

# THE INFLUENCE OF THE SOCIAL SYSTEM ON THE ADOPTION OF COMBINE HARVESTER INNOVATIONS IN SUBAK BENGKEL, TABANAN REGENCY

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## ABSTRACT

*Using a combine harvester can simplify farmer performance. Combine harvesters should be able to increase the interest of local workers to become rice harvest workers. The aim of this research is to analyze the influence of the social system on the adoption of combine harvester innovation in Subak Bengkel, Kediri District, Tabanan Regency. The population of this research was all 500 farmers in Subak Bengkel with a sample of 84 farmers. The influence of the social system on the adoption of combine harvester innovation in Subak Bengkel, Kediri District, Tabanan Regency will be analyzed using Partial Least Square (PLS) with SmartPLS version 3.0 software which is run using computer media. Simultaneously, the social system has a significant influence on the adoption of combine harvester innovation in Subak Bengkel with The coefficient of determination is 0.901, meaning that this variable is able to explain the innovation adoption variable by 90.1%. With the development of technology, farmers in Subak Bengkel must be brave enough to take risks and try out new innovations so that they can increase the efficiency of rice farming.*

*Key Words : Combine\_Harvester, Subak, Social\_System*

## PRELIMINARY

Until now, the agricultural sector has played a role as the main provider of the food needs of the Indonesian people. Food is a basic need and human right (Siregar and Octaviana, 2020). Food can improve the quality of human resources. Individuals in the household receive adequate, safe and nutritious food intake in a sustainable manner, which will improve health status and provide opportunities for each individual to reach their maximum potential. Food security is an inseparable component of national resilience which is closely related to the quality of human resources.

Food security is closely related to social resilience, economic stability, political stability and national security or resilience. Food security in the sense of food affordability is also closely related to efforts to improve the quality of Indonesia's human resources (Alfia, 2016). Lowland rice farming can produce rice which is the staple food for the majority of Indonesian people, namely rice. The adoption of innovation is carried out to increase the productivity of lowland rice farming. According to Mardikanto (2009), in Paramarta (2022), adoption can essentially be interpreted as the process of accepting innovation and/or changing behavior in the form of knowledge, attitudes or skills in a person after receiving the innovation presented by the resource person.

The social system influences whether an innovation is accepted or rejected in society (Paramarta, 2022). By observing the suitability of the social system as the initial cause of the innovation adoption process, through the communication sources used, public awareness grows to understand the characteristics of

innovation and apply it in everyday life (Winangsih, 2018). Innovation is formed from an idea, practice or object that is considered new by individuals and community groups. An idea is considered new by some people, not necessarily by others in the social system. It all depends on how the individual or group feels about the idea, practice or thing. Innovation is a process of human activity or thought to discover new things related to input, process and output. Innovation provides benefits in human life. Innovation related to input is defined as patterns of human thought or ideas that contribute to new discoveries. Innovation related to processes is more oriented towards methods, techniques or ways of working in order to produce something new. Furthermore, innovation related to output is more aimed at the results that have been achieved, especially the use of thought patterns and work methods or techniques that have been carried out. These three elements of innovation actually form a unity (Makmur and Rohana, 2015).

The rice harvest process, which usually uses traditional tools, is now switching to using modern combine harvester machines. Users of combined harvesting tools increase harvest efficiency compared to human labor and traditional tools, and also reduce the level of yield loss. The working principle of this combination rice harvesting tool is apart from cutting the rice (reaping), also threshing (threshing), as well as packing the grain into sacks. Combine harvesters can save time and costs during harvest and become a place to develop businesses, especially in the agricultural sector, by providing harvesting services using modern harvesting equipment. Combine harvesters are an opportunity for entrepreneurs operating in the agricultural sector to gain profits from this business (Zainuddin, Mursalim and Adul, 2016).

## 1. INTRODUCTION

Tabanan Regency is nicknamed the rice barn of Bali Province. Rice is one of the agricultural sector commodities that has a time period in the harvest process. Late harvesting of rice results in decreased productivity of rice plants, because the rice grains are too dry and fall off. Farmers and entrepreneurs will suffer losses because the productivity of lowland rice commodities will decrease, both grain and rice. Delays in harvesting occur due to a lack of local labor due to the low interest of the population in working in the agricultural sector. The agricultural sector is considered to be a backward and underdeveloped field of employment.

Subak Bengkel is one that uses workers from outside Bali in Tabanan Regency. Subak Bengkel has an area of 329 Ha. The need for rice harvesting labor at Subak Bengkel is 188 people/season. Of the total number, only 12% came from local Balinese workers and 88% came from outside Bali (BPP Kediri District 2022). The workers used outside Bali come from East Java (Ngadi, 2013). These workers will arrive before the main harvest season and usually return after the harvest is over. The average use of labor for rice farming during one season is 56.3 HOK/Ha (Suharyanto, et al., 2015).

Using a combine harvester can simplify farmer performance. Combine harvesters should be able to increase the interest of local workers to become rice harvest workers. According to I Made Merta Suteja, a farmer figure in Subak Bengkel, Tabanan Regency, a combine harvester is able to speed up the harvest process because it combines three elements of rice harvest. Combine harvesters have cheaper rental costs because they have a larger working capacity. Combine harvesters are able to increase the yield of rice harvests in rice fields or GKP (Harvested Dry Grain). The combine harvester is able to produce clean grain thereby increasing the yield of rice in the mill. The combine harvester will also improve the image of the agricultural sector workforce which was previously underdeveloped to become renewable. The plantation owner will buy the grain from the combine harvester at a higher price of around IDR 100/kg. Based on the problems above, the aim of this research is to analyze the influence of the social

system on the adoption of combine harvester innovation in Subak Bengkel, Kediri District, Tabanan Regency.

## 2. RESEARCH METHODOLOGY

### Research Location and Time

The research was conducted in Subak using a combine harvester at Subak Bengkel, Tabanan Regency, Bali Province. The location selection was carried out deliberately or purposively with the consideration that Subak Workshop is the Subak that has the largest rice field in Kediri District, Tabanan Regency, amounting to 329 Ha. Subak workshop also has characteristics that are in accordance with the combine harvester innovation, namely 80% flat land. Subak Workshop is able to represent the continuous rice farming business because it has a good Subak organizational system.

### Data Types and Sources

The type of data used in this research is quantitative data consisting of data that can be measured on a numerical scale, such as the number of farmers who use combine harvesters in Tabanan Regency, Bali Province. Qualitative data is data that presents reality descriptively through descriptive words and sentences such as the identity of respondents, Subak monographs, innovation diffusion processes, harvest habits, consequences of adopting innovations and obstacles faced in using a combine harvester.

The data source used in this research is primary data consisting of data collected directly from the results of in-depth interviews with samples, namely Kelian Subak and farmers who are members of Subak who use combine harvesters. Secondary data is data obtained indirectly from the source and is able to provide information related to research. Secondary data consists of Subak documentation, Subak monographs, official local government archives, population data, population profession data, literature data via the internet such as research journals and articles related to analysis of innovation adoption.

### Method of collecting data

The methods used in collecting data in research include library research, field research which consists of observations carried out by conducting direct observations at the research location regarding activities related to the adoption of combine harvester innovation in rice farming. In-depth interviews are defined as data collection techniques to find out things about research subjects in more depth.

### Population and Sample

The population of this research is all 500 farmers in Subak Bengkel (BPP Kediri District, 2023). Sample determination was carried out using simple random sampling, where each farmer had the same opportunity to become a respondent in this research. Determining the number of samples using the Slovin formula. The number of samples from this research was 84 farmers.

### Variables, Indicators, and Measurements

Table 1. Variables, Indicators and Measurements

No	Variable	Indicator	Measurement Scale
1	Innovation Adoption (Y)	Knowledge (Y1)	Ordinal Data
		Persuasion (Y2)	Ordinal Data
		Decision (Y3)	Ordinal Data

	Implementation (Y4)	Ordinal Data
	Confirmation (Y5)	Ordinal Data
2	Social System (SS)	
	Social Structure (SS1)	Ordinal Data
	Norm (SS2)	Ordinal Data
	Courage to Take Risks (SS3)	Ordinal Data
	Participation Level (SS4)	Ordinal Data
	New Ideas (SS5)	Ordinal Data

Based on Table 1, the social system has 5 indicators that influence the process of adopting combiner harvester innovation in Subak Bengkel, Kediri District, Tabanan Regency.

### Data analysis

The influence of the social system on the adoption of combine harvester innovation in Subak Bengkel, Kediri District, Tabanan Regency will be analyzed using Partial Least Square (PLS) with SmartPLS version 3.0 software which is run using computer media. Partial Least Square (PLS) is used to analyze variant-based structural equations (SEM) which can simultaneously test measurement models as well as test structural models. Partial Least Square (PLS) is a powerful method of analysis because of its lack of dependence on measurement scales (e.g. measurements that require interval or ratio scales), sample size, and distribution of residuals. Indicators in PLS can be formed in a reflexive or formative type. PLS is said to be soft modeling because it uses less than 100 samples.

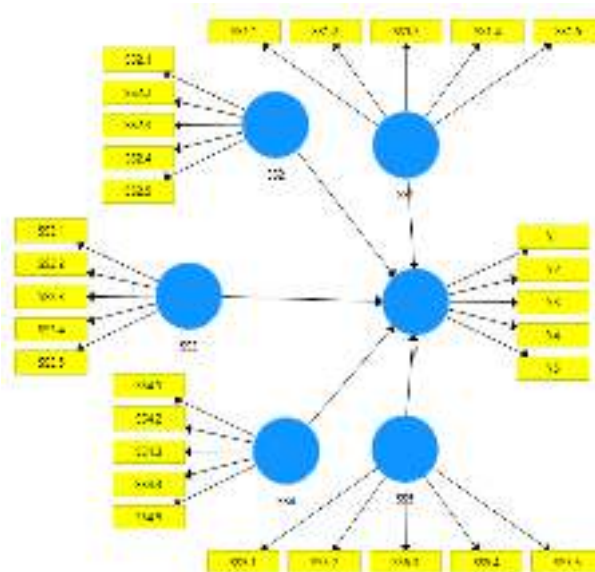


Figure 1. Partial Least Square (PLS) Model of the Influence of Social Systems on the Adoption of Combine Harvester Innovations in Subak Bengkel, Tabanan Regency

## 3. RELATED RESEARCH/LITERATURE REVIEW

### Adopt innovation

Diffusion of innovation consists of the process of spreading and absorbing a new idea to change a social system in society which is carried out continuously in a certain place and over a certain period of time. Society will adopt or accept an innovation once they know about it. One group takes a long time to try something new, while another group takes a shorter time to try something new. The acceptance of an innovation (science, technology, field of community development)

by members of a particular social system is the main goal of innovation diffusion. Social systems can take the form of individuals, informal groups, and other community organizations (Paramarta, 2020).

Innovation adoption or innovation decisions are formed from the mental process from when someone learns about the existence of an innovation until making a decision to accept or reject it. The decision-making process is influenced by communication channels, socio-economic characteristics, personality and perceptions of innovation characteristics (Ulfa and Sumardjo, 2017).

### **Social Systems**

Targets in a social system have various groups with different innovation adoption rates. The size of the farm is an indicator of a wider social system, usually the quicker it is adopted, because it has better economic capabilities. The level of income is the same as the size of the farm, farmers with higher levels of income will usually be quicker to adopt innovations. The courage to take risks, where the target at the initial stage usually does not always succeed as expected, is formed from individuals who have the courage to be more innovative. The level of participation in groups/organizations outside their own environment. Community members who like to associate with people outside their own social system are generally more innovative than those who only make personal contact with local community members. The activity of seeking information and new ideas is formed by groups of people who actively seek information and ideas. new, usually more innovative than people who are passive and do not believe in anything new (Mardikanto, 2009).

### **Combine Harvester**

Combine harvesters are an innovation in lowland rice farming. Users of combined harvesting tools will increase harvest efficiency compared to human labor and traditional tools, as well as reducing the level of yield loss. The working principle of this combination rice harvesting tool is apart from cutting the rice (reaping), also threshing (threshing), as well as packing the grain into sacks. Combine harvesters can save time and costs during harvest and become a place to develop businesses, especially in the agricultural sector, by providing harvesting services using modern harvesting equipment. Combine harvesters are an opportunity for entrepreneurs operating in the agricultural sector to gain profits from this business (Zainuddin, Mursalim and Adul, 2016).

## **4. RESULTS AND DISCUSSION**

### **Adoption of Combine harvester Innovation at Subak Bengkel**

*Combine harvesters*It was first introduced at Subak Bengkel in 2017 by a main dealer named Sari Untung in collaboration with the Tabanan Regency Agricultural Service. The main dealer's approach in disseminating information about combine harvesters utilized a young man named Pande Putu Widya Paramarta. The young farmer received facilities from a major dealer in agricultural machinery in Tabanan Regency to try out a combine harvester at Subak Bengkel. Experiment this carefully. Before the experiment was carried out, the instructor and the dealer first checked the dryness of the land and ensured that the water gates of the irrigation canals were tightly closed. The instructor also conducted experiments in the dry season, specifically during the harvest season in March. The size of the machine is also adjusted to the habits of local farmers.

Based on the research results, the adoption stage of the combine harvester innovation at Subak Bengkel is progressing very well. This was stated by the majority of respondents, where 66% said it was very good, 22% said it was good, 4% said it was sufficient. However, there were 10% of respondents who said it was very unfavorable. This happened because the respondents had experienced problems at the knowledge stage. An introduction where farmers were influenced

by rumors stating that combine harvesters could damage soil quality. According to Pande Putu Widya Paramarta, this problem can be overcome by ensuring that the rice fields that are harvested using a combine harvester are dry.

### **The Influence of the Social System on the Adoption of Combine Harvester Innovation in Subak Bengkel**

In this research it is known that, variables social structure, norms, courage to take risks, level of participation and new ideas has a coefficient of determination of 0.901, meaning that this variable is able to explain the innovation adoption variable of 90.1% and the remaining 9.9% is explained by variables outside the model.

Table 2. Path Coefficient

Variable	Original Samples	Samples Mean	Standard Deviation	t-statistic	p-value
Social structure > Innovation Adoption	0.554	0.567	0.034	2,216	0.004
Norms > Innovation Adoption	0.568	0.493	0.125	4,834	0.003
Courage to take risks > Adoption of Innovation	0.896	0.897	0.013	7,166	0,000
Participation rate > Innovation Adoption	0.676	0.456	0.101	3,262	0.004
New ideas > Adopt Innovation	0.095	0.061	0.187	0.508	0.612

Source: Primary data processing, 2024

Based on table 2, there are four variables that have a significant effect, namely social structure, norms, courage to take risks, and level of participation so the hypothesis is accepted. Meanwhile, the variables that did not have a significant effect were new ideas so the hypothesis was rejected. These results were obtained by testing the structural model to assess the effect of each direction of the relationship (causal path) and testing the predetermined hypothesis, using a special SmartPLS technique, namely the bootstrapping technique with a significance level (p-value) of 5% and with a t-statistic value > 1.96 (Khairunisa, et.al, 2020). For a better understanding of the adoption of combine harvester innovation, the five influencing variables will be discussed in detail, including: social structure, norms, courage to take risks, level of participation and new ideas.

In the theory of diffusion of innovation, society is seen as a very large social system. Subak is a community social institution that covers rice fields in Bali. Subak is an irrigation system for farmers who are members of the Subak Sekaa (Adnyani, 2021). The combine harvester was introduced by the Tabanan Regency Agriculture Service through a trial in Subak Nyitdah II in 2009. The trial failed so at that time the combine harvester was deemed not in accordance with agricultural culture in Bali. This failure resulted in the government's provision from 2009 to 2016 being neglected and not utilized. The combine harvester again attracted public interest when one of the main dealers in 2017 at Subak Bengkel. Subak members and owners of the Rice Milling Unit (RMU) who were present gave a positive response to the combine harvester because the trial run went smoothly. The success of the trial in 2016 was able to improve the assessment of the combine harvester. The rice milling unit (RMU) currently buys harvested grain using a combine harvester for Rp. 100,-/kg more expensive than conventional harvest.

### **5. CONCLUSIONS**

Simultaneously, the social system has a significant influence on the adoption of combine harvester innovation in Subak Bengkel with the coefficient of determination is 0.901, meaning that this variable is able to explain the innovation

adoption variable by 90.1%. Partially, social structure, norms, courage to take risks, and level of participation so the hypothesis is accepted.

With the development of technology, farmers in Subak Bengkel must be brave enough to take risks and try out new innovations so that they can increase the efficiency of rice farming. Apart from that, there are 9.9% other factors that influence the adoption of combine harvester innovation so it is hoped that future researchers will be able to analyze these factors.

## REFERENCE

- Ulfah Maria & Sumardjo. 2017. Pengambilan Keputusan Inovasi pada Adopter Pertanian Organik Sayuran di Desa Ciputri, Pacet, Kabupaten Cianjur. Bogor: Jurnal Sains Komunikasi dan Pengembangan Masyarakat. 1 (2). 209-222.
- Adnyani, Sari. 2021. Pengakuan Atas Kedudukan dan Keberadaan Masyarakat Hukum Adat Kajian Pengaturan Subak dalam Perspektif Hukum Negara. Buleleng: Jurnal Pendidikan Kewarganegaraan Undiksha. 9(2). 463-473.
- Khairunnisa, A. H., *et.al.* 2020. Pengaruh Brand Awareness dan Kepercayaan Terhadap Keputusan Menyalurkan Zakat dan Donasi Melalui Tokopedia. Bogor: Jurnal Ilmiah Ekonomi Islam. 6(2), 284-293.
- Zainuddin, Mursalim & Abdul Waris. 2016. Analisis Ekonomi Penggunaan Combine Harvester Tipe Crown CCH 2000 Star. Makasar: Jurnal AgriTechno, 9(1), 36-43.
- Mardikanto. 2009. *Sistem Penyuluhan Peternakan*. Surakarta: Lembaga Pengembangan Pendidikan (LPP) UNS dan UPT Penerbitan dan Pencetakan UNS (UNS Press).
- Makmur, dan Rohana Thahier. 2015. *Inovasi & Kreativitas Manusia*. Bandung: PT Refika Aditama.
- Suharyanto, Jemmy Rinaldy, dan Arya Nyoman Ngurah. 2015. Analisis Risiko Produksi Usahatani Padi Sawah di Provinsi Bali. Bali: Balai Pengkajian Teknologi Pertanian (BPTP) Bali. 1(2), 70-77.
- Ngadi. 2013. Pemberdayaan Petani di Kawasan Subak Guama dan Jatiluwih, Kabupaten Tabanan, Bali. Bogor: Analisis Kebijakan Pertanian. 11(2), 149-162.