Available online at http://ijasc.pasca.unand.ac.id

International Journal of Agricultural Sciences

ISSN: 2598 – 1145 (online)

Implementation of Salibu Rice Cultivation Technique in Supporting Food Security in West Sumatra, Indonesia

Sri Wahyuni [a]

[a] *Department Socio-Economic, Faculty of Agriculture, Andalas University, Kampus Unand Limau Manis, Padang-West Sumatera, Indonesia*

ARTICLE INFORMATION

Article history:
Received: 28 May 2020
Revised: 15 December 2020
Accepted: 31 December 2020

Keywords:
Communication pattern, innovation characteristics, *salibu* technology, sustainability

Correspondence:

sriwahyuni@agr.unand.ac.id

A B S T R A C T

This study aims to describe the characteristics of innovation, communication patterns, and sustainability of the application of *salibu* technology in Tanah Datar District; and to analyze the correlation between innovation characteristics and communication patterns on the sustainability of *salibu* technology in Tanah Datar. This research was quantitatively using a survey method and supported by qualitative descriptive data. The research location was chosen purposively based on the location topography, that is, in the Tarab River and Batipuh subdistricts. Data analysis is done using descriptive statistical analysis and inferential statistics using the software SPSS 23.00. The characteristics of technological innovation are generally quite good. The pattern of communication is relatively good. The type of communication applied is dialogical by involving the participation of all actors, the direction of communication is convergent, and the frequency and the quality of communication are done where the perpetrators equally understand the meaning of the message conveyed. The adoption in both areas has been sustainable in each harvest season, increased land area, and the desire to continue implementing and developing *salibu* technology. Sustainability is supported by the characteristics of innovation and communication patterns in both regions.

INTRODUCTION

As a staple food of Indonesian people, rice is one of the food commodities experiencing an increase in demand. (Balitbangtan, 2015) noted that there were indications that the growth rate of rice production has declined, and the cost of production per unit area has increased in the last five years. Therefore, the government announced an increase in national rice production by 1.5% per year to overcome these problems. Therefore, efforts to increase rice production must continue through various production and productivity improvement breakthroughs (Balitbangtan, 2015); (Dirjen Tanaman Pangan, 2017)

Governments continue to work toward increasing rice production through various means, such as the Movement Implementation of Integrated Crop Management (GP-PTT) and a variety of Special efforts (Upsus) (Balitbangtan, 2015); (Dirjen Tanaman Pangan, 2017). Indonesia has various types of rice cultivation patterns based on researchers' findings through clinical experiments and community findings based on the results

DOI: 10.25077/ijasc.4.2.80-87.2020

of local wisdom. There are a variety of cultivation patterns derived from the habits and customs of local communities and proven to have various benefits, such as intercropping patterns in East Java (Setiawan, 2009), Kejrun Blang and Kanuri Blang in Aceh (Ansor M, 2014); (Maifianti, Sarwoprasodjo, & Susanto, 2014); (Putra, Hariadi, & Harsoyo, 2012), to *salibu* rice cultivation (maternal saline) in West Sumatra (Erdiman, 2013.).

Salibu rice cultivation technology, referred to as *salibu* technology, is one form of local wisdom that flourished in West Sumatra. *Salibu* rice technology is a technology that utilizes rice cultivation under the rod after harvest as the producer shoots/tillers will be maintained. These shoots function as a substitute for transplanting lips into the system (Erdiman, 2013.). Against this background, BPTP Solok re-examined *salibu* technology in 2013 as one of the government's efforts to achieve rice self-sufficiency 2015-2019 (RKT Kementan, 2014).

Research on *salibu* technology has been carried out because it has great potential to be developed because it has various advantages. Erdiman (2013) mentions that some of the *salibu* technology advantages include cost-effective, seed-saving, labor-saving, water-saving, and environmentally friendly. *Salibu* technology can also increase rice productivity per unit area and per unit time and increase the harvest index from one to two to three times a year. Compared with conventional ratun technology, salibu technology can produce a more uniform number of tillers. In addition, productivity can be the same or even higher than the main crops, thus increasing production every planting season. Applying rice cultivation salibu by utilizing high-yielding varieties would be a more stimulating farming activity since it can obtain additional very tangible results (Erdiman, 2013.)

West Sumatra, a central area of *salibu* technology development, has also applied this technology to several regions, such as Dharmasraya District, Agam District, Solok District, Padang Panjang City, to Tanah Datar District, as the initial discoveries of *salibu* technology. The sustainability of the application of *salibu* rice technology as a form of technological innovation relates to various factors, both physical factors in cultivation and characteristics of *salibu* technology innovation, as well as non-physical factors related to humans, such as farmers' characteristics and communication patterns. Various studies related to the characteristics of innovation and communication patterns on the application of technological innovations have been widely carried out, such as the influence of interpersonal communication channels on the adoption of bio-industrial agricultural innovations in integration of lemongrass-livestock lemongrass (Rushendi, Sarwoprasodjo, & Mulyandari, 2016), the relationship of farmers' characteristics in the SL-PTT program (Narti, 2015); the influence of the role of instructors on the adoption of innovative rice paddies (Putra, Hariadi, & Harsoyo, 2012); AKIS effectiveness for dissemination of ISFM innovations (integrated soil fertility management) in Kenya and Ghana (Adolwa, Schwarze, Belwood-Howard, Schareika, & Buerkert, 2016); and research on alternative models to predict the level of adoption of farmers' innovations, where several factors that determine the acceleration of technology adoption are the value of the attributes of innovation and interpersonal communication (Samiee & Rezei-Moghaddam, 2017).

Nonetheless, research related to *salibu* technology leads to technical cultivation, which is a physical factor, such as research conducted by Suwandi et al. (2012), Susilawati & Purwoko (2012), Erdiman, (2013), Ritonga (2015), Sinaga et al. (2015), and Herlinda et al. (2015). There have been no studies on non-physical factors of *salibu* technology, such as innovation characteristics and communication patterns, for the sustainability of the application of *salibu* technology. The characteristics of innovation and communication patterns have a relationship and influence the sustainability of the application of innovation, such as the results of Mannan et al. (2017) and Indraningsih (2011).

Therefore, in general, this study aims to analyze the relationship between the characteristics of innovation and communication patterns on the sustainability of the application of *salibu* technology in Tanah Datar District. Specifically, this study aims to 1) describe the characteristics of innovation, communication patterns, and the sustainability of the application of *salibu* technology in Tanah Datar District and 2) to analyze the relationship between the characteristics of innovation and communication patterns on the sustainability of the application of *salibu* rice in Tanah Datar District.

MATERIALS AND METHODS

The study was conducted from August to October 2017 in Tanah Datar District, West Sumatra Province. Location determination was done purposively because Tanah Datar District was one of the centers of rice production and had developed the Paddy *Salibu* Technology in West Sumatra Province. The census carried out respondent sampling, namely 48 people in the Surau Jambu Farmers Group representing the highlands and 51 people in the Beringin Bersatu Farmers Group in Batipuh District. The type of data collected in this study consisted of primary data obtained directly from research respondents and secondary data consisting of supporting data in the form of documents from relevant institutions and agencies.

Quantitative data were analyzed using descriptive statistics and inferential statistical tests. Descriptive statistics are used to measure variables of farmer characteristics, variables of characteristics of innovation, variables of communication patterns, and variables for the sustainability of the application of *salibu* technology. Inferia statistics are used to analyze the relationship between farmer characteristics, innovation characteristics, communication patterns, and the sustainability of the application of *salibu* technology. Inferia statistical analysis in this study using Spearman rank correlation analysis assisted with SPSS 23.00 program.

RESULTS AND DISCUSSION

Innovation Characteristics of Rice Salibu in Tarab River and Tanah Datar District of Batipuh

Rogers (2003) stated that the nature or characteristic of the innovation itself is a factor that influences the decision-making process and the speed of innovation adoption. This factor was also confirmed by several research results such as (van der Meulen, van Assseldonk, & Ge, 2016), (Senyolo, Long, Blok, & Omta, 2017) and (Suryani, Fathchiya, & Susanto, 2017). Characteristics of these innovations consist of (1) relative advantage, (2) compatibility, (3) complexity, (4) possibility of trial, and (5) observability possibilities.

Characteristics of *salibu* technology innovation in the Tarab River and Batipuh are generally similar. The relative advantage in the second sub-district of *salibu* rice is high, meaning that farmers get the benefits and advantages of applying *salibu* rice. Advantages gained by farmers, among others, are cost-effective production, seed cost-effective, labor saving, and saving in water use. Another advantage is the increased production of an average of 25 percent, and the harvest index increased to three times a year, which the research findings were in line with (Erdiman, 2013.). These relative benefits may also affect the decision of farmers to apply *salibu* technology (Sholahuddin, Setyawan, & Trisnawati, 2017)

Appropriate innovation is an easy innovation adopted by the community (Mulyadi et al., 2009). The results showed that the suitability level of *salibu* technology in the Sungai Tarab and Batipuh Subdistricts was in accordance with the needs, habits, resources, and environmental conditions of farmers in the Tarab and Batipuh Rivers. Based on field observations, this is partly due to the fact that *salibu* rice is a technology derived from local customs, as also explained by Balitbangtan (2015), that *salibu* rice cultivation technology is site-specific rice cultivation based on local wisdom.

Farmers in Sungai Tarab and Batipuh subdistricts judge that *salibu* technology is not complicated, both theoretical understanding, practice, and access to the resources needed. Application of rice technology in two subdistricts of *salibu* is easily made by farmers, both in the outside area of small-scale and large scale. Farmers can also easily observe the level of growth and yields and increase rice production using *salibu* technology. Based on the findings in the field, the easiness of farmers in observing the growth and yield of *salibu* technology is also one of the motivations of farmers in applying *salibu* rice, as also stated by Sholahuddin, Setyawan, & Trisnawati (2017) that observability can affect the adoption of innovation.

Salibu Technology Communication Pattern in Tarab River District and Batipuh Subdistrict Tanah Datar District

Communication patterns play a role in various agricultural development programs and activities. Various communication patterns are implemented to accelerate farmers' adoption of new technological innovations. In its implementation, these communication patterns affect the implementation of agricultural development activities, including the implementation of

 DOI: 10.25077/ijasc.4.2.80-87.2020

a program and innovation. Various studies show that communication has an important and strategic role in the implementation of programs or innovations in agriculture, as well as the results of research by Musyafak & Ibrahim (2005), Satriani, Muljono, & Lumintang (2011), Zainal, Lubis, & Rangkuti (2014), Muchtar (2016), and Darmastuti, Bajari, Martodirdjo, & Maryani (2016).

The communication pattern of farmers in applying *salibu* technology in Sungai Tarab and Batipuh subdistricts is high. It means that the communication patterns in both regions have taken place in a participatory manner by relying on the involvement of all actors involved, especially farmers and extension agents. The type of communication and direction in both regions is generally classified as high, meaning that ongoing communication between involved actors, such as farmers and extension workers, takes place reciprocally. The ongoing communication between farmers and extension workers no longer takes place in one direction (top-down) but has been two-way (bottom-up). This two-way communication encourages increased motivation of farmers to implement innovation because the flow of information takes place in all directions where farmers can share information about their needs for the application of *salibu* technology to fellow farmers and extension agents, as well as the findings of Satriani, Muljono, & Lumintang (2011), Muchtar (2016), Firmansyah, Yulianti, & Alif (2017) also affirmed that it is necessary to use a communication strategy that involves all actors in each activity to accelerate the adoption of innovation,

Communication frequency in both regions is high because both farmers in Sungai Tarab and Batipuh are equally enthusiastic about applying salibu technology. The extension agent is also quite active in visiting farmers. Information about *salibu* technology is not only obtained by farmers when there are special activities such as field schools but at informal times such as when extension workers visit farmers to chat, share stories, and so on. The high frequency of communication is one of the drivers of the good quality of communication obtained by farmers. Farmers in both regions have become aware of information related to the application of *salibu* obtained from fellow farmers and extension agents. This awareness can encourage the adoption of the sustainability of the application of *salibu* technology by farmers, in line with the research of (Wibowo, Sumardjo, Hafidhuddin, & Agung, 2012) and (Pamungkas, Saleh, & Muljono, 2013) that the frequency of communication can encourage the application of innovation by farmers.

Application Sustainability of Salibu Technology in Tarab River District and Batipuh Subdistrict Tanah Datar District

The sustainable application of *salibu* technology in Sungai Tarab and Batipuh Subdistricts is high. It means that the application of *salibu* technology continues to be carried out by farmers continuously in almost every growing season, land use with the same or growing area for *salibu* technology also continues, and most farmers have the desire to re-apply *salibu* technology in the next planting season, and farmers have the desire to develop *salibu* technology.

Sustainability *salibu* technology implementation by farmers is generally driven by a wide range of benefits available, such as saving in terms of cost, time, and manpower, and can increase the amount of production and harvest index, as was also described by Erdiman (2013). However, there are still some farmers in Batipuh District who do not apply *salibu* rice in a sustainable manner. Based on interviews with respondents in Batipuh, there is a lack of irrigation water in the dry season because even though *salibu* rice does not need too much water, the amount must be regulated so as not to dry out. In addition, the less optimal management of *salibu* rice also resulted in decreased production of rice produced by farmers, so in the next planting season, some farmers did not continue the application of *salibu* rice.

Table 1. Relation Coefficient Value Between Characteristics of Innovation with the Application Sustainability of Rice Salibu Technology

Innovation Characteristics	Application of salibu rice every planting season		Land Use		Increase in Land Area		Application Sustainability of Salibu Rice		Development of Salibu Rice	
	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh
Relative advantage	,294*	-,013	,291*	,052	,316*	-,101	,272	-,065	,301*	-,103
Adjustment Level	,330*	,126	,288*	,264	,315*	,345*	,309*	,049	,348*	-,115
Level of Innovation Complexity	,488**	,324*	,120	,290*	,059	,237	,351*	,188	,345*	-,057
Level of convenience	,441**	,196	,285*	,320*	,265	,202	,441**	,429**	,372**	,266
Level of observation	,428**	,237	,293*	,011	,273	,172	,454**	,066	,382**	,013

**Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed)

Furthermore, the level of sustainability of land use for the application of *salibu* rice in the two sub-districts is relatively high, similar to the sustainability of land use. Farmers did not increase the area of land for paddy *salibu* application, especially in Batipuh, mainly because of the availability of irrigation water. When water requirements are insufficient for *salibu* technology, some paddy field areas are processed using conventional rice cultivation techniques.

The Relationship between Innovation Characteristics and Communication Patterns with the Sustainability of Rice Salibu Technology Application

Various works of literature and research results, as suggested by Rogers (2003), van der Meulen et al. (2016), and Senyolo et al. (2017), show that the characteristics of innovation affect the application of innovation. The characteristics of these innovations can drive the speed of innovation adoption but also can inhibit the adoption of innovation, as well as the findings of Warnaen et al. (2013). Based on Spearman's rank analysis, there is generally a real relationship at $p < 0.05$ between innovation characteristics and the sustainability of the application of *salibu* technology in both Sungai Tarab and Batipuh Subdistricts. Table 1 shows a real relationship (at the $p < 0.05$) between each indicator of the innovation characteristics with the sustainability of the *salibu* technology application in each growing season and the sustainability of the development of *salibu* rice in the Tarab River. These results indicate that the better the characteristics of *salibu* technology innovation, the sustainability of farmers in applying and developing *salibu* rice is higher. This phenomenon is in line with the results of a study by Suryani et al. (2017) that the characteristics of innovations, such as relative benefits, level of suitability, and complexity of innovation, affect the sustainability of farmers in implementing innovation.

Edwina & Maharani (2010), Sadikin (2013), Fachrista & Sarwendah (2014), and Sholahuddin et al. (2017) also emphasized that the more innovation has an advantage, the easier it is for an innovation to be applied and observed. The more suitable the innovation for the needs of farmers, the easier it will be for farmers to adopt an innovation. Furthermore, Table 1 also shows that the ease of innovation level of *salibu* rice is also significantly related to the level of $p < 0.05$ with the sustainability of land use and the sustainability of the application of *salibu* rice in Sungai Tarab and Batipuh Districts. Based on observations in both sub-districts, the ease of applying *salibu* rice technology encourages the sustainability of land use and the application of *salibu* rice by farmers. As stated by Erdiman (2013), one of the facilitation is seen by farmers no longer needing to do hatchery and piracy in *salibu* rice cultivation.

 DOI: 10.25077/ijasc.4.2.80-87.2020

Tabel 2 Relation Coefficient Value Between Communication Pattern with the Application Sustainability of Rice Salibu Technology

Communication Pattern	Application of salibu rice every planting season		Land Use		Increase in Land Area		Application Sustainability of Salibu Rice		Development of Salibu Rice	
	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh	Sungai Tarab	Batipuh
Communication type	,421**	,298*	,357*	,484**	,306*	,489**	,340*	,724**	,355*	,724**
Communication course	,484**	,387**	,052	,433**	,071	,422**	,367*	,698**	,349*	,698**
Communication frequency	,361*	,298*	,354*	,484**	,309*	,489**	,380**	,724**	,319*	,724**
Communication quality	,447**	,286*	-,096	,433**	-,122	,438**	,344*	,668**	,367*	,668**

**Correlation is significant at the 0.01 level (2-tailed) *Correlation is significant at the 0.05 level (2-tailed)

A good communication pattern, where communication between actors occurs in a dialogical and reciprocal manner, and all of them are encouraged to participate in communication, has proven to affect the successful implementation of agricultural programs, especially the adoption of innovations by various levels of society. This result is confirmed by various studies by Muchtar (2016), Darmastuti et al. (2016), and Rushendi et al. (2016). Table 5 shows that based on Spearman's rank analysis, there is generally a real relationship at $p < 0.05$ between the communication patterns and the sustainability of the application of *salibu* technology in Batipuh and Sungai Tarab. In the Batipuh subdistrict, all communication patterns, including the type, direction, frequency, and quality of communication, are related to the sustainability of the application of *salibu* technology. It means the better the communication patterns that occur, the more dialogical and the more often the actors communicate, and the more they understand and understand the actors with the information provided. The application of *salibu* rice in both regions will continue each planting season.

CONCLUSIONS

Characteristics of salibu technological innovation are generally quite good. The application of salibu technology in these two areas has a relative advantage according to the needs and resources owned by farmers. This cultivation technique was uncomplicated and easy to practice in a small area, and the growth and results can be observed. The communication patterns of the actors in applying *salibu* rice have been going well, where the type of communication applied takes place dialogically by involving the participation of all actors, and the direction of communication takes place in all directions (convergent). The frequency of communication is often carried out, and the quality of communication goes well when the actors mutually understand the message's meaning.

The application of *salibu* rice in both regions has been sustained both in the harvest season and increase in land area to the desire to continue to implement and develop *salibu* technology. Sustainability in both areas is supported by the characteristics of innovation which consist of (1) relative advantage; (2) compatibility; (3) complexity (complexity); (4) possibility of the trial (trialability); and (5) observable possibilities (observability); and communication patterns consisting of (1) communication frequency, (2) communication direction, (3) communication type, and (4) communication quality.

To maintain the sustainability of the paddy *salibu* adoption in Tanah Datar, the District government must improve farmers' understanding of this *salibu* using communication patterns in all directions (converging) involving all actors, ranging from the extension, UPT, department of agriculture, and researchers.

ACKNOWLEDGEMENT

This research was conducted using the Andalas University Postgraduate Grants Fund. Therefore, the researchers would like to thank Andalas University

Postgraduate for their support so that this research can be carried out well. Thank you to the researchers for telling the Flamboyan Farmer Women Group in Tarab River District and the Beringin Bersatu Farmers Group in Batipuh District. The researcher also expressed his gratitude to the extension workers from BPP Tarab River District and BPP Batipuh District for their assistance.

REFERENCES

Adolwa, I., Schwarze, I., Belwood-Howard, I., Schareika, N., & Buerkert. (2016). A Comparative Analysis of Agricultural Knowledge And Innovation Systems in Kenya And Ghana: Sustainable Agricultural Intensification in The Rural-Urban Interface. *Agriculture and Human Values*, 34(2):453-472.

Ansor M, N. (2014). *Relasi Gender Dalam Ritual Kenduri Blang pada Masyarakat Petani di Gampong Sukarejo Langsa.*

Balitbangtan. (2015). *Panduan Teknologi Budidaya Padi Salibu*. Jakarta: Kementerian Pertanian.

Darmastuti, R., Bajari, A., Martodirdjo, H., & Maryani, E. (2016). Gethok tular, pola komunikasi gerakan sosial berbasis kearifan lokal masyarakat samin di Sukolilo. *Jurnal ASPIKOM*, 3(1): 104-118.

Dirjen Tanaman Pangan. (2017). *Pedoman Pelaksanaan Kegiatan Padi 2017*. Jakarta: Kementerian Pertanian.

Edwina, S., & Maharani, T. (2010). Persepsi Petani terhadap Inovasi Teknologi Pengolahan Pakan Ternak di Kecamatan Kerinci Kanan Kabupaten Siak. *Indonesian Journal of Agriculture Economis*, 2 : 170-183.

Erdiman. (2013.). *Teknologi Salibu Meningkatkan Produktivitas Lahan (3-6 Ton/Ha/Tahun) dan Pendapatan Petani (Rp.15-25 Juta/Tahun).* Balai Pengkajian Teknologi Pertanian Sumatera Barat.

Fachrista, I., & Sarwendah, M. (2014). Persepsi dan Tingkat Adopsi Petani Terhadap Inovasi Teknologi Pengelolaan Tanaman Terpadu Padi Sawah. *Agriekonomika*, 3(1): 1-10.

Firmansyah, H., Yulianti, M., & Alif, M. (2017). Strategi komunikasi dalam penguatan kapasitas kelembagaan pada pengelolaan lahan gambut melalui peningkatan sumberdaya manusia di sektor pertanian Kalimantan Selatan. *Journal of communication studies.*, 2(1): 119-131.

Herlinda, S., Dewi, R., Adam, T., Suwandi, & Wijaya, A. (2015). Struktur komunitas laba-laba di ekosistem padi ratun: pengaruh aplikasi Beauveria bassiana (Balsamo). *Jurnal Entomologi Indonesia*, 12(2): 91-99.

Maifianti, K., Sarwoprasodjo, S., & Susanto, D. (2014). Komunikasi Ritual Kanuri Blang sebagai Bentuk Kebersamaan Masyarakat Tani Kecamatan Samatiga Kabupaten Aceh Barat Propinsi Aceh. *Jurnal Komunikasi Pembangunan*, 12(2): 30–35.

Mannan, S., Nordin, S., Rafik-Galea, S., & Rizal, A. (2017). The Ironies of New Innovation and The Sunset Industry: Diffusion and Adoption. *Journal of Rural Studies*, 55:316-322.

Muchtar, K. (2016). Penerapan Komunikasi Partisipatif pada Pembangunan di Indonesia. *Jurnal Makna*, 1(1): 20-32.

Musyafak, A., & Ibrahim, T. (2005). Strategi percepatan adopsi dan difusi inovasi pertanian mendukung prima tani. *Jurnal Analisis Kebijakan Pertanian*, 3(1): 20-37.

Narti, S. (2015). Hubungan Karakteristik Petani dengan Efektivitas Komunikasi Penyuluhan Pertanian dalam Program SL-PTT. *Jurnal Professional FIS UNIVED*, 2(2): 40-52.

Pamungkas, S., Saleh, S., & Muljono, P. (2013). Hubungan Aktivitas Komunikasi dengan Tingkat Keberdayaan Kader Posdaya di Kota dan Kabupaten Bogor. *Jurnal Komunikasi Pembangunan*, 11(1): 47-57.

Putra, A., Hariadi, S., & Harsoyo. (2012). Pengaruh Peran Penyuluh dan Kearifan Lokal terhadap Adopsi Inovasi Padi Sawah di Kecamatan Montasik Kabupaten Aceh Besar. *KANAL*, 1(1): 85-101.

Ritonga, E. (2015). *Uji Adaptasi Galur – Galur Padi Ratun Di Lahan Pasang Surut Kabupaten*

 DOI: 10.25077/ijasc.4.2.80-87.2020

Pelalawan Provinsi Riau. Prosiding Seminar Nasional Lahan Suboptimal.

RKT Kementan. (2014). *Rencana Kerja Tahunan Kementrian Pertanian Tahun 2015*. Jakarta: Kementerian Pertanian.

Rogers, E. (2003). *Diffusion of Innovations Fifth Edition*. New York (AS): The Free Pr.

Rushendi, Sarwoprasodjo, S., & Mulyandari, R. (2016). Pengaruh Saluran Komunikasi Interpersonal terhadap Keputusan Adopsi Inovasi Pertanian Bioindustri Integrasi Serai Wangi–Ternak di Provinsi Jawa Barat. *JAE*, 34(2): 135-144.

Sadikin, I. (2013). Pengaruh Faktor Sosial Ekonomi Terhadap Adopsi PTT di Sentra Padi Jawa Barat. *Agros*, 15(1): 123-136.

Samiee, S., & Rezei-Moghaddam, K. (2017). The Proposed Alternative Model to Predict Adoption of Innovations: The Case of No-Till Technology in Iran. *Journal of the Saudi Society of Agricultural Sciences*, 16(3): 270-279.

Satriani, I., Muljono, P., & Lumintang, R. (2011). Komunikasi Partisipatif pada Program Pos Pemberdayaan Keluarga (Studi Kasus di RW 05 Kelurahan Situgede, Kecamatan Bogor Barat, Kota Bogor). *Jurnal Komunikasi Pembangunan.*, 9(2): 17-27.

Senyolo, M., Long, T., Blok, V., & Omta, O. (2017). How the characteristics of innovations impact their adoption: An exploration of climate-smart agricultural innovations in South Africa. *Journal of Cleaner Production*, 30: 1-16.

Setiawan, E. (2009). Kearifan Lokal Pola Tanam Tumpangsari di Jawa Timur. *Agrovigor*, 2(2): 79-89.

Sholahuddin, Setyawan, A., & Trisnawati, R. (2017). *Pengaruh Karakteristik Inovasi terhadap Niat Mengadopsi Solopos Epaper*. Prosiding Semnas Riset Manajemen & Bisnis.

Sinaga, P., Trikoesoemaningtyas, Sopandie, D., & Aswidinnor, H. (2015). Daya Hasil dan Stabilitas Ratun Galur Padi pada Lahan Pasang Surut. *Penelitian Pertanian Tanaman Pangan*, 34(2): 97-104.

Suryani, A., Fathchiya, A., & Susanto, D. (2017). Keberlanjutan Penerapan Teknologi Pengelolaan Pekarangan oleh Wanita Tani di Kabupaten Kuningan. *Jurnal Penyuluhan*, 13(1): 50-63.

Susilawati, & Purwoko, B. (2012). Pengujian Varietas dan Dosis Pupuk untuk Meningkatkan Pertumbuhan dan Hasil Ratun-Padi di Sawah Pasang Surut. *Jurnal Pengkajian dan Pengembangan Teknologi Pertanian*, 15(1): 47-54.

Suwandi, Ammar, M., & Irsan, C. (2012). Aplikasi Ekstrak Kompos Meningkatkan Hasil dan Menekan Penyakit Padi Sistem Ratun di Sawah Pasang Surut Kabupaten Banyuasin. *Jurnal Lahan Suboptimal*, 1(2): 116-122.

van der Meulen, H., van Assseldonk, M., & Ge, L. (2016). The state of innovation in European agriculture: Innovators are. *Studies in Agricultural Economics 118*, 172-174.

Warnaen, A., Cangara, H., & Bulkis, S. (2013.). Faktor-Faktor yang Menghambat Inovasi pada Komunitas Petani dan Nelayan dalam Meningkatkan Kesejahteraan Masyarakat di Kabupaten Takalar. *KAREBA*, 2(3): 241-249.

Wibowo , C., Sumardjo, Hafidhuddin, & Agung , S. (2012). Pola Komunikasi pada Pengembangan Kapasitas Kewirausahaan Petani Sayuran (Kasus Pendampingan Misi Teknik Taiwan di Kabupaten Boyolali dan Bogor). *Jurnal Komunikasi Pembangunan*, 10(1): 47-57.

Zainal, M., Lubis, D., & Rangkuti, P. (2014). Pola komunikasi partisipatif pada program pengembangan usaha agribisnis perdesaan di kabupaten bogor. *Jurnal KMP*, 12(2): 80-90.