

# Adoption and Innovation Process in “Jajar Legowo Planting Technology” By Farmers in Bantul Regency

Sutrisno

*Department of Agribusiness  
Universitas Muhammadiyah Yogyakarta  
Yogyakarta, Indonesia  
sutrisno\_agrifp@umy.ac.id*

Tika Rahmawati Nurvitasari

*Department of Agribusiness  
Universitas Muhammadiyah Yogyakarta  
Yogyakarta, Indonesia  
tikarahma017@gmail.com*

Indardi

*Department of Agribusiness  
Universitas Muhammadiyah Yogyakarta  
Yogyakarta, Indonesia  
indardi@umy.ac.id*

**Abstract**--The aims of this research is to describe the adoption process, the reason of adoption sustainability and the adoption rate of Jajar Legowo Planting Technology towards farmers in Bantul Regency. This research was conducted by using simple random sampling based on the percentage of the application of Jajar Legowo Planting Technology in Bantul Regency. This research were analyzed using descriptive method. The primary data was taken from interview of 50 farmers as respondents. All respondents are domiciled in Bantul Regency. The result of this research shows that majority of farmer in Bantul Regency has passed all adoption process stages including introduction, persuasion, decision and confirmation. The adoption process that needs to be considered is persuasion stage at the time of the implementation of demonstration plot, the success of demonstration plot is influenced by the speed of innovation in adoption, so the failure of the demonstration plot should be minimized. The reason of farmer to decide sustainability adoption is because there are some different opinions such as the ease of farming, suitability of land, profit of farming and influence of farmer's group. It is concluded that the level of the application of Jajar Legowo Planting Technology towards farmer in Bantul Regency is in middle category.

**Keywords:** *Adoption, Innovation, Jajar Legowo Planting Technology*

## I. INTRODUCTION

Bantul Regency is one of the regions of Yogyakarta Special Region Province. Bantul's economy is able to grow rapidly one of them in agriculture. The Excess of natural resources in Bantul Regency which is fertile and almost spread throughout of the region, however the productivity of rice plants in Bantul Regency is still not stable. Based on the data from the [1], the productivity of lowland rice in Bantul Regency in 2012-2014 continued to decline. In 2012 until 2013 the total productivity decreased by 4.06 Ku / ha, then in 2013 until 2014 the total productivity of rice in Bantul Regency, again decreased by 0.58 Ku / ha.

The declining productivity can be solved by land intensification, such as through the use of superior seeds, balanced fertilization, right waters, pest control and so on. These efforts are in addition to get optimal plant growth and are also intended to increase farmers productivity and income. These component-combination can be applied by using Jajar Legowo Planting Technology. Jajar Legowo Planting Technology was introduced in Bantul Regency in

2007 through socialization from the Food Security Counseling and Implementing Agency of Bantul Regency (BKP3) to all Agricultural Extension Agencies (BPP) from each sub-district in Bantul Regency. Then the socialization of the Agricultural Extension Agency (BPP) from each sub-district do the review or demonstration plot to all farmer groups found in each sub-district with the hope that the farmers will be able to apply the Jajar Legowo Planting Technology.

The results of a research conducted by [2] states that the farmer response to the application of Jajar Legowo Planting Technology in the Bantul District with a range score of 125.35%. However, in fact, the adoption of the Jajar Legowo Planting Technology used by farmers in Bantul Regency is varied. After the application study program or demonstration plot conducted by the Extension Agency Agriculture (BPP) from each district, there are some farmers who decide to return to conventional rice planting systems. From this condition, it is possible that there are several things that affect farmers in the adoption process that occurs, as well as the reasons underlying the farmers in the decision of adoption and need to measure the level of Legowo row planting technology application happened to rice farmers in Bantul Regency. From the explanation, the aims of this research is to describe the adoption process and the reason of adoption sustainability of Jajar Legowo Planting Technology towards farmers in Bantul Regency.

## II. METHODS

The study was conducted in 4 farmer groups from 4 sub-districts in Bantul Regency. Selected farmer groups namely Mugi Makmur, Tirta Nugroho, Sido Rukun, and Sido Makmur 1, the determination of the sample of farmer groups was done intentionally (purposive sampling). The respondents in this study were 50 farmers. The primary data were obtained through interviews, while for secondary data, the data was obtained from the internal data of the Farmer Group, the Food Security and Extension Agency (BKP3) of Bantul Regency, and the Agricultural Extension Agency (BPP). This research is carried out with the assumption and limitation of the problem, namely the condition of the study area such as the geographical location and the influential climate in which they are considered the same. The samples taken were rice farmers who had attended counseling on

Jajar Legowo Planting Technology, and the information obtained by farmers about the legowo planting technology was considered the same. The data collection in this research is conducted through interviews to the respondent that has been selected, the interviews will be conducted based on a list of questions that have been compiled by the researchers. The research method used in this study is descriptive analysis. The researchers make a simple tabulation by using microsoft excel based on information obtained from the results of questionnaires and interviews. Then, the results of tabulation is made based on the number of answers from respondents, so it will be obtained the results of the answers of each variable stages of the adoption process.

### III. RESULTS AND DISCUSSION

#### Innovation Adoption Process

**Knowledge Stage**, at the knowledge stage, farmers get information from agricultural extension. At this stage farmers were introduced to the Jajar Legowo Planting Technology innovation by agricultural extension officers through the field school program (SL-PTT) with the aim of the farmer groups. In the SL-PTT activities, in addition to obtaining information about the Jajar Legowo Planting Technology innovation, farmers also obtained information about hybrid variety seeds, balanced fertilization and use of organic fertilizer. To support SL-PTT activities, the government provides facilities in the form of seed assistance, planting tools and costs for planting and harvesting movements, jellyfish activities, guidance, guidance, monitoring and evaluation.

Hence, it can be said that farmer groups are still an important forum for farmers to obtain information in introducing a technology through counseling. According to [3] the existing farmer groups show many important roles in the implementation of agricultural development programs. In addition, the role of extension workers is very influential on the subsequent decisions that farmers will take as adopters. This is consistent with Maryani [4] opinion that the ability of instructors to communicate, mastery of material and the ability of instructors to motivate farmers is very important in changing the behavior of farmers to adopt an innovation. So that the role of extensionists is a very important factor in socializing as well as to increase farmers' knowledge, forming a positive attitude while changing the behavior of farmers to accept an innovation that has been introduced.

**Persuasion Stage**, after farmers gained knowledge about agricultural innovations through field schools and practiced them in demonstration plots, farmers began to assess and consider information regarding the innovations they had received. At this stage innovation is tested and questioned in terms of ease, suitability, level of profit and farmers' interest in the innovation of Jajar Legowo Planting Technology. The results showed that the innovation adoption process of farmers took a long time, farmers in adopting did not necessarily receive an innovation, but farmers needed time to see the results obtained after the experiment. So, the success of instructors in conducting experiments or

demonstration plots is very influential on the speed of adoption of innovation.

When the demonstration plot was held in each sub-district, it was located on a strategic roadside, making it easier for farmers to observe the implementation of Jajar Legowo Planting Technology implemented by SL-PTT members and extension workers. Usually farmers are more quickly adopting an innovation if the innovation offered is easier than something that was before. This is in accordance with what was conveyed by [5] that the level of complexity of an innovation will affect the speed of the innovation adoption process. The easier the innovation can be practiced, the faster the process of adoption of innovation will be done by farmers.

At this stage, the farmer will consider his decision to implement the innovation or reject it. Usually when an innovation is in accordance with the environmental conditions of farmers both socially and economically, the farmer will be interested and will seek additional information to ensure his decision. This is in accordance with the opinion of [5] if in the process of adoption of innovation involves greater costs, usually someone will act more carefully in adopting the innovation. In addition, farmers will take into account whether the innovations introduced will provide benefits to the farming business, especially in terms of economic benefits. Basically farmers who have benefited from the application of an innovation will be interested and the possibility of adoption will be higher. The statement is in accordance with [6] who stated that the greater the relative advantage of an innovation, the faster the innovation will be adopted .

**Decision Stage**, at this stage farmers make decisions on an option to use or reject the innovation. Farmers usually in implementing innovation have many considerations, so they need data to convince them. The success of demonstration plots when SL-PTT is very influential on the decisions that will be taken by farmers. At the time the demonstration plot, farmers will consider various aspects related to the innovation. After the farmers are interested, farmers will usually experiment on their own farms on a small scale to minimize losses in the event of failure. So that at this stage the education should continue to be carried out with a commitment so that farmers can solve the problems themselves faced through direct assistance from extension agents. This is in accordance with what was conveyed by [7] that in order to increase the adoption of farmers in implementing the legowo crop, continuous and continuous extension activities are needed so that feedback occurs in an innovation adoption.

This type of decision also affects a person's speed in adopting an innovation. Based on the results of the study, there are 2 types of decisions that occur in Bantul farmers in the adoption of Legislative Jajar Planting innovations. Most farmers in Bantul Regency stated that the decision to implement the Tanam Jajar Legowo Technology was based on their own awareness and willingness without coercion from other parties, because they felt they were convinced that the Jajar Legowo Planting Technology was beneficial

for their farming. However, there are also some farmers who state that the decision to implement Jajar Legowo Planting Technology is included in the type of authority decision, based on the results of interviews with farmers in the research location stated that their reason for implementing Jajar Legowo Planting Technology was a joint decision of the farmer group even in agreement if there were members those who do not apply the Jajar Legowo Planting Technology in their farms will be given sanctions that have been agreed together.

In general, in decision making that innovation is decided by relative authority it is believed that it will be adopted more quickly because people involved in the process of making an innovation decision are fewer. However, if the form of traditional decision, the adoption time will be longer. So it can also be said that a person's decision making on an innovation is not an easy matter, even the time cannot be estimated. This is in accordance with Rogers 1981's opinion in [8] that a person's decision to accept or reject an innovation is not an action that can be once made, but rather a process that consists of a series of actions within a certain period.

**Confirmation Stage**, at this stage, the farmer seeks reinforcement information related to the decision that has been taken. usually farmers who apply mutual evaluation and will tell farmers who do not apply. If successful, usually many farmers who do not apply will follow it without being told, whereas if they fail to implement it will usually change their mind to stop applying, to get convincing data. At this stage farmers remain active in seeking additional information to ensure their decision.

In this case, farmers who are just learning an innovation, mentoring counselors is very important in helping to solve problems if the farmers experience problems during the implementation. In this case even though the farmer accepts and decides to implement an innovation sometimes it is still hindered by a number of obstacles, one of which is by planting workers who have difficulty in implementing the innovation on the grounds that they are not familiar. Besides being constrained by labor, farmers usually find it difficult to implement innovations that farmers find difficult and require additional costs.

As a form of confirmation if a person accepts an idea, an idea or an innovation, it is likely that the farmer will continue to apply if he feels the benefit, while if the farmer fails to cause a loss, the farmer will stop continuing because it does not meet their expectations (disenchantment). At this stage usually the group that first receives or applies is the heads of the farmer groups while those who refuse are group members because they need confidence by seeing the results of the group leaders.

### **Reasons for Sustainability of Adoption Decisions**

**Continuity**, is a person's decision to accept or continue to implement an innovation. Continuity usually occurs because someone is satisfied with the results of the application of the innovation. Based on research conducted on rice farmers in Bantul Regency, the reason farmers

decided to continue to implement Jajar Legowo Planting Technology because of the advantages, ease of farming, the influence of the group and the suitability of the land.

For profit reasons, farmers stated that Jajar Legowo Planting Technology was able to provide more production results compared to conventional planting systems. This is because the implementation of Jajar Legowo Planting Technology is able to provide different spaces in obtaining the sunlight needed in the photosynthesis process. The more sunlight the plant can get, the faster the photosynthesis process will take place and eventually accelerate plant growth. In addition, a wide spacing in Jajar Legowo Planting Technology can facilitate plants to get nutrients so that plant growth can be more optimal and the number of tillers produced will be more. Based on the results of the interviews, farmers stated that when the demonstration plot was implemented with the implementation of Legowo planting technology, it was able to produce 9 tons / ha of grain with a 30% plant population. Whereas if using a conventional cropping system is only able to produce 6.4 - 6.5 tons / Ha, so from this it is proven that legowo row planting technology is able to increase productivity significantly.

For reasons of ease in farming, farmers in Bantul Regency state that the Jajar Legowo Planting Technology is able to provide facilities for their farming. With Jajar Legowo Planting Technology, the outermost row of plants provides space that makes it easier for farmers to fertilize and weed, with empty lines, farmers need only one way to fertilize and weed so that they will save time and energy. With the implementation of Jajar Legowo Planting Technology, farmers will also be easier in pest control, in the empty rows between Legowo units can be made shallow ditches, the trench can function to collect golden snails. In addition, the availability of labor in the research location is also one reason farmers continue to apply the planting technology.

For reasons of influence from the group, the farmers stated that applying the Jajar Legowo Planting Technology due to the encouragement of the farmer groups required the farmers to implement the planting system, however the farmers also felt that the Jajar Legowo Planting Technology was able to increase productivity and provide ease in fertilizing and weeding so that time and labor to take care of the land to be more effective and efficient.

For reasons of land suitability, a farmer stated that he applied the Jajar Legowo Planting Technology because the location of the farmers' agricultural land in accordance with the cropping system was easy in water management. Basically Jajar Legowo Planting Technology in addition to paying attention to the age of the seedlings must also pay attention to the irrigation system in the land. One of the objectives applied is the Jajar Legowo Planting Technology to utilize air turbulence effects which when combined with intermittent wet-dry irrigation systems can lift the acids soil organic which is harmful to plants through evaporation, so that it will increase the content of carbon dioxide (CO<sub>2</sub>) and the results of photosynthesis of plants will be maximized.

**Discontinuity**, it is someone's decision to stop using innovation after previously adopting the innovation. The reason farmers in Bantul regency change their decision from applying to not applying due to the reason that Legowo planting technology is not profitable, the land is not suitable, and it is difficult to implement.

For unfavorable reasons, farmers stated that the planting technology was not able to produce results that were different from conventional planting systems or tiles, farmers only cultivated their agricultural land to meet their daily needs so that when harvesting the farmers did not calculate the yields. In fact, farmers feel that by applying technology, the row of Legowo increases production costs such as the price of more expensive planting power, more needed seeds, and more fertilizer needs due to the increasing population.

For reasons that the land is not suitable, the farmer said that he stopped applying Jajar Legowo Planting Technology because the agricultural land in the research location was not in accordance with Jajar Legowo Planting Technology which was supposed to use intermittent irrigation systems. Agricultural land at the research site is difficult to discharge, even floods often occur and the condition of the land is too much snails. In addition, farmers stated that the absence of assistance from extension workers was also one of the reasons why farmers stopped applying the planting technology. When the farmer told the problem to the extension agent, the farmer felt he did not get a solution to the problem at hand. So that the farmers finally decided to stop applying legowo planting technology and switch to conventional cropping systems.

For reasons that the method is difficult to implement, farmers say they find it difficult to plant because they have to adjust the size, it is also due to the availability of planting workers who are old and difficult to change the previous habits. The jajar legowo planting technology package that has been introduced to farmers is not fully implemented by farmers, such as balanced cropping and fertilization patterns that are very dependent on the ability of the planting power and farmers' economy. In addition, the pace of adoption can also be influenced by farmers' habits, usually farming activities carried out by farmers have been carried out from generation to generation so that farmers tend to carry out activities based on their experience so that it is difficult to adopt new technologies. In accordance to Fujisaka's statement in [9] some of the causes of farmers rejecting innovation are the technologies offered by farmers and may not be better compared to existing local technologies, technological innovation creates new problems for farmers because it is not appropriate with technology existing localities, and the application of technology requires high costs while the results obtained by farmers as adopters are inadequate.

#### IV. CONCLUSION

The result of this research shows that majority of farmers in Bantul Regency have passed all of the stages of adoption process. The process are introduction, persuasion,

decision and confirmation. The adoption process that need to be considered is persuasion stage at the time of the implementation of demonstration plot, the success of demonstration plot is very influence to the speed of innovation in adoption, so the failure of the demonstration plot should be minimized. The reason of farmer to decide sustainability adoption is because there are some different opinions such as ease of farming, suitability of land, profit of farming and influence of farmer's group.

#### REFERENCES

- [1] Badan Pusat Statistik (BPS). 2015. <https://www.bps.go.id/brs/view/id/1271>. diakses pada tanggal 2 Maret 2017
- [2] Kementrian Pertanian. 2015. Tanaman Pangan. <http://www.pertanian.go.id>. [online] Diakses pada 11 Juli 2017.
- [3] Nuryanti, Sri dan Dewa K. S. Swastika. 2011. Peran Kelompok Tani Dalam Penerapan Teknologi Pertanian. *Jurnal Forum Penelitian Agro Ekonomi*. Vol. 29 No 2. Pusat Sosial Ekonomi dan Kebijakan Pertanian.
- [4] Maryani, N. Dewi, dkk. 2014. Adopsi Inovasi PTT pada Sekolah Lapang Pengelolaan Tanaman Terpadu (SL-PTT) Padi di Kecamatan Sukawati, Kabupaten Gianyar. *Jurnal Manajemen Agribisnis* Vol. 2, No. 2, Oktober 2014. ISSN: 2355-0759. Universitas Udayana
- [5] Soekartawi. 1988. *Prinsip Dasar Komunikasi Pertanian*. UI-PRESS. Jakarta
- [6] Harinta, Yos Wahyu. 2011. Adopsi Inovasi Pertanian di Kalangan Petani di Kecamatan Gatak Kabupaten Sukoharjo. *Jurnal Agrin*. Volume 15 Nomor 2. ISSN: 1410-0029
- [7] Irwandi, Dedy dan Susilawati. 2016. Peran Penyuluh Pertanian dalam Adopsi Inovasi Padi Sistem Jajar Legowo di Lahan Pasang Surut. *Prosiding Seminar Nasional Inovasi Teknologi Pangan*. BPTP. Kalimantan Tengah.
- [8] Hanafi, Abdillah. 1981. *Memasyarakatkan Ide-Ide Baru*. Usaha Nasional, Surabaya
- [9] Kartasapoetra, A. G. 1987. *Teknologi Penyuluhan Pertanian*. Jakarta. Bumi Aksara.