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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Amelioration of the Land of Former Gold Mine By Providing Kirinyuh Weeds and Agricultural Waste to Increase Paddy Production in Sijunjung Regency

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Abstract— In Sijunjung Regency, Gold mining activities caused damage to the surrounding fields. After mining is complete, the land becomes unproductive ex-mining land. Land productivity can be increased through the provision of ameliorant in the form of kirinyuh weeds and agricultural waste. This study aims to find the best dose of ameliorant treatment, namely kirinyuh weeds and agricultural waste that can improve soil chemical properties to increase rice production. This study used a Completely Randomized Design (CRD) with 4 levels of treatment and 3 replications, namely A (without compost + 100% NK artificial fertilizer), B (1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K artificial fertilizer), C (2 tons / ha kirinyuh + 2 tons / ha rice straw + 2 tons / ha pukan + 50% N, K artificial fertilizer), D (3 tons / ha kirinyuh + 3 tons / ha rice straw + 3 tons / ha + 50% N, K artificial fertilizer). The results showed that the administration of kirinyuh weeds and agricultural waste as ameliorant in the former gold mine land was able to improve the chemical properties of the soil. The best treatment is the administration of 3 tons / ha of kirinyuh + 3 tons / ha of rice straw + 3 tons / ha of potting + 50% N, K artificial fertilizers increase the production of rice plants.

Keywords: amelioration, former gold mines, kirinyuh, agricultural waste, rice

INTRODUCTION

Increasing the number of the population every year has increased the need for land for various non-agricultural sectors also increased. As a result, the conversion of agricultural land to non-agricultural land has increased, especially in paddy fields. In Sijunjung Regency, the area of paddy fields in the community experienced a decline due to gold mining activities. After mining is completed, the land is left behind and left to become unproductive, due to damage to the physical, chemical and biological properties of the soil, such as low water holding capacity, large porosity, and low soil fertility, acidic soil pH, N-Total, P-available, CEC soil, and low base (K, Ca, Mg and Na) content. Gusmini *et al*., (2016), explained that mining activities could damage the environment, and cause pollution (environmental degradation) around the area, and are indicated to contain mercury poison (Hg).

The productivity of the former gold mine land can be increased by improving the chemical properties of the soil by adding ameliorant. Ameliorant or soil amendment is material added to the soil to improve the root environment for plant growth. The provision of ameliorant is intended as a source of nutrients, reducing soil acidity and as a source of binding or absorbing leached cations. Ameliorant that can be used to recover land from the former gold mine is kirinyuh weeds and agricultural waste in the form of rice straw and cow manure. Kirinyuh has its own uniqueness besides being able to develop quickly; the weed can grow in water-poor land. Composition of nutrient content of 2.42% K; 0.26% P; 50.40% C; and 20.82% C / N. (Jamilah *et al*., 2009). The nutrient content for 1 ton of rice straw compost is N 2.11%; P2O5 64%; K2O 7.7%; Ca 4.2%; and 0.5% Mg microelements; Cu 20 ppm; Mn 684 ppm, and Zn 144 ppm (BPTP, 2013).

The addition of organic material can be cultivated from local resources such as cow manure produced by local farmers. Nutrient nutrient levels according to Hakim et al., (1986) *cit* Syofiani (2012) were 0.5% N; 0.25% P2O5; and 0.5% K2O. Based on some information on these results, it is clear that kirinyuh, rice straw, and manure can be used as a convenient source of organic fertilizer is produced, as well as a source of nutrients, especially N, P and K.

MATERIALS AND METHODS

A. Time and place of research

The study was conducted for 7 months (February to August 2019). The research was carried out in Jorong Palaluar Nagari Palaluar, Koto VII District, Sijunjung Regency.

B. Experimental Design Experimental

Design in the form of a Completely Randomized Design (CRD) consisting of 4 levels of treatment and 3 replications to obtain 12 experimental units as follows:

A : without compost + 100% NK artificial fertilizer
B : 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K artificial fertilizer)
C : 2 tons / ha kirinyuh + 2 tons / ha rice straw + 2 tons / ha pukan + 50% N, K artificial fertilizer)
D : 3 tons / ha kirinyuh + 3 tons / ha rice straw + 3 tons / ha pukan + 50% N, K artificial fertilizer).

C. Research Procedure

- Making Compost

Rice straw chopped up to 3-5 cm in size. kirinyuh material and chopped rice straw and manure are weighed according to treatment. EM4 activator is added to the mixture, to speed up the decomposition process. All ingredients are stirred until evenly distributed, then stacked on an incubation container or curing (thick black plastic). Then the material is closed for one month and observed once a week by turning it over until the compost cooks with the characteristics: the raw material is

not clearly visible such as kirinyuh leaves and straw, it is blackish brown, and has no smell.

- Seed Preparation, Planting, Maintenance, and Harvest The

Seeds used are upheaval varieties. The spacing used are 25 cm x 25 cm. Maintenance includes watering, weeding, and eradicating pests and diseases. Harvesting is done when the plant is ± 125 HST.

D. Observation

The parameters observed were analysis of soil chemical properties, NPK and soil pH, and observations on rice plants, namely rice production.

The flow of the research are: (1) determining the location of the study, (2) making compost, (3) giving treatment which is then incubated for 1 week and then taking soil samples for soil chemical analysis, (4) planting and maintaining rice plants, (5) Harvest

RESULTS AND DISCUSSION

A. Characteristics of compost chemistry

The results of the analysis of some chemical characteristics of compost used can be seen in Table 1

Table 1. Characteristics of Compost

Treatment of	pH (1: 1)	N (%)	P (%)	K (%)	C-organic (%)
A: without compost + 100% NK artificial fertilizer					, 44
B: 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha 50% N, K artificial fertilizer)					15.14
C: 2 tons / ha kirinyuh + 2 tons / ha rice straw + 2 tons / ha pukan + 50% N, K artificial fertilizer)					15.86
D: 3 tons / ha chirinyuh + 3 tons / ha rice straw + 3 tons / ha pukan + 50% N, K artificial fertilizer) .		5.66 5.68 5.74 5.80 1.08 1.00 1.10 1.22			18.45

In Table 1, it appears that the pH value of compost in all treatments is in the slightly acidic criteria. The C-organic content of the D treatment is higher because it is closely related to the mixture and dosage of the material used in making compost. The carbon content (C) in compost material contributes energy to decomposition.

Rice straw in the process of decomposition requires a long time to release carbon in the form of carbon dioxide. The level of C in decomposed organic material will be reduced long enough until the composting time is complete. This shows that the straw slows down more slowly, so it contains higher organic C. Arafah's research results (2003). showed that the C-organic content of rice straw was quite high at 40%.

In Table 1, it can be seen that N levels range from 1.00 to 1.22%. It seems that compost in treatment D contains the highest percentage of N, this is in line with the increase in compost dose. Compost P nutrient levels in treatments C and D carry the same high P nutrient content. P nutrient levels of rice straw were 0.10% (Ponamperuma, 1984 *cit* Syofiani, 2012) and P nutrient content of manure 0.15% (Atmojo, 2003). In this case, P is derived from the addition of SP-36 fertilizer to compost production. Besides that, chaff, rice straw, and manure also contribute P and K nutrients. The nutrient content in the three composts is almost the same, which is around 1% (Table 1).

From the chemical characteristics of compost that have been stated above, it is expected to play a role in increasing soil fertility, so as to reduce the application of artificial fertilizers and be able to provide high rice yields in new openings.

B. Soil chemical characteristics Soil

- *pH values*

Results of soil pH analysis after incubation of compost with artificial fertilizers are presented in Table 2.

Table 2. pH values of wetlands affected by compost and artificial fertilizers

Treatment of	pH (1: 1)
A: without compost + 100% NK artificial fertilizer	5.66 am
B: 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K artificial fertilizer)	5.68 am
C: 2 tons / ha kirinyuh + 2 tons / ha rice straw + 2 tons / ha pukan + 50% N, K artificial fertilizer)	5.74 am
D: 3 tons / ha kirinyuh + 3 tons / ha rice straw + 3 tons / ha pukan + 50% N, K artificial fertilizer).	5.80 am

Note: am = slightly acidic

The soil pH value after adding compost and artificial fertilizers is in the slightly acidic criteria. In the process of decomposition, compost donates organic material that releases organic acids. According to Gusnidar (2007), weathering organic materials can produce organic acids such as acetic acid, gallate, propionate, salicylate, citrate, succinate, and tartaric. These organic acids play a role in chelating Al and Fe so that Al is no longer hydrolyzed and does not donate H+ ions; consequently, the pH will rise. The value of Ph will increase with the provision of organic material if the organic material has weathered completely.

- *Values of C-organic, total N and C / N of soil*

The effect of compost on levels of C-organic, total N, and C / N of soil are presented in Table 3.

Table 3. Values of C-organic and N of wetland affected by compost and artificial fertilizers

Treatment	Organic C (%)	N (%)	C / N
A: without compost + 100% NK artificial fertilizer	2.94 to	0.22 to	13.36 to
B: 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K fertilizer artificial	2.80 to	0.31 to	9.03 r
C: 2 tons / ha kirinyuh + 2 tons / ha rice straw + 2 tons / ha pukan + 50% N, K artificial fertilizer	3.02 t	0.44 to	6.86 r
D: 3 tons / ha kirinyuh + 3 tons / ha rice straw + 3 tons / ha pukan + 50% N, K artificial fertilizer	3.09 t	0.51 t	6.05 r

, Note: r = low, sd = medium, t = high

The addition of compost to the C, D treatments can increase the C-organic criteria to be high. High levels of soil C-organic due to the provision of organic matter in treatments C and D are more than 2 tons/ha and 3 tons/ha compared to other treatments (compost A and B). Thus, the more organic material is given, the C-organic content also increases. Increased soil organic matter content due to compost will be able to control the solubility of Fe^{+2} in the rice fields. According to BPTP (2005), organic material applied to the soil must be decomposed.

The total N content of the soil after being treated is in the moderate to high criteria. The provision of organic material in the form of compost into the soil undergoes a reconstruction, and freeing from N. organic matter will be overhauled with the help of soil microbes into amine compounds (amination). Amine will be converted to ammonium (ammonification), and subsequently, ammonium is converted into nitrite and nitrate (nitrification). Through this mechanism, the N contained in compost will be released into the soil, making it available to plants.

Soil C / N values (Table 3) generally range from 6-13, generally already <20. The level of decomposition of organic matter can be seen in the C / N ratio. The increase in C-organic and total N of various soils turned out to have caused the ratio of C and N of soils to also vary. Soegiman (1982) explained that the sooner or later process of humification will be determined by the comparison of C and N of the organic material itself

- *P-available value and K-dd*

The results of chemical analysis of the value of P-available and K-dd soils after being given compost and Artificial fertilizers can be seen in Table 4. P-available

values are classified as medium criteria. During the decomposition process, organic material from the compost releases organic acids that can dissolve the P elements that are bound in the soil. Organic acids play a role in overcoming P sorption by Fe, by preventing the interaction of Fe metal with P ions through complex or chelate reactions, so that when P fertilizer is added, the P element is not absorbed by Fe and can dissolve and P is available to plants.

Table 4. P-available and K-dd values of paddy soils affected by compost and butane fertilizer

treatment	**P-available(ppm)**	**K-dd (me / 100 gram)**
A: without compost + 100% NK artificial fertilizer	18.49 to	0.32 to
B: 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K artificial fertilizer	21.72 to	0 , 48 to
C: 2 tons / ha kirinyuh + 2 ton / ha rice straw + 2 tons / ha pun + 50% N, K fertilizer artificial	21.64 to	0.53sd18-23
D: 3 tons / ha kirinyuh + 3 tons / ha rice straw + 3 tons / ha pukan + 50% N, K artificial fertilizers	23.40 to	0.61 t

, Note: = moderate, t = high

P nutrient levels ranging from ppm are expected to be able to support the growth and yield of rice in paddy fields. Okalia (2011), explains that the provision of compost can increase the P-available value of paddy soils by 8-19 ppm and can provide quite high rice yields.

In addition to increasing the P-value available, compost is given to paddy soil also influences the K-dd value of the soil (Table 4). Giving compost in treatment D is at high criteria. This is due to the high dose of compost in treatment D. The Addition of compost can affect the availability of K in the soil. Adding KCl-made fertilizer and organic material in the form of compost derived from kirinyuh weeds and agricultural waste will free the element K into the soil. Organic matter in the form of compost will produce organic acids in between decomposition so that it can dissolve K. According to Hardjowigwno (2007), adding organic matter to the soil will release organic acids that can dissolve alkaline minerals such as K.

C. *Plant Observation*

- *Number of productive tillers*

Provision of compost (kirinyuh weeds and agricultural waste) and butane fertilizer has no significant effect on the number of productive tillers. The effect of compost and artificial fertilizer on the number of productive tillers are presented in Table 5.

Table 5. Number of productive tillers affected by compost and artificial fertilizer on paddy soil

Treatment	Number of productive tillers (stems / clumps)
A: without compost + 100% NK artificial fertilizer	13.13
B : 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K artificial fertilizer	13.12
C: 2 tons / ha kirinyuh + 2 ton / ha rice straw + 2 tons / ha pukan + 50% N, K artificial fertilizer	13.86
D: 3 tons / ha kirinyuh + 3 tons / ha rice straw + 3 tons / ha pile + 50% N, K artificial fertilizer	14.06

A number of productive tillers in the table Above ranges from 13 to 14 stems/clumps. This is caused by the availability of soil P nutrients that are still in the criteria of being less balanced with other nutrients, especially N. Rosmarkam *et al*., (2002), explains that the P nutrient element at the beginning of planting is very instrumental in encouraging plant growth. Lack of P element, in general, can reduce the amount of plant tissue and become darker.

- *Dry Weight of Paddy (ton/ha)*

Giving compost (kirinyuh weeds and agricultural waste) and butane fertilizer have a significant effect on the dry weight of rice grain. The effect of compost and artificial fertilizer on the dry weight of rice is presented in Table 6.

Table 6. Dry weight of rice affected by compost and artificial fertilizer on paddy soil

Treatment	Dry weight of grain (ton / ha)
A: without compost + 100% NK artificial fertilizer	4.46
B : 1 ton / ha kirinyuh + 1 ton / ha rice straw + 1 ton / ha pukan + 50% N, K artificial fertilizer	4.47
C: 2 tons / ha kirinyuh + 2 ton / ha rice straw + 2 tons / ha pukan + 50% N, K fertilizers	4.61
D: 3 tons / ha kirinyuh + 3 tons / ha of rice straw + 3 tons / ha Pukan + 50% N, K fertilizers	4.98

The difference between the grains that are treated with compost with the grains that treated with artificial fertilizer is not too high. This is in line with the results of the number of productive tillers. The results are also in accordance with the results of soil analysis (Tables 2, 3, and 4) dry rice grain showed results that were in line with

plant height, the total number of tillers, number of productive tillers, and dry weight of straw were also not significantly different. In this case, the use of organic fertilizers (kirinyuh and agricultural waste) with a 50% reduction in NK of artificial fertilizers has been able to provide the same growth and yield of rice with 100% of NK of artificial fertilizers with an average grain dry weight of around 4 tons/ha. For treatment C and D, almost close to 5 tons/ha. Gusnidar (2007) argues that the rice field system makes the efficiency of N fertilizer low because of ammonia gas at the surface of the soil (oxidation layer) and denitrification of nitrate into $Ngas_2$ reduction layer.

CONCLUSION

Based on the research that has been done, it can be concluded that the giving of kirinyuh weed compost and agricultural waste 3 tons/ha kirinyuh + 3 tons/ha rice straw + 3 tons/ha manure + 50% NK, can increase rice production in Nagari Palaluar Sijunjung Regency namely 4.98 tons/ha.

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