Security in food, renewable resources, and natural medicines

SFRN 2019

PROCEEDING

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3rd INTERNATIONAL CONFERENCE ON SECURITY IN FOOD, RENEWABLE RESOURCES, AND NATURAL MEDICINES 2019 (SFRN 2019)

Convention Hall Politeknik Pertanian Negeri Payakumbuh
INDONESIA

QUANTUM-LEAP OF AGRI-FOOD SYSTEM 4.0 AND DELIVERY OF SUSTAINABLE DEVELOPMENTS GOALS (SDGS)

September 25-26, 2019

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Welcome Message
Executive Chairman of The 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019

Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikum wr.wb

On behalf of the SFRN 2019 organizing committee, I am really honoured and delighted to welcome all of you to the 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the State Polytechnic of Agriculture Payakumbuh, West Sumatra Indonesia

Our technical program is rich and varied with 8 keynote speeches and 4 invited talks and more than 170 technical papers split between 8 parallel oral sessions and 1 poster sessions. The speakers and participants came from 8 different countries, consist of Academicians, Scientists, Researchers, Practitioners, Professionals, and Government Officialsin multidiscipline branch of knowledge, who gathered here today to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and HealthCare Free for All, in particular for those who in needs. As the chairman of conference 2019 SFRN, I know that the success of the conference depends ultimately on the how many people who have worked in planning and organizing both the technical program and supporting social arrangements. This year, the conference is jointly organized by the Payakumbuh State Agricultural Polytechnic and Andalas University. We also thank to the steering committee fortheir wise and brilliant advice on organizing the technical program; and also to the the Program Committee, both from the Payakumbuh State Agricultural Polytechnic and Andalas University , for their thorough and timely reviewing of the papersand to the Directorof Payakumbuh State Agricultural Polytechnic and the rector of Andalas University, and the Head of the Institute forResearch and Community Service of Andalas University, and Payakumbuh State Agricultural Polytechnic. Our recognition should go to the Organizing Committee members who have all worked really hard for the details of the important aspects of the conferenceprograms and social activities, and then we extend our gratitude to our students who bore the arduous burden for preparing this event.

We hope this event is also a good step in gaining strengthenn cooperation between our universities as we know that the State Agricultural Polytechnicof Payakumbuh is part of the Andalas University previously, of course the psychological relationship between the State Agricultural Polytechnicand the Andalas University is really close.

Finally on behalf of the committee, we apologize profusely for all the shortcomings and everything that is not properly in organizing this event and hopefully AES-Network contributes significantly to the research and technology for the good of humanity.

Thank you

Fithra Herdian, S.TP, MP

Message from Afro-Eurasia Scientific (AES) Network
3rdInternational Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

On behalf of the AES Network, I am honored and delighted to welcome you to the 3rdInternational Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the Agricultural State Poly Technique of Payakumbuh, Indonesia. I believe we have chosen a venue that guarantees a successful technical conference amid the culture, delicacy and scenery of Payakumbuh, the city of "Rendang".

The AES-Network aims to Promote Livelihood Through Food Security, Promote Future Smart and Green Mobility by Using Renewable Energy, Promote Prosperity by Equally Managing and Distributing the Sustainable Resources and Promoting Enjoyable Long-Life by using Natural Medicines With Free Health Care For All. The AES-Network was established in 2018 and already have memberships from 12 countries. Our members consist of Academicians, Scientists, Researchers, practitioners, professionals, and government officials from multidiscipline branch of knowledge, who gathered and contributed their expertise to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All.In particular, the network aims to alleviate the condition of those who in dire needs. In the future, we also expect to provide technical demonstrations, and numerous opportunities for informal networking for Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In this opportunity, we invited you to become our members and join our efforts for a better life to all of mankind.

As a team, we acknowledge the existence of mutual interest among university and college educators, researchers, activists, business sector, entrepreneurs, policy

makers, and all society members. We must promote the need to strengthen cooperation for establishing Security in Food, Renewable Resources, and Natural Medicines in Africa, Europe, and Asia.

The AES-Network believe, a firm foundation for mutual collaboration with the spirit of equality and partnership and thereby contribute towards sustainable development in these three regions.

Therefore, through networking, friendships, and joint efforts, the capacity of our network can be enhanced to address major challenges in securing the Food, Renewable Resources, and Natural Medicines in Africa, Europa, and Asia.Our Network goals areto increase the awareness of educators, researchers, scientific community, business sector, entrepreneurs, and policy makers in Africa, Europa, and Asia, that the future of a better world, lies within their responsibilities, and to improve the networking, mobility and mutual collaboration of scientific community, business sector, entrepreneurs, and policy makers in Africa, Europe, and Asia to energize the delivery of Sustainable Development Goals.

Finally, I hope that, by registering our network, you will be provideda common platform and support the exchange of knowledge, while at the same time, we offer constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrived at the best solutions to our terminal goal, Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care based on scientific evidence in Africa, Europa, and Asianregion.

Thank You for Joining us!

President
Assoc. Prof. Dr. Eng. Muhammad Makky

Welcome Message
Head of Institute for Research and Community Service
Universitas Andalas

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

It is with great pleasure that I welcome the participants of the SFRN 2019 in Payakumbuh, the city of "Rendang", the prime of Indonesian delicacy.

In this esteem event, we share the knowledges, and imparted it to the people. The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that this conference will become a platform to gather and disseminate the latest knowledge which can be adopted for securing the food, resources, and health for mankind, in Asian, European and African region.

Academicians, Scientist, Researchers and practitioners from multidiscipline branch of knowledge who gathered here today will be able to share and discuss new findings and applications of innovations for ensuring food security, in particular for those who reside in developing countries. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to issues on environmental and sustainability. Therefore, we urge to all participants, to establish a scientific network that will voice the needs

Researchers in the multi sectoral aspects related to the benefit of mankind have been progressing worldwide. Food is a basic right, while energy drive the world. Human need a lot of resources so the civilization can be flourished. But human is not immune, and thus, ones need to take care of their health regularly. Modern Agri-food systems is the foundations of a decent life, a sound education and the achievement of

the Sustainable Development Goals. Over the past decade, we have witnessed a chain reaction that threatens the very foundations of life for millions of the world's people. Rising energy prices drove up the cost of food and ate away the savings that people otherwise would have spent on health care or education. Unsustainable plantation management induced forest fire and posed haze hazard to the whole Sumatra island and our neighboring countries.

The human cost of the food and energy crisis has been enormous. Millions of families have been pushed into poverty and hunger. Thousands more suffering from the collateral effects. Over the past year, food insecurity led to political unrest in some 30 countries. Yet because the underlying problems persist, we will continue to experience such crises, again and again -- unless we act now. That is why we are here today.

We must make significant changes to feed ourselves, and most especially, to safeguard the poorest and most vulnerable. We must ensure safety nets for those who cannot afford food, or energy, nor even a health service. We must transform agricultural development, markets and how resources is distributed. We must do so based on a thorough understanding of the issues. That is the only possible way we can meet the Goals of Sustainable Development.

Thank You,

Assoc. Prof. Dr.-Ing. Uyung Gatot S. Dinata,MT.

Opening Ceremony
Rector of Andalas University

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

I welcome the opportunity to address you at this important event.

It gives me great pleasure in welcoming you to this 3rdConference on "Security in Food, Renewable resources, and Natural Medicines (SFRN)" 2019. I am delighted that so many have accepted our invitation. I am particularly happy that we have in this room, dedicated individuals from so many stakeholder groups — including our most respected and distinguished guest "The ministry of Agriculture of the Republic of Indonesia". We also welcome the mayor of Payakumbuh and the Regent of Lima Puluh Kota. We extend our welcome to the civil society, the private sector, international organizations; the science community; and others dedicated to help create an environment in which people can escape food insecurity. Imagine what we can do together if we make the security for all as an our top priority, and pull in the same direction. We can make a difference in the lives of millions.

Food is a basic right. Food security are the foundations of a decent life, a sound education and the achievement of the Sustainable Development Goals Access to medicines - a fundamental element of the right to health. Health is a fundamental human right, indispensable for the exercise of many other rights in particular the right to development, and necessary for living a life in dignity. Moreover, human rights principles and language are being used to support resource access claims as rights-based approaches empower individuals and groups to gain or maintain access to natural resources

Much progress has been made during the last decades but much more needs to be done. Millions of people are Insecure worldwide, meaning that they either starve or they do not know from where their next meal, health care or resources will come.

Much of the progress on security has occurred at the expense of our environment. With business as usual, we foresee that the production improvements during the next decade will be less than the last one, while the environmental degradation will continue, and health will deteriorate significantly. Without available resources to seek, mankind will become endanger species in a very short time.

Solutions to the security problems need to be designed and implemented within a new and rapidly changing environment. Globalization and sweeping technological changes offer new opportunities for solving these problems. A number driving forces or trends must be taken into account in developing appropriate action. Some of the action needed, such as appropriate technology for small farms, is not new but it must be cast in the new and changing global and national environment, taking into account new opportunities and risks. I hope that by providing a forum for knowledge exchange, this conference will help identify the action to be taken. Furthermore, this conference will help to provide constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrive at the best solutions.

In conclusion, even if those responsible give high priority to achieving sustainable security for all and back it up with action, the world may not achieve the goal by 2030. But we will be much closer than with business as usual. I urge all of us to provide the strongest support for this event, to enable securing the food for all in the closest time possible. It is my sincere optimism that through the accomplishment of the objectives of this event, we will come to an important step nearer to secure the food for all.

Finally, I would like to thank the organizing committee who have spent their utmost efforts to prepare and manage this event successfully. Let me conclude my remarks by wishing our guests happiness, good luck and great success in the conference.

May I announce now the opening of the "3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019" in Payakumbuh.

Thank you.

Rector,
Prof. Tafdil Husni, SE, MBA, PhD

Welcome Message
Director of Politeknik Pertanian Negeri Payakumbuh

Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikumwr.wb

I congratulate to all participants on the invitation and participate at our beloved campus Payakumbuh StateAgricultural Polytechnic. I feel really honoured to welcome all of you at our event, the 3rd International Conference on Security in Food, Renewable Resources, and Natural Medicines (SFRN) 2019 at thePayakumbuh State Agricultural Polytechnic, Indonesia.

Food security is a very important aspect in a country's sovereignty. Food also determines the future direction of a nation. Many social and political fluctuation can also occur if food security is disrupted. Food availability that is smaller than its needs can create economic instability. This critical food condition can even endanger economic and national stability. In the current situation, there are many challenges in exteriorize food security, such as climate change, population, limited natural resources and other challenges both locally, regionally and globally.

Renewable resources are also our starting point to start sustainable development. Research on renewable resources is also very important as the solution in meeting the principles of sustainable development. As we know that Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability is the foundation for today’s leading global framework for international cooperation - the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs)

The discovery of treatment based on local culture also contributes greatly to the good of humanity. Unfortunately, there are still many treatments that have not been carried out by scientific research. So, through this conferencewe hope it can be a trigger to increase in traditional plant-based treatments that not go through complex

chemical processes, so that the effectiveness of the pillars can be further suppressed and also contribute to the community's economy.

Finally, I would like to express my gratitude to all people who involved in organizing this event and to all ofstakeholders who have helped to make this event go on succesfully. Please accept my apologize for any shortage, Assalamu'alaikumwr.wb.

Thank you

Ir. Elvin Hasman, MP

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Farmer's Adoption Level for Inpara 3 and Inpari 34 Newly Rice Varieties Experiment in Swampland Areas, Betara District, West Tanjung Jabung, Jambi

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Abstract. The study aimed to determine the adoption level of Inpara 3 and Inpari 34 varieties in swamps. The study was carried out in the swampland areas of Makmur Jaya Village, Betara District, West Tanjung Jabung, Jambi Province, from January to August 2019. The sample size was 40 cooperative farmers under the "Surya Gemilang" farmer group, which randomly selected within Makmur Jaya village, Betara District. Data were analyzed descriptively both qualitatively and quantitatively with scoring techniques. The results showed that the level of farmers' knowledge of the Inpara 3 and Inpari 34 varieties adoption was high, about 84.3% and 71.3%, respectively. In contrast, the farmers' decisiveness towards the innovation of the two varieties were included in the approved category. The Inpara 3 and Inpari 34 varieties are efficient enough to be developed in these swamps. Inpara 3 variety is preferable because of its adaptability in swamps, its resistance to pests and diseases, and the high number of tillers and high productivity. Whereas the Inpari 34 variety is also preferable because of its adaptability in swamps, its resistance to pests and diseases, the grain shape, and the texture/taste of rice. Increasing adoption of Inpara 3 and Inpari 34 varieties can be done through increasing dissemination and supporting seed preservation to support their rice development program in the swamps area.

Keywords: adoption, varieties, swamps

INTRODUCTION

The development of rice in swamps areas is one alternative technique to anticipate the decreasing of agricultural lands in Java, which has turned into non-agricultural land. The Indonesian swamps areas are estimated at 34.1 million hectarages. It is about 9.5 million hectarages has the potential to be developed as productive agricultural areas. The main problems encountered for developing paddy in swamps are the biophysical conditions of the land (especially water contain and soil fertility), climate change, and socio-economic conditions which is related to human resources (farmers), limited facilities and infrastructure, and policies that do not take sides for optimizing sub-optimal land use (Alihamsyah et al. 2003; Noor et al. 2006). This condition causes the level of rice productivity in the tidal swampland is average to 3.25 tons/ha and lower than in irrigated land area about 4.08 tons/ha (Irianto 2012).

Swampland productivity in Jambi Province is still low, ranging from 3.00 to 3.90 tons/ha (BP4K, West Tanjung Jabung Regency, 2010). The production can still be increased up to 5-6 tons/ha through the introduction of rice technologies such as newly superior seeds, fertilization, amelioration, and pest control (Ismail et a, 1993 and Alihamsyah et al., 2003). According to Abdullah et al. (2008), one of the causes of low rice production is newly improved varieties (VUB) planted by farmers have a limited genetic capacity to produce higher yields (Balitpa, 2003).

In Jambi Province, tidal land areas have long been cultivated by both local and transmigration residents. In general, farmers in tidal land areas have to cultivate rice only once a year. Rice planting time is carried out in the rainy season. The rice-fallow cropping pattern is more dominant than the rice-cropping pattern. Efforts to improve tidal land productivity has been supported by appropriate technology. The technology leads to improving farm management through increasing farm productivity and efficiency, as well as maintaining soil fertility through soil and water conservation measures (Abdurachman, 2005), or the application of rice cultivation technology must collaborate with an integrated crop management (PTT) approach (Ministry of Agriculture, 2008).

The introduction of new technology has so far been considered to be less successful. The low level of adoption indicates it. The process of introducing new technologies (i.e., newly swamp rice varieties) to farmers who want to adopt it, is indeed not easy. Farmer interest or level of farmer adoption of varieties is closely related to four factors: (1) high yield potential, (2) early maturity, (3) resistance to pests and diseases, and (4) quality and tastes of consumers (market) (Puslibangtan 2007).

The adoption method is a process of behavior change, both in the form of knowledge, attitudes, and skills in a person, in accepting the agricultural innovations conveyed by the instructor. Acceptance means implementing or applying it correctly in life and usually can be observed directly by others, as a reflection of changes in attitude, knowledge, and skills (Mardikanto 1993). The stages of the adoption process include: (1) the awareness phase, (2) the interest stage, (3) the assessment phase, (4) the trial phase, and (5) the adoption stage. The adoption sustainability of innovation is theoretically influenced by the character of the actor, the character of innovation, and its environment (Fider et al. 1985 in Wahyudi et al. 2003).

Supporting the P2BN program in swamps areas, sustenance for source seeds availability is very important. The Jambi Assessment Institute for Agricultural Technology (AIAT) established the Source Seed Implementation Unit (UPBS) with an assignment for producing rice seeds and disseminating/distributing its seeds in the form of aid and non-seed assistance. Finding out the role of disseminating seeds development of Inpara 3 and Inpari 34 varieties, adoption studies are needed. The purpose of the study was to determine farmers' adoption levels for Inpara 3 and Inpari 34 varieties acceptance in the tidal swampland.

METHODOLOGY

This study was carried out on swamps in Makmur Jaya Village, Betara Sub-District, West Tanjung Jabung Regency in 2019, using the survey method. Research activity by conducting interviews and distributing a structured questionnaire form for some farmer groups and selected farmers who implemented both Inpara 3 and Inpari 34 as newly rice varieties tested in the form of demonstration areas as primary data collection. Whereas, secondary data were obtained from local government institution for Food Crops and Horticulture in West Tanjung Jabung Regency and in Agriculture Provincial offices in Jambi Province.

The primary method used in this study was a descriptive-analytical method, which was research based on solving actual problems that exist presently. The existing data was tabulated, compiled, and further analyzed (Surachmad 1989).

The collected data were tabulated and analyzed using scoring and qualitative techniques. Measurements by scoring were carried out on both knowledge behavior and attitudes (Table 1). Farmer behavior data was distributed in different classes. Scoring used a five tiered Likert scale (attitude and knowledge). These classes have amount of intervals which determined through some class interval formula. The value score was displayed as a percentage (Suharyanto & Kariada 2011), with the formula:

$$\textbf{\textit{Table of Content}} = \frac{\text{\% highest score} - \text{\% lowest score}}{\text{The sum on total Interval Number}}$$

The adoption rate of varieties implementation was measured using the planting area of superior varieties of Inpara 3 and Inpari 34 as the object of the research. Calculations were made based on one comparison area of previous planting time (base year) with the following year. The adoption rate (%) per year is obtained by adding up the annual increase divided by the number of years multiplied by 100. The average adoption of great yielding varieties was the average planting area per year.

$$\textbf{Adoption Levels} = \frac{\textbf{Adoption Levels}}{\textbf{Previous Newly Rice Varieties Areas}} \boldsymbol{x}\ \mathbf{100}$$

Table 1. Categories of farmers' level of knowledge and attitudes towards the adoption of agricultural technology innovations of Inpara 3 and Inpari 34 varieties in swamp areas.

Score Interval (%)	Knowledge/Skill	Attitude
>82 – 100	Very High	Highly Agree
>64 – 82	High	Agree
>52 –66	Medium	Hasitate
> 34–50	Low	Not Agree
18 – 32	Very Low	Highly Not Agree

RESULT AND DISCUSSION

Farmer Characteristic

The characteristics of farmers in Makmur Jaya village, Betara sub-district can be seen in Table 2. It indicated that the age of farmers varied between 26 to 75 years, with an average age of 47.37 years and classified as productive age. Younger farmers usually have high curiosity, so they try to adopt innovations like new varieties even though they are still inexperienced in the cultivation of the varieties. The average level of educational attainment was 7.6 years, with a range of elementary schools to high schools. Soekartawi (1988) stated that farmers with higher education generally adopt innovations faster than in low education. Furthermore, Prayogo (2010) also said that differences in the level of technical mastery are caused by differences in farmers' inherent attributes, such as farm experience, age, and education (Table 2).

Table 2. Characteristics of Farmer in Makmur Jaya Village, West Tanjung Jabung District

Character	Farmers in Makmur Jaya Village, Betara Sub-District	
	Average	Range
Age (year)	44,51	26–65
Education attainment (year)	7,54	6–12
Experience as Farmer (year)	19,57	2–40
Productive workers: (Person/Family)		
Male	1,71	1–4
Female	1,49	1–3
Land Owner (ha)	2,69	0,5–6
Land Cultivation (ha)	2,41	1,5–6

Age is one of the aspects that a person can use to determine the level of effort and its closely related to their farming productivity. Besides, age is an essential factor that can affect farming management systems, such as in making decisions, both in the use of production factors, participation in farmer groups or other institutions, as well as the marketing of farm products. Based on the results of this study, it was found that the age of farmers ranges between 26-65 years, with an average of 44.51 years old. These results indicate that rice farmers in Makmur Jaya Village, Betara District, West Tanjab District swamp areas are mostly in productive age. Adoption of technology is about mental process and behavior change, both in the form of knowledge, attitudes, and skills from listening, understanding until deciding to apply it.

The process of diffusion of technology is not much different from the process of adoption, but in the defusion of the source of information from the system of the community itself, while the adoption of the source of information from outside the

system of the community system itself (Roger & Shoemaker 1981). It was stated by Rina and Roesmani (2018), that the source of information was an individual or agency that conveyed to farmers. In this circumstance, extension workers, researchers, community leaders, and fellow farmers are an influence for them. As many as 64.5 percents of farmers stated that they first heard information about newly superior varieties from extension workers, about 25.8 percent from farmer contacts and 9.7 percent from fellow farmers. It was also stated that 3.33 percent said that three years later, they could only adopt the technology (Table 3)

Table 3. Farmer Time Interval since starting to hear/get to know the innovations of both Inpara 3 and Inpari 34 varieties to implement it

Hear /time get to know	Implementing time	Application Interval Times (Year)	Number (Farmers)	Sum (%)
2000	2000	0	4	13,33
2002	2002	0	2	6,66
2003	2003	0	1	3,33
2004	2004	0	2	6,66
2005	2005	0	4	13,33
	2006	1	1	3,33
2006	2007	1	2	6,66
	2009	3	1	3,33
2008	2009	1	1	3,33
2009	2009	0	1	3,33
2010	2010	0	3	9,99
	2011	1	2	6,66
2011	2011	0	2	6,66
2012	2012	0	2	6,66
	2013	1	1	3,33
2013	2013	0	1	3,33
Total			**32**	**100,00**

Source. Yanti R. and Roesmani (Balitrra, 2018).

Furthermore, Yanti R. and Rooesmani (2018), stated that the process of technology adoption requires a time span of one to three years, as supported by Hendayana et al. (2009) in Hendayana (2010). Farmers who adopted less than one technology were 55.9 percent, between one to three years was around 30.7 percent, and more than three years was about 13.4 percent. The average level of farmers' knowledge of Inpari 34 and Inpara 3 varieties was 71.3 percent and 84.3 percent, respectively. It was including high category adoption. Information from extension agents, district dictated officials, and information from fellow farmers are crucial factors in determining farmers' knowledge of the two varieties (Fadwiwati *et al*. 2014)

Table 4. Characteristics of Farmers' knowledge in Adopting Inpara 3 and Inpari 34 varieties in Makmur Jaya Village, West Tanjung Jabung Regency

Variables	Inpara 3 Variety			Inpari 34 Variety		
	Score	%	Categories	Score	%	Categories
Superior varieties	3,07	81,8	High	2,52	50,4	Medium
High yield benefits	2,94	76,6	High	3,48	71,6	High
Adaptive to the environment	3,28	81,2	High	3,41	70,5	High
Long/ short life	3,55	72,0	High	3,29	65,7	High
Plant height	3,76	76,8	High	3,46	68,3	High
Level of recline	4,12	81,2	High	3,42	70,4	High
Resistant to pests-disease	3,69	71,2	High	3,42	69,2	High
Fruit loss rate	3,54	79,4	High	2,60	66,0	High
Fruit shape	3,26	80,2	High	3,21	70,4	High
Rice Texture	3,78	79,0	High	2,23	59,7	Medium
Age of seedlings <21hr	4,00	79,0	High	3,22	64,4	High
Fertilization (fertilizer dosage)	3,85	77,8	High	3,22	70,6	High
Seed availability	3,92	78,6	High	2,93	58,8	Medium
Consumer needs	4,10	80,6	High	3,55	70,2	High
Average	3,91	84,3	High	3,38	71,3	High

Explanation: % score: 20 - 36 = very low, > 36 - 52 = low, > 52 – 68 = medium, >68-84 = high, >84 - 100 = very high.

Fatwiwati et al. (2014) reported that the availability of information contributes to improving technical efficiency. Extension methods can improve technical efficiency through changes in cultivation techniques, mechanization, use of new and superior inputs, an optimal number of inputs, and improved technology. Farmers' knowledge about the adaptation of Inpari 34 and Inpara 3 varieties to the environment was high and moderate or 84.3% and 71.3%, respectively. Farmers' Knowledge of adaptation of Inpari 34 variety is lower than that of Inpara 3 variety. It was because the Inpari 34 variety has only been developing in the Betara District areas in the last one to three years ago. At the same time, the Impara 3 variety has been developing for quite a long time in this region. Whereas, farmers' knowledge about pest and disease resistance of both varieties is high.

Farmers 'knowledge about plant age, plant height, reclining level, rice texture, and fruit shape, age of planted seedlings, and the needs of consumers in Inpara 3 varieties are high, while farmers' knowledge of rice texture, age of seeds, and availability of seeds to Inpari 34 variety at a moderate level. Likewise, with the fruit shape, the Impara 3 variety was high, and the Inpari 34 variety was medium. The Impara 3 variety is better known by the farmers as it resembles the Malaya local variety, and the price of grain was also the same. The average knowledge level of

farmers about Inpara 3 and Inpari 34 varieties was included in the high category. It is due to the fact that instructors often convey information about Inpara 3 and Inpari 34 varieties to farmers and farmers attending meetings when extension workers conduct exercises and visit farmers while applied by themselves. Adoption behavior is dynamic and is closely related to conformity with farmers' wishes and information flow. The more farmers get information, both formally (researchers, extension workers, farmer groups) and non-formal (fellow farmers), the higher technology adoption would be.

The attitude of farmers about adaptive to the environment, rice texture, and the shape of fruit for Inpara 3 variety was very much in high agree, and Inpari 34 variety was only agreed. Inpara 3 was 84.3% and 71.3%, respectively, in their high agree category. The average attitude of farmers towards Inpara 3 and Inpari 34 varieties were included in the high agree category. It is because the superior varieties of Inpara 3 and Inpari 34 are in accordance with the needs. This was supported by the farmers' high knowledge. The superiority of Inpari 34 variety was more resistant to blast attack and high production (Koesrini et al. 2013). The formation of farmers' attitudes is not automatic because if someone decides to accept or reject the variety, there is usually a relationship between knowledge and attitude.

The adoption rate of the Inpara-3 and Inpari-34 varieties was better than Ciherang variety in the tidal swampland, as reported by Koesrini et al. (2014). Ciherang varieties in farmers' field cultivation areas, in general, have been planted for many years from previous crops. This condition causes genetic decline, which results in the weakening of resistance to pests and disease, and the yields are declining. The Inpara 3 variety in Betara District received a reasonably good response as seen from the increasingly widespread its plantations.

Farmers' interest in rice production and productivity should be increased by applying a strategy, which is optimizing land through intensification. Intensification can be done by increasing rice productivity in the rainy season coupled with the application of technological innovation and enhancing cropping intensity (IP 200). In the dry season, farmers on tidal land areas generally do not plant rice or fallow, and most of their land is under-utilized optimally. It was stated by Jumakir et all (2012) that rice planting in the dry season with a potential acid sulfate land typology and type B water overflow with an area of 1.0 ha. The introduction of technology applied in this activity through integrated crop management (PTT) approach for tidal land rice. The technological components include tillage, quality and labeled seeds. New superior varieties namely Inpara 1, Inpara 3, Ciherang and Cisokan. Planting a legowo jajar 6: 1 system, organic fertilizer / manure and dolomite, inorganic fertilizer, micro water system and IPM. The productivity of rice VUB tested was the highest yield in the Inpara 3 variety, which was 7.04 t/ha GKP, followed by Inpara 1 variety, which was 5.60 t/ha, Cisokan 4.64 t/ha and Ciherang 4.20 t/ha GKP (Table5).

Table 5. The productivity of several rice varieties in the tidal land of Teluk Ketapang Village, Tanjung Jabung Barat Regency, Jambi Province

Varieties	Dry Rice Production (t/ha)	
	Wet season (MH)	Dry season (MK)
- Inpara 1	-	5,60
- Inpara 3	-	7,04
- Ciherang	4,15	4,20
- IR 42	4,00	-
- Cisokan	4,50	4,64
-Serai	2,50	-

Source : Jumakir *et al*. 2012 ; Jumakir and Endrizal, 2013

Hendayana (2010) stated that a high response to the development of superior rice varieties occurs in areas where the infrastructure conditions of transportation facilities and infrastructure are already open. The condition of the opening of the region has led to a shift in the orientation of rice farming from subsistence, shifted towards commercial. In this case, the target planting of superior rice varieties (Inpara,) is for sale, while local rice is for family food security.

Farmers' response to the problem of planting Inpara 3 and Inpari 34 superior rice varieties is presented in Table 6. The problem of adoption of Inpara 3 variety of 43.14% stated that there was a bird pest attack, 18.16% of farmers declared flooded, and 11.06% stated the difficulty of drying grain. The problem of adoption in the Inpara variety was 21.46%. Farmers stated that there were rodent and bird attacks. 18.16 % said it was challenging to flood. 11.06% stated labor shortages, and 19.21% of farmers declared flooded. The shortage of labor is due to the fact that most of the workforce was captivated in the oil palm plantations around the village.

Table 6. Farmers' responses to the main problems of Inpara 3 and Inpari 34 rice farming in the swampland areas of Betara District, West Tanjab Regency.

Uraian	Inpara 3		Inpari 34	
	Number (Persons)	%	Number (Persons)	%
Rice drying	12	21,46	15	25,47
Labor Shortage	-	-	10	19,21
Rat and Bird attacks	10	18,16	14	22,31
Flooded	-	-	7	11,06

SUMMARY

The level of farmers' knowledge of the Inpara 3 and Inpari 34 varieties was high, 80.3 % and 74.3%, respectively, while the farmers' attitudes towards the innovation of the two varieties are included in the agree category. Inpara 3 and Impari 34 variety of farming in tidal swamps is quite profitable and efficient. Inpara 3 variety is highly favored by farmers because of its adaptability to swamps, resistance to pests and diseases, the high number of tillers, and high productivity.

Farmers are highly favored the Inpari 34 because of its adaptability in swamps, resistance to pests and diseases, the shape of grain, and the texture or taste of rice. Increased adoption of Inpara 3 and Inpari 34 varieties can be done through increased dissemination and support of sustainable source of seeds to support their development in the tidal swampland areas.

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