								
Low	75.00	33.33	58.33	66.67	50.00	41.67	58.33	66.67
Middle	8.33	41.67	25.00	8.33	33.33	25.00	25.00	8.33
High	16.67	25.00	16.67	25.00	16.67	33.33	16.67	25.00
Period								
New	41.67	50.00	50.00	58.33	33.33	66.67	58.33	33.33
Enough	25.00	41.67	16.67	33.33	50.00	25.00	8.33	50.00
Long	33.33	8.33	33.33	8.33	16.67	8.33	33.33	16.67

Table 3: Means, standard deviations and statistical significance for video effect

Groups	Pre-test	Post-test	Post-test only
	Mean (SD)	Mean (SD)	Mean (SD)
One-sided message			
Knowledge			
Treatment	6.58 (1.78)	9.33 (2.02)**	8.58 (1.73)*
Control attitude	7.00 (2.13)	6.75 (2.14)	6.67 (1.92)
Treatment	42.83 (5.84)	47.83 (2.08)**	46.92 (2.97)
Control	44.25 (3.31)	44.08 (3.32)	45.42 (3.00)
Two-sided message			
(Knowledge)			
Treatment	6.17 (2.21)	9.42 (1.78)*	8.92 (1.62)*
Control attitude	6.42 (2.27)	7.33 (2.96)	6.92 (2.31)
Treatment	46.58 (4.10)	46.83 (2.59)	46.33 (5.07)
Control	44.58 (4.42)	45.58 (4.48)	45.50 (4.60)

*p<0.05; **p<0.01

The interaction between the two treatment factors and the tests was also not found in the attitude variable. In the first experiment, the one-sided message video, it was shown by F-value 1.834<F-table 2.82 at the p>0.05. In the second experiment, the two-sided message video, it was shown by F-value 0.028<F-table 2.82 at the p>0.05. It means that the effect of the treatments and the tests was not correlated one and another towards the change of farmer's attitude.

Video effect: The treatment effect on those two ongoing experiments which were the one-sided message video and the two-sided message video, towards the knowledge increase and the attitude change could be seen in Table 3. In the pre-test, it was not significantly different with the Independent t-test. Thus, it could be assumed that the prior knowledge and the prior attitude of farmers on the controlled and treated groups were the same/homogeneous.

Knowledge: The ANCOVA result between the PSDA group and KSDA group against the farmer's knowledge showed significant increase at the p<0.01 with F-value 24.764>F-table 5.78. ANCOVA was also treated to the

PDDA group and KDDA group towards the farmer's knowledge showed significant increase at the p<0.05 with Fvalue 6.204>F-table 3.47. This means that the effect happened was the treatment given to the respondents. van Mele argued that farmers to watch a video or listen to an audio programme at their own convenience helps to reduce farmer's dependency on outside organizations and at the same time triggers their interest to learn more. Rather than making service providers superfluous we believe video-mediated rural learning will rather create demand for new services and products. In line with the statements above, farmers need a media which can help them deal with their weaknesses like having difficulty in reading printed materials. The element of audio visual in videos help them learn to understand knowledge and information. The farmer's knowledge increase of GAP about shallots was an initial process to introduce new ideas and farming techniques. If equipped with knowledge, farmers can decide to make changes (Ban and Hawkins, 1996).

The video which was developed using farmer to farmer concept (from and for the farmers) and the Zooming-In Zooming-Out (ZIZO) method which has been introduced by van Mele since until now has proven giving strong effects to farmers in creating a conducive learning chance. If local actors are involved in making the video and their expertise is also, used, transferring information will be much easier with horizontal learning. This way of learning is effective for them in order to erase gaps between communicators and communicants. The farmer's knowledge increase about GAP is the main requirement for moving into a sustainable agriculture.

Attitude: Thus, the result of ANCOVA between the PSDA group and the KSDA group towards the respondent's attitude change showed significant increase at the p<0.01 with F-value 20.867>F-table 5.78. It means the effect which had happened has been successfully proven as a result of the treatment given. To boost the farmer's

positive attitude, the result of a research done by Sasongko *et al.* (2014) suggests that the farmer's communication attitude in the shallots cultivation should be increased by optimizing the existence of interpersonal media, mass media and group media which can be accessed by them to search for and pass on high technology adoption about shallots cultivation. It is clearly in line with the result of this research that optimizing the use of video can change farmer's attitude to support and accept the GAP technique of shallots.

ANCOVA was also, treated to the two-sided message video treatment group with pre-test (PDDA) and the two-sided message video controlled group with pre-test (KDDA) towards the respondent's attitude change showed that there was not any significant at the $p > 0.05$ with F-value $0.980 < F\text{-table } 3.47$. The next step was, a single t-test between PDTA and KDTA. The result of the t-test revealed that there was no evidence of treatment effect because the result of t-value $0.422 < t\text{-table } 2.07$ at the $p > 0.05$.

Since, the test results had not shown any significant results yet, the last test which must be conducted was the Z-meta test which combined the last two analyses (Braver and Braver, 1988). In this approach, the p level from each statistical test is converted to a normal deviate z-value, the following formula:

$$Z_{meta} = (Z_{p1} + Z_{p2}) / \sqrt{k}$$

Where:

Z_{p1} = The Z-value corresponding to the one-tailed p-value of ANCOVA

Z_{p2} = The Z-value corresponding to the one-tailed p-value of t-Test

k = The number of such tests. In the present instance, $k = 2$

$$Z_{meta} = (0.98 + 0.42) / \sqrt{2} = 1.4 / 1.41 = 0.99$$

The result of Z_{meta} was 0.99 converted again into p (0.32). The final result showed not significant at the > 0.05 , meaning there was no treatment effect toward the farmer's attitude changes in the two-sided video. They made an aware consideration between the advantage (positive argument) and the challenge (negative argument), a high elaboration against messages through central route was crucially needed (Petty and Cacioppo, 1986). Greenwald (1989) explained that attitude was influenced by thoughts happening in the interlocutor's mind. The existence of a message and the message receiving were two different things. Someone, could learn the content of the message without changing his/her own attitude or behavior.

Message sidedness effect: For knowledge aspect, the manipulation on sidedness message both one-sided and two-sided had proven that it could increase or add knowledge to farmers. It was simply because the beginning part of both videos showed ways to cultivate GAP shallots with equal information (Krosnick *et al.*, 1993). How about the attitude aspect? Based on the present research, there was different effects produced from message sidedness manipulation. The findings of this study are as follows:

One-sided message: Significant, attitude changes were shown by farmers who were exposed with one-sided message video. The PSDA group which was unfavorable in the beginning had a significant increase in their attitude changes to favorable after watching the one-sided message video on shallots GAP. So, one-sided message proves very effective to change farmer's attitude in unfavorable prior attitude.

On one-sided message video treatment group, the attitude changes about income (the economic benefits) have a high increase. It gives a very strong argumentation to the farmers to convince their prior attitude. Messages using rational approach like message sidedness give persuasive effects, thus, argumentation users which support the idea will eventually add the attitude changes effectivity and even strengthen the prior attitude. Next, the farmers thought that the implementation of GAP was not difficult. The one-sided message containing positive argumentation eventually could change their judgment about how difficult it was to implement shallots GAP.

Two-sided message: Although, the one-sided message could significantly change the farmer's attitude, it does not mean that the two-sided message is not good in persuading them to determine their attitude since the mean score of post-test does not get any attitude changes at all. It means they are actually in favorable attitude for the shallots GAP technique. So, the two-sided message still shows an effectiveness in persuading the farmer's attitude which is the prior attitude is favorable.

A research conducted by Rucker *et al.* (2008) proved that two-sided message was effective in creating attitude certainty which was later used to predict behavior. In line with the result, Lumsdaine and Janis (1953) proved that after some viewers exposed with the second counterargument, they found that the two-sided message was more effective in a long time than one-sided argument when they were exposed with the counterargument. The farmers who were exposed one-sided message could possible change their attitude easily, since, they did not have enough information about the challenges and the

Table 4: The correlation coefficient and significance level

Farmer's characteristics	Correlation coefficient	
	Knowledge gaining	Attitude changing
Age	-0.094	0.150
Education	-0.066	-0.169
Period of farming	-0.145	-0.032

*p<0.05; **p<0.01

obstacles in implementing shallots GAP. Meanwhile, those who were exposed with two-sided message video were more convinced with decision they had made because they had known and considered not only the advantages but also the challenges and drawbacks they would face in implementing technique of shallots GAP. It will possible happen because a judgment towards an attitude with less information may lead to predict the attitude in a wrong way. On the other hand, a decision making which is based on sufficient information tends to be stable when giving judgment and behaving about something (Fabrigar *et al.*, 2006).

There is an attitude score increase on risk aspect on the two-sided message video. The farmers said that they dared to take any risks when implementing the shallots GAP. Hale *et al.* (1991) explained that someone who got exposed by two-sided message video and later changed their attitude or behavior into a positive direction, it could be concluded that his attitude change would last in a long period of time (consistent). It was not easy for someone who had already known the drawbacks of something but instead he was motivated to be able to undergo the risks.

Correlation: The characteristics of the respondents which are assumed can influence their knowledge increase and their attitude changes are as follows: age, education and period of farming. Based on Table 4, there is no significant relationship found between age, education and period of farming towards their knowledge increase and their attitude change. It is shown in $p>0.05$. It means, farmers' gain knowledge and attitude changes caused by treatment. Videos can gain knowledge and change attitude of the farmers with various age group, different education background and different period of farming.

CONCLUSION

The use of the Solomon method has proven that there is no sensitivity in the pre-test on both dependent variables which are knowledge and attitude. Farmer-to-farmer video proved to gain farmer's knowledge in understanding GAP of shallots. One-sided message video is effective to change their attitude. While the two-sided message video is not proven to change that.

The effect caused in this study is simply because of the treatment given since there is not significantly correlated between the characteristics of farmers (age, education and period of farming) with gaining knowledge and changing attitude.

RECOMMENDATIONS

The farmer-to-farmer video concept is best developed in Indonesia for disseminating information and innovation in the field of agriculture, so that, it can become the best solution since the number of agricultural extension officers is still deficient. In this study, the communication is still a one-way communication and the feedback is only a closed-questionnaire limited to knowledge and attitude. Thus, for the next research, after the video is played, an interactive dialog can be further conducted, so that, transactional communication can take place and one source information is avoided, since, it is highly possible that other farmers have got experiences or knowledges that can be shared to their peer farmers.

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