

Innovation Adoption Process On Shallot Cultivation From True Shallot Seeds By Farmers In East Payakumbuh, Payakumbuh, West Sumatera

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Abstract – This study aims to analyze the adoption process of farmers' innovations on shallot cultivation from true shallot seeds in East Payakumbuh sub-district, District of Payakumbuh, West Sumatera, Indonesia. The research was conducted in the Working Area of the Agricultural Extension Center in East Payakumbuh District. The research method used is a case study with a total of 29 farmers who have received information about cultivating shallots from true shallot seeds (TSS) and have implemented shallot cultivation using the bulbs. Data analysis was carried out using descriptive qualitative and percentage.

The results showed that farmers went through several adoption stages regarding shallot cultivation from the seeds, namely obtaining information (knowledge stage), experimenting the innovations on shallot cultivation from seeds on a small scale, and assessing the innovation from the technical and economical aspects. However, most farmers ended the innovation adoption process by not adopting the innovation or refusing to apply the innovation on their land.

The results of the study illustrate that not all stages in the adoption process are passed and accepted by farmers, and the innovation decision process does not always end with adoption.

Keywords – Innovation Adoption Process, True Shallot Seeds.

I. INTRODUCTION

Shallots are one of the most consumed horticultural commodities in daily life. This vegetable commodity belongs to the group of non-substituted spices which function not only as food seasonings but also traditional medicinal ingredients (Agricultural Research and Development, 2005). Aside from being the main seasoning for cooking, shallots are also potential to be used as raw materials for the food industry, such as fried onions, flour, dried slices, and pickles (Darmawidah et al., 2005). The demand for shallots is predicted to always increase in line with the development of culinary business and food industry. According to Sumarni (2005), in the last decade, there has been a great demand for shallots for domestic consumption and seeds, therefore increased production and quality of shallots must be encouraged continuously through intensification and extensification.

In Indonesia, shallot are generally cultivated using bulbs as planting material. This is because planting with bulbs is considered more practical and uncomplicated with high success rate. However, one of the obstacles in shallot cultivation is the limited bulb time and quantity, not to mention the increased price of the bulbs during planting season resulting in expensive and risky production costs for shallot cultivation. The use of bulbs of the same variety for generations also causes little opportunity for quality improvement causing decline in the competitiveness of Indonesian shallots. One way to solve this problem is through the introduction of cultivation technology using true shallot seed (TSS). Compared to traditional bulbs, the use of TSS has several

advantages, namely the need for seeds of only around 7.5 kg per ha compared to bulbs of around 1.5 t/ha, high resistance to virus and bulb-borne diseases, reducing planting costs, producing healthier plants, and higher yield than that of bulbs (Sumarni et al. 2005)

The city of Payakumbuh is one of the lowland areas beginning to develop shallot cultivation from True Shallot Seeds (TSS) since 2018. In order to encourage and develop shallots from TSS, the local government through the Payakumbuh City Agriculture Service has carried out various activities to introduce shallot cultivation innovations from TSS to farmers in Payakumbuh City, including in the sub-district of East Payakumbuh. As an innovation, it is expected that the shallot cultivation technology from seeds will be adopted by farmers in this area.

Adoption of innovations has been shown to be critical to the process of change in human societies (Adebayo, 2005). Mardikanto (2009) states that every innovation that is introduced to farmers is not always immediately adopted, but there are several stages that beneficiaries must go through until they decide whether they will adopt or even reject the innovation. According to Rogers (1983) the innovation decision-making process is the process by which a person passes from first knowledge of an innovation by forming an attitude towards the innovation to deciding whether to reject or accept. The stages in the adoption process consist of: (a) awareness stage, (b) interest stage, (c) evaluation stage, (d) trial stage, (e) adoption stage

Extension workers as change agents and as mediators in development communication are expected to assist farmers to be aware of innovations, discuss to individual farmers to motivate them in new information and innovation, assist them to evaluate, and try the innovations (Halil, 2017). An assessment of the decision process for cultivating shallots from TSS by farmers is crucial so that an extension strategy can be formulated to increase the adoption of innovations by farmers for cultivating shallots from seeds.

II. RESEARCH METHODS

This research was conducted from September to November 2022 in the East Payakumbuh sub-district. The research method is a case study, with as many as 29 farmers receiving the shallot development program in East Payakumbuh District as respondents. The criteria for farmers as research respondents were farmers who had received information about shallot cultivation from true shallot seeds and bulbs. Data collection was carried out by in-depth interviews with respondents and extension workers or agents for the development of shallot cultivation from seeds. Data analysis was performed with descriptive qualitative. The stages of innovation adoption that farmers go through is described and analyzed based on the innovation adoption process theory put forward by Rogers (1983).

III. RESULT AND DISCUSSION

a. Characteristics of Respondents

The characteristics of the respondents observed consisted of age, gender, last formal education, non-normal education attended in the last year, land area, and land ownership status. The distribution of respondent characteristic data is presented in Table 3.

Table 3. Characteristics of Respondents

No	Internal Characteristics	Categories	%
1	Age (year)	a. 21 – 38	20.7
		b. 39 – 56	48.3
		c. > 56	31
2	Sex/Gender	a. Male	65.5
		b. Female	34.5
3	Formal Education	a. Primary School	24.1
		b. Junior High	20.8

		School/equal	48.3
		c. Senior High School /equal	3.4
		d. Diploma 3	3.4
		e. Bachelor Degree	
4	Informal Education	a. Yes	41.4
		b. No	58.6
5	Land Ownership	a. Private	51.7
		b. Lease/Rent	48.3
6	Farming Experienced (year)	a. 1- 15	65.5
		b. 16 – 30	24.1
		c. > 30	10.4
7	Land Area (Ha)	a. 0,2 – 0.8	58.6
		b. 0,9 – 1.5	24.1
		c. >1.5	17.3

The results showed that most of the respondents (48.3%) were in the age category of 39 to 56 years, followed by farmers over 56 years of age. This illustrates that many of the farmers in the research location are rather old. The majority of the farmers is male, indicating that the agricultural sector is still dominated by male in old age. However, this old age is not in line with high farming experience, as shown in Table 3, that most of the farmers have farming experience ranging from 1 to 15 years. Information in the field stated that many of the respondents in previous studies worked outside the agricultural sector.

In the aspect of the formal education of the respondents, it was included in the fairly high category, namely at the senior high school level, with 48.3%, and there were even farmers with bachelor degree or undergraduate education. The education level of farmers is influential in making decisions to adopt innovations because it is related to the ability to obtain information and apply existing technology to be developed in their farming business (Sofia, 2022)

Most of the respondents (58.6%) have a land area that is in the narrow land category, which ranges from 0.2 to 0.8 Ha. This condition is in accordance with information from the Ministry of Agriculture's Agricultural Research and Development Agency (2005) which states that the shallot farming profile is mainly characterized by 80% of small farmers with a land area of less than 0.5 Ha.

b. Farmers' innovation decision process for cultivating shallots from true shallot seeds

The innovation decision process of farmers regarding shallot cultivation with seeds is measured based on the stages of innovation adoption by Rogers (1983) which consist of the awareness or knowledge stage, interest in innovation, the stage of evaluation or assessing innovation, the stage of trying innovation on a small scale, and the stage of implementing innovation. The process of adopting farmer innovations is presented in Table 4

Table 4. Distribution of respondents in the process of adopting farmer innovations for shallot cultivation with true shallot seeds (knowledge stage)

Knowledge or awareness on the innovation	Frequency	%
a. Time of Knowing		
• 2018	18	62.1
• 2019	2	6.9
• 2020	7	24.2
• 2021	1	3.4
• Do not remember	1	3.4
b. Type of Information obtained		
• Cultivation	24	82.9
• High Harvest Yield	2	6.9
• Big Bulbs	1	3.4
• Price	1	3.4
• Economical/ Cheap	1	3.4
c. Sources of information		
● Extension Workers	22	
● BPTP (Indonesian Agency for Agricultural Research and Development)	3	
● Farmer Groups	4	

Table 4 shows that the majority of respondents (62.1%) received information about the innovation of shallot cultivation from seeds in 2018 through agricultural extension workers in their group. The introduction of shallot cultivation innovation from the seeds was carried out through the shallot development program by the Payakumbuh City Agriculture Office. The information shared was about shallot cultivation, which includes; how to prepare the nursery, sow the seeds, handle the seeds in the nursery as well as planting techniques in the field up to the harvest and post harvest processes.

The interest stage in innovation is the next stage that beneficiaries will go through after they receive information about an innovation. This is usually indicated by the activities of beneficiaries by seeking further information about the innovations. The distribution of respondents at the interest stage is presented in Table 5.

Table 5. Distribution of respondents in the process of adopting farmer innovations for shallot cultivation from true shallot seeds (interest stage)

Adoption stage: Interest	Frequency	%
a. Obtaining further information	0	0
b. Referring to other farmers	3	10.3
c. Implementation on their own land	26	89.7
Interest		
a. Interested	26	89.7
b. Rather interested	3	10.3
c. Not interested		0
Sources of information		
a. Extension workers	22	55
b. Farmer Groups	6	15
c. Other farmers	6	15
d. Internet	6	15

The results showed that the interest stage was passed on by farmers without carrying out activities to seek further information about shallot innovations from the seeds, but most of the farmers (89.7%) immediately tried these innovations in their fields. This happened because the introduction of innovation was carried out through the Payakumbuh City Regional Government program. After farmers were introduced to the innovation of cultivating shallots from seeds, the Department of Agriculture also provided assistance with production facilities to farmer groups to be able to implement innovations in their respective groups' fields. This assistance encourages farmers to directly implement shallot cultivation from seeds, without further thinking about seeking in-depth information about the innovations.

Agricultural extension workers are a source of information for farmers when they start experimenting with innovations. The results of Nwaobiala's research (2022) show that contact with agricultural extension agents is one of the factors that influence farmers in adopting innovations.

The next stage is the evaluation stage. The various assessments of respondent farmers in the evaluation stage of shallot cultivation innovations from seeds are presented in Table 6.

Table 6. Distribution of respondents. The process of adopting innovations by farmers for shallot cultivation with seeds (evaluation stage)

Adoption Stage: Evaluation	%
Activities carried out	
a. Conducting evaluation to the innovation	68.97
b. No Evaluation to the innovation	31.03
Aspects evaluated	
a. Economy	62.1
b. Technical	34.5
c. social	3.4
Evaluation on Innovation	
a. More economical	41.4
b. Technically more difficult	34.5
c. Not accordance to the beneficiary condition	24.1
d. No Evaluation	0

The results of the respondent farmer's assessment of the innovation of shallot cultivation from the seeds are it is indeed more economical. This farmer's assessment is in accordance with Atman's statement (2021) which states that shallot cultivation technology from seeds can save up to 66.7% in purchasing seeds and increase yields to 30-40 tonnes/ha. On the other hand, technically farmers consider that cultivating onions from seeds is more difficult to implement than cultivating shallots with tubers. The difficulties experienced by farmers are during the process of sowing seeds and transferring the seedlings from the nursery to the field. This is in line with the opinion of Sumarni (2005) which states that although farmers' interest in shallots is quite high, various obstacles are still encountered in the process of cultivating them, both technical and economic ones.

Farmers also stated that the innovation of cultivating shallots from true shallot seeds was not in accordance with their abilities, thus they considered this innovation to be more complicated to implement. This is in accordance with Basuki's statement (2009) that the use of the true shallot seeds is economically feasible because it can double the production compared to the use of conventional bulbs. However, the cultivation of shallots using seeds requires special handling because it takes 40 days to sow.

The next stage in the adoption process is to try on a small scale. This means in the adoption process is when; someone who has gained knowledge about an innovation, will first try the innovation he or she receives before deciding to adopt or apply it permanently in his farming business. The distribution of respondents in the small-scale trial phase is presented in Table 7.

Table 7 Distribution of respondents in the process of adopting innovations in shallot cultivation from true shallot seeds (small-scale trial stage)

Adoption stage: Trial		Frequency	%
Number of component tried			
a.	Trial on small scale	24	82.8
b.	No Trial	5	17.2
Area of land for trial			
a.	All land area	0	0
b.	Small part of the land	29	100
Intensity of the innovation component			
a.	All components	29	100
b.	Parts of the components	0	0

Table 7 shows that the majority of farmers (82.8%) tried innovations in shallot cultivation from seeds in parts of their land. This is because they are implementing this small-scale innovation through an assistance program provided by the Agriculture Service, so the location of the application is on the farmer group's land. All respondents (100%) admitted that they applied all the innovation components of shallots from seeds in the field, because they were given assistance with production facilities and assistance in cultivating.

The final stage of the innovation-decision process is the adoption stage. The results of the study show that all components of the innovation of shallot cultivation from seeds are implemented by adopters, but they only apply this innovation in one growing season. The distribution of respondents based on the stages of adoption is presented in Table 8.

Table 8. The distribution of respondents at the adoption stage in the adoption process of shallot cultivation innovations with true shallot seeds

Adoption Process: Adoption		Frequency	%
Implementation of the innovation :			
a.	Already applied	23	79.3
b.	Hesitant	0	0
c.	Not applied	6	20.7
Intensity of innovation implementation from true shallot seeds:			
a.	Implementing all component	23	100
b.	Implementing only parts of component	0	0
Adoption Frequency			
a.	1 planting season	14	60.9
b.	More than 1 planting season	9	39.1
c.	Every planting season	0	0

IV. CONCLUSION

The stages of innovation adoption process that farmers in the sub-district of East Payakumbuh go through in cultivating shallots from true shallot seeds include the knowledge stage, the small-scale trial stage, evaluating and the unsustainable adoption stage. The low and unsustainable adoption rate in shallot cultivation with seeds is thought to be caused by the complexity in implementing innovations, incompatibility of innovations with farmers' habits and lack of assistance in implementing innovations.

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