COMPARISON OF SIDENUK NUCLEAR RICE AGRIBUSINESS WITH CILIWUNG RICE IN BAJENG DISTRICT, GOWA REGENCY

Komparasi Agribisnis Padi Nuklir Sidenuk dengan Padi Ciliwung di Kecamatan Bajeng Kabupaten Gowa

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ABSTRACT

This study aims to analyze the comparison of production input use, production process, marketing, support, and income of rice fields planted with Sidenuk nuclear rice and rice fields planted with Ciliwung rice in Bajeng District, Gowa Regency. The data obtained were analyzed using the descriptive comparative method to compare the comparative use of production inputs, production processes, marketing, support and farm income, and using comparative test analysis using the t-test to compare differences in income between Sidenuk Nuclear rice farmers and Ciliwung rice farmers. There are differences in agricultural inputs in this study, the difference is the area of land, the type and amount of seeds used, the type and amount of fertilizer used, the type and amount of pest and plant disease drugs used, as well as the amount of labor and the length of work required. In the production section, there are differences in seeding time, transplanting time, the amount and time of weeding, fertilizer time, and harvest time. In the marketing and support section, no differences were found. T test results sig value, (2-tailed) of 0.000 <0.05 which means H0 is rejected so it can be concluded that there is a significant difference between the net income of Nuclear Sidenuk rice farmers and Ciliwung rice farmers in Bajeng district, Gowa Regency.

Keywords: ciliwung rice, comparison, sidenuk nuclear rice

ABSTRAK

Penelitian ini bertujuan untuk menganalisis perbandingan penggunaan input produksi, proses produksi, pemasaran, penunjang, serta pendapatan sawah yang ditanami padi nuklir Sidenuk dengan sawah yang ditanami padi Ciliwung di Kecamatan Bajeng kabupaten Gowa. Data yang diperoleh dianalisis menggunakan metode komparatif deskriptif untuk membandingkan komparasi penggunaan input produksi, proses produksi, pemasaran, penunjang dan pendapatan usaha tani, serta menggunakan analisis uji perbandingan dengan menggunaka uji T untuk membandingkan perbedaan pendapatan antara petani padi Nuklir Sidenuk dengan petani padi Ciliwung. Terdapat perbedaan input pertanian pada penelitian ini, perbedaannya yaitu luas lahan, jenis dan jumlah benih yang digunakan, jenis dan jumlah pupuk yang digunakan, jenis dan jumlah obat hama dan penyakit tanaman yang digunakan, serta jumlah tenaga kerja dan lama pengerjaan yang dibutuhkan. Pada bagian produksi terdapat perbedaan waktu penyemaian, waktu pindah tanam, jumlah dan waktu penyiangan, waktu pemupukan, dan waktu panen. Pada bagian pemasaran dan penunjang tidak ditemukan perbedaan. Hasil uji T nilai sig. (2-tailed) sebesar 0,000 < 0,05 yang berarti H0 ditolak sehingga dapat disimpulkan bahwa terdapat perbedaan yang signifikan antara pendapatan bersih petani padi Nuklir Sidenuk dengan petani padi Ciliwung di kecamatan Bajeng kabupaten Gowa.

Kata Kunci: padi ciliwung, komparasi, padi nuklir sidenuk

INTRODUCTION

Nuclear power began to be developed during World War II as a weapon of mass destruction. This happened because the use of nuclear energy was used as a bomb that was detonated in Mexico, besides that in Hiroshima and Nagasaki in Japan (Khairunnisa, 2017) This incident made the world aware of the dangers of using nuclear as a weapon, so it needs to stop its spread and use. So at the General Assembly of the United Nations (UN) on January 24, 1946, a special commission was formed whose task was to make recommendations on how to eliminate nuclear weapons in world weapons systems (Sinaga, 2013).

In 1946, America started a change by forming the Atomic Energy Commission which became the driving force for the development and development of nuclear technology for peaceful purposes. Then in Idaho a nuclear reactor was made that could produce the first electricity from nuclear technology. This was the beginning of the development of nuclear technology for purposes that were more beneficial to humans (Khairunnisa, 2017). Meanwhile, in Indonesia efforts to develop nuclear technology began with concerns about the dangers of nuclear radiation in the Pacific Ocean Region, so a committee was created to research radioactivity. Then proceed with making Government Regulation Number 65 of 1958 concerning the use of nuclear technology for the welfare of the Indonesian people. After that, the Indonesian

Atomic Energy Council and the Indonesian Atomic Energy Institute were formed which were merged to become the National Atomic Energy Agency.

One manifestation of the development of nuclear technology carried out by the National Nuclear Energy Agency (BATAN) is the development of nuclear technology for agriculture, especially in the development of superior varieties of food crops. Seed research and development uses isotope and radiation technology. This nuclear radiation then causes the plants to change their properties and their offspring become better and of better quality. The role of the National Nuclear Energy Agency in creating superior varieties through nuclear technology is one of the government's efforts to create food security in Indonesia. This is very necessary because Indonesia is a country that makes rice the main food source (Ishaq et al., 2017). After successfully producing various superior varieties of staple food, the National Nuclear Energy Agency continues to innovate. The National Nuclear Energy Agency succeeded in creating superior rice seeds from the development of nuclear technology. Some of the advantages of rice seeds resulting from nuclear radiation are their durability, drought resistance, and fast harvest time. One of the innovations produced by the National Nuclear Energy Agency is the Sidenuk nuclear rice seed. The advantages of Sidenuk rice seeds are having many panicles and grains, high productivity, and short lifespan.

South Sulawesi is one of the provinces in the top 10 provinces with the most rice production. Gowa Regency is one of the areas that contributes to its rice agricultural products. Land use as paddy fields in Gowa in 2020 can produce as much as 143,276.08 tons of rice (BPS South Sulawesi, 2021). However, the utilization of rice seeds resulting from the development of nuclear technology in Gowa Regency and even in South Sulawesi Province in general is still very low. Currently, based on the search results, only a few paddy fields in Gowa, Takalar, and Maros Regencies are planting rice using seeds resulting from the development of nuclear technology. This is influenced by various factors. One research journal revealed that rice produced by the development of nuclear technology in the minds of the public would be dangerous for consumption because it would be contaminated with the dangers of nuclear radiation (Sari et al., 2021). Maccini Baji Village is one of the areas located in Bajeng District. In this area there is a group of farmers who plant Sidenuk nuclear rice seeds on their land. Sidenuk nuclear rice seeds have been planted since 2017 on an area of 2 hectares. In addition, besides the land planted with Sidenuk nuclear rice, Ciliwung seed rice has also been planted since 2020 on a 2 hectare land.

Furqon (2015) has compared the income levels of lowland rice using the Ciherang variety with those using the Sidenuk nuclear rice variety as well. Although the income of the Sidenuk nuclear variety is higher than that of the Ciherang variety, but there is no significant difference between the income of Ciherang and Sidenuk nuclear rice in Linduk Village, Pontang District, Serang

Regency. The Badung Regency Government of Bali Province (Pemerintah Kabupaten Badung, 2018) analyzed the advantages of cultivating Sidenuk nuclear rice compared to Ciherang rice. The research conducted in 2017 obtained data that the dry grain yield of the Sidenuk nuclear rice harvest was 9.01 tons/ha while for the Ciherang variety it was 1.38 tons/ha.

Research that compares the productivity of Sidenuk Nuclear rice with other types of rice is still very rarely done. So far, there has only been one comparative study of Sidenuk Nuclear rice and Ciherang rice. While comparative research between types of rice has been done a lot. The new thing that was done in this research was not only to compare income but also to compare the agribusiness system as a whole such as production inputs, marketing, and other supporting aspects. This research was also conducted in Bajeng District, Gowa Regency, at this location there were already breeding Sidenuk Nuclear rice seeds, but only 15 farmers used Sidenuk Nuclear rice while other farmers still used other varieties. The results of this study can be a reference for farmers to use superior varieties in order to be able to increase farm income.

RESEARCH METHOD

This research was conducted in Kecamatan Bajeng, Kabupaten Gowa, South Sulawesi. Location was selected purposively. The research was planned to be conducted in February 2023 - March 2023. The method used was the survey in rice fields planted with Sidenuk nuclear rice and rice fields planted with Cilwung rice in Bajeng District. The survey method is used to obtain data from certain locations in a natural way, but there is still treatment during data collection, for example through structured interviews, administering questionnaires, or tests in large or small populations (Darna & Herlina, 2018). Data in this study come from primary sources and secondary sources. This primary data is data obtained by researchers from original sources directly (Tan, 2021). Primary data collection technique is by interviewing farmers directly to find out the inputs, production processes, marketing, support and income of each land. Secondary data in this study were obtained using documentation techniques, namely by collecting reports or documents from relevant agencies.

Farmers whose land is planted with inbred Sidenuk rice and farmers whose land is planted with Ciliwung rice in Maccini Baji Village are the population in this study. Then, the sample taken for the study was taken using a purposive sampling technique, which is sampling with a specific purpose (Hadi, 2015). The analysis method used is descriptive statistics on the comparison of the use of production inputs, production processes, marketing, and support. While to determine the comparison of income used farm income analysis method and comparative test analysis (T test). The form of farm income analysis of paddy rice farming/ha/growing season and comparative test analysis (T test) is as follows:

Farming Income Analysis

Tabel 1.   Income Analysis

1. Farm Business Acceptance	
1A. Production	(1A)
1B. Production Unit Price	(1B)
1C. Total Revenue	(1A x 1B) = (1C)
2. Production cost	
2A. Variable Cost	
1. Seeds	
2. Fertilizer	
3. Pesticides and Drugs	
4. Labor Wages	
5. Machine Rental	
6. Miscellaneous expense	
Total Variable Cost	(2A)
2B. Fixed Cost	
1. Land Tax	
Total Fixed Costs	(2B)
3. Total Cost of Production (3A)	(2A) + (2B) = 3A
4. Gross Income (4A)	(1C) – (2A) = 4A
5. Net income 5(A)	(1C) – (3A) = 5A

Comparative Test Analysis (T Test)

$$H0: \mu_1 = \mu_2 \text{ versus } H1: \mu_1 > \mu_2$$

Information

μ_1 = productivity parameter of rice fields planted with Sidenuk nuclear seeds

μ_2 = parameter of productivity of rice fields planted with Ciliwung seeds

H0   = no difference in the average of the parameters studied

H1   = there is a difference from the average of the parameters studied

Before the T-test is carried out, the normality test and homogeneity test are carried out. The T-test was carried out by means of an independent sample T-test. The entire test was carried out using the SPSS application.

Data Normality Testing

Before testing the independent sample T test, the average data of the two samples must be normally distributed and homogeneous. If the data is not normally distributed, it is recommended to use non-parametric statistics. The data normality test used is the Shapiro Wilk test. The basis for decision making in the shapiro wilk data normality test:

1. If the significance value is ≤ than 0.05 then the data is not normally distributed
2. If the significance value is ≥ than 0.05 then the data is normally distributed.

Variance Homogeneity Testing

Testing the homogeneity of variance with the F test is done to determine which T-test formula will be used for hypothesis testing, therefore it is necessary to first test the variance of the two samples of the average income of rice farmers, the aim is to see whether or not the two groups of farmers are homogeneous. The basis for decision making in the homogeneity of variance test:
1. If the significance value ≤ than 0.05 then the variance of the two populations of data is not equal
2. If the significance value ≥ than 0.05 then the variance of the two populations of data is the same.

RESULT AND DISCUSSION

Analysis Descriptive

1. Description Comparison Use of Production Inputs

This section describe about comparison use of production inputs between Nuclear Rice farmers Sidenuk with Ciliwung Rice.

a. Comparison Use Land

This section describe about wide land used by farmers for plant rice. Based on the data obtained, the total land area used by Sidenuk Nuclear rice farmers for planting is 2.77 ha while the total land area used by Ciliwung rice farmers is 2.92 ha. Based on this data, it can be seen that each Sidenuk Nuclear and Ciliwung rice farmer uses a different land area. Indonesian people make rice as a food consumed daily

Table 2.   Usage Land

No.	Land Area (Ha)	Amount Farmer (Person)		Percentage	
		Nuclear Rice Sidenuk	Ciliwung Rice	Nuclear Rice Sidenuk	Ciliwung Rice
1	0.13 – 0.18	8	7	53.33	46.67
2	0.19 – 0.24	4	7	26.67	46.67
3	0.25 – 0.3	3	1	20.00	6.66
Amount		15	15	100.00	100.00

Source: Primary Data, 2023

Research conducted by Andrias (2017) stated that land area has a positive and significant influence on production yields and farm income in Jelat Village, Baregbeg District. However, the study did not specifically mention the types of seeds and other production inputs used. This is also similar to that found by Usman & Juliyani (2018) who found that there was a positive and significant influence between land area and farm income in Gampong Matang Baloi. In fact, when compared to other areas in the vicinity, the land area in the area is narrower but has the most yields. This could be due to the superior seed conditions and the surrounding environment that is suitable for getting large yields despite the narrow land. Therefore, this study also used the variables of fertilizer use and labor.

b. *Comparison Use Seed*

Implementation is an action or application of a plan that has been systematically prepared (Amiruddin et al., 2022). This section describes about amount of seeds planted by farmers during one year last divided in three growing periods.

Table 3.   Average Usage Seed

No.	Seed (kg)	Amount Farmer (Person)		Percentage	
		Nuclear Rice Sidenuk	Ciliwung rice	Nuclear Rice Sidenuk	Ciliwung Rice
1	4	7	3	46.67	20.00
2	5	3	6	20.00	40.00
3	6	2	5	13.33	33.33
4	7	3	1	20.00	6.67
Amount		15	15	100.00	100.00

Source: Primary Data, 2023

Based on Table 3., known that there are 7 farmers' paddy Nuclear Sidenuk planted 4 kg of seeds with a percentage of 46.67%. Three farmers paddy Nuclear Sidenuk planted 5 kg of seeds with a percentage of 20%. 2 farmers paddy Nuclear Sidenuk planted 6 kg of seeds with percentage of 13.33 % and 3 farmers paddy Nuclear Sidenuk who planted 7 kg of seeds with a percentage of 20%. Meanwhile, there are 3 farmers paddy Ciliwung who planted 4 kg of seeds with a percentage of 20%. There are 6 farmers paddy Ciliwung who planted 5 kg of seeds with percentage of 40%. 5 farmers paddy Ciliwung with percentage of 33.33 planted seed as much as 6 kg, as well as 1 farmer paddy Ciliwung plant seed weighing 7 kg with percentage of 6.67%.

Zen et al. (2017) say that seed is one factor to be determinant results plant. Use combined seeds with other production inputs such as use fertilizer, water availability, content light, as well circumstances climate matters a lot results

plant. So, if other production inputs have enough fine, however use seed with low quality so will obtained low yield too. It is the same with what was conveyed by Emalia et al. (2021) quote from Gunawan said that use seed own influence in it worked production rice. Difference seed Of course will greatly affect the quality and quantity produced rice. Height production achieved one of them is role from seed superior used, so will impact on income business farmer. Pali (2016) said that use quality seeds will produce quality rice and so on otherwise. Quality seeds is one component determinant income need farmer. Moment this seed superior already lots developed along with development technology. Some of the advantages of rice seeds produced from nuclear radiation technology are their durability, resistance to drought and fast harvest time.

Research by Salsabila & Fahraty (2019) found that the seed variable itself has a positive impact or effect on increasing farmers' businesses. This is evidenced by the results of the study which state that an increase in seed costs by 1% will have an impact on increasing farm income by 0.77%. The effect of seeds on farm income is due to the use of quality seeds, the use of the number of seeds in accordance with the land area, and the price of good seeds. Good seed quality. Superior seeds must have superior traits such as high yield potential, fast fruiting, resistance to certain pests and diseases, resistance to environmental stress.

Productivity paddy Nuclear Sidenuk during one year in three growing periods was at an average of 9.02 tons/ha. The average value of the results production paddy Nuclear Sidenuk this is also appropriate with dethe scription varieties Nuclear Sidenuk issued by BATAN which said that average yield production of 6.9 tons/ha and has potency results up to 9.1 tons/ha of grain dry milled. The average is also close the productivity paddy Nuclear Sidenuk distributed in the district Badung, Bali in 2017 above 10 ha of land, obtaining yield of 9.01 tons/ha (Pemerintah Kabupaten Badung, 2018) and also close mark productivity paddy Nuclear Sidenuk distributed in the district Kebumen namely 8.03 tons/Ha. Not only on the islands Java and Bali, apart from in the Regency Gowa place study implemented, a number of the districts which also has develop paddy Nuclear Sidenuk. Regency Pangkep record in 2017 harvest paddy Nuclear Sidenuk achieved an average yield production of 9 tons/Ha (Sari, 2017).

Temporarily, on research this paddy Ciliwung obtain results more production low, that is is at an average of 5.42 tons/ha so there is the difference is 3.60 tons/Ha. Production results paddy Ciliwung on research is no different far with estimation potency results in production paddy the estimated Ciliwung of 4.80 tons/Ha. The result is also not different from the results of research conducted by Amir & Wantidewayani (2012) the recipient results production plant paddy Ciliwung in the Regency Takalar of 6 tons/Ha. Those results are far more low compared to a number of varieties superior made as a comparison on research.

c. Comparison Use Fertilizer

This section describe about type and amount fertilizers used by farmers paddy Nuclear Sidenuk and the farmer paddy Ciliwung in the district Bajeng regency Gowa.

Table 4.   Average Usage Data Fertilizer Every Endeavor

Use Fertilizer	Sidenuk Rice Farmers			Ciliwung Rice Farmers		
	Type	Amount	Unit	Type	Amount	Unit
	Artificial	12.20	kg	Urea	38.93	kg
	NPK	18.47	kg	NPK	19.47	kg

Source: Primary Data, 2023

Based on the data contained in Table 4. obtained that farmer paddy Nuclear Sidenuk using 2 types of fertilizer that is fertilizer artificial with average weight use of 12.2 kg and 18.47 kg of NPK fertilizer. Meanwhile, farmers paddy Ciliwung using 2 types of fertilizer that is Urea fertilizer and NPK fertilizer. The average Urea fertilizer used by farmers paddy Ciliwung was 38.93 kg and 19.47 kg of NPK fertilizer.

Difference fifth is on-stage fertilization. There is a number of difference treatment at stage fertilization. First, the difference in fertilizer used. Nuclear Rice Sidenuk has given fertilizer artificial as much as 65 kg and NPK as much as 100 kg. Meanwhile, plants paddy Ciliwung given 200 kg of urea fertilizer and 100 kg of NPK fertilizer. Besides different type fertilizer, time fertilization is also different. On rice Nuclear Sidenuk at 20 days and 40 days while in plants paddy Ciliwung at 15 days and 30 days. Difference this naturally no can proud in a manner direct because of course each variety need different fertilizers. Pradiko & Arsyad (2015) state that fertilization is one decisive factor success A business farmer. There is a principle that must fulfilled in gift fertilizer for plants, principle called 5 exactly. The first appropriate type means type given fertilizer must in accordance with needs plant. Second, right dose it means the dose given fertilizer must in accordance with no superfluous and not lack. Third appropriate time it means time gift fertilizer customized with time element the needed. Fourth, right place means techniques and methods fertilization must watch place fertilization. Fifth appropriate method it means appropriate in method give fertilizer so that no there is wasted fertilizer because the method gifts that is not appropriate so that no capable absorbed by plants.

d. Comparison Use Pest/Disease Drugs

This section describe about type and amount drug pests / diseases used by each farmer For overcome attack pest or diseases found in plants planted rice.

Table 5.　　Usage Data Pest/ Disease Drugs.

Pest and Disease Drugs	Sidenuk Rice Farmers			Ciliwung Rice Farmers		
	Type	Amount	Unit	Type	Amount	Unit
	Spenoc	36.93	ml	Poison Seed	77.87	ml
	POC	1.13	Liter	POC	1	Liter

Source: Primary Data 2023

Based on the data in Table 5. it is known that farmer paddy Nuclear Sidenuk use two types of drug pests/diseases those are Spenoc and Pesticides organic Liquid (POC). Spenoc average used 36.93 ml and POC was used as much as 1.13 liters. Meanwhile, the farmers of Ciliwung use poisoned seeds and POC. The average usage of poison seed is as much as 77.87 ml and an average POC of 1 liter.

e. Labor Usage Data

Table 6.　　Average Data on the Use of People's Labor

Work	Sidenuk Rice Farmers		Ciliwung Rice Farmers	
	Labor	Day	Labor	Day
Preparation Land	1.13	1.0	1.00	1.0
Seeding	1.00	1.0	1.00	1.0
Planting Irrigation	3.40	1.2	3.30	1.2
Fertilization	1.00	2.0	1.00	2.0
Weeding	2.00	4.0	1.20	3.0
Control Pests and Diseases	1.00	2.0	1.00	2.0
Harvest Process	2.20	2.0	2.53	1.0

Source: Primary Data, 2023

Efficient labor management can help farmers in the study area to increase their rice farming production (Salam et al., 2022). This section describes about type and amount power work used by farmers paddy Nuclear Sidenuk and the farmer paddy Ciliwung start from processing land until harvest divided in the District Bajeng regency Gowa.

Basically, these two processes require almost the same labor from land preparation, seeding, planting irrigation, fertilization, weeding, control pests and diseases to harvesting. this is because the technology used is the same between these two processes. Labor in agriculture has a very important role in increasing farm productivity.Besides use power people work, results research also found that second farmer use power work machine that can seen in the Table 7.

Table 7.   Use of Labor Machine

Type Activity	Nuclear Rice Farmers Sidenuk		Ciliwung Rice Farmers	
	Machine	Amount	Machine	Amount
Setup Land	Tractor engine	1	Tractor engine	1
Harvest	Combine harvesters	1	Combine harvesters	1

Source: Primary Data, 2023

Based on Table 7. obtained information that farmer paddy Nuclear Sidenuk and rice Ciliwung use power work machines for activity setup land in the form of 1 machine tractor. Moment harvest farmer paddy Nuclear Sidenuk and the farmer paddy Ciliwung using 1 combine harvester machine.

Based on the results study obtained that farmer paddy Nuclear Sidenuk average uses more lots power work humans in the process of planting, weeding and harvesting. This is in accordance with the opinion Sukirno (2015) who stated that factor important influences income is power work. The theory economy explain that analysis production always there is three factor characteristic production constant that is source power nature, availability of capital, and entrepreneurship. Temporary power work experience change amount so that can said that the use amount power work influences income a effort. Besides study this, a few research too researching about exists influence amount power work to enhance income business farmer with do an influence test. Handayani in Pranuwanti & Ketut (2021) also stated that level mistakes in the work done will reduce if power work own skill and speed for do his job until done. Besides that the more lots power work so the more lots results production.

Research results and opinions is also supported with a number of study other. Study Haryanto et al., (2021) obtain test results with mark significance of 0.000 means that there is significant influence between power work with income earned farmer rice in the District Haurwangi Regency Cianjur. Besides research conducted in Java, results stated research power work own influence significant to income business farmer is research conducted by in Satriani (2018) Bone District. Study the gain results that power work in a manner partial own influence positive to results production rice in Biru Village, Kahu District, Bone Regency. Not only in business rice, influence significant power work to income business farmers are also found in research on business Arabica coffee farming in the Village Bilanrengi Regency Gowa is done (Juniati, 2016).

2. Description Production Process Comparison

a. Preparation Process Data Land

This section containing about way data farmer paddy Nuclear Sidenuk and rice Ciliwung do preparation land before used as a planting medium rice. The data presented in the Table 8.

Table 8.   Preparation Process Data Land

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Objective Processing Land	For remove remainder plant	For remove remainder plant
Stages Processing Land	Plowing land Then do spraying	Plowing land Then do spraying
Tools Required	Machine tractor and tools sprayer	Machine tractor and tools sprayer
Prepared Ingredients	Poison seed	Poison Seed

Source: Primary Data, 2023

Table 8. obtained information that no there is a different method processing land between farmer paddy Nuclear Sidenuk with farmer paddy Ciliwung. This looks at the sourced data pad from results questionnaires and interviews. The second farmer broadly speaking said that processing land is done for remove the remainder plants on land. There are two namely plowing land and do spraying. The farmer plows the fields using machine the fields after that farmer squirt poison seeds on the ground use poison added seeds to tool spray.

b. Seeding Process Data

Table 9.   Seeding Process Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Seeding Time	15-20 days	14-19 days
Place Seeding	Ricefield	Ricefield

Source: Primary Data, 2023

Based on Table 9. shows information that time done for seeding seeds paddy Nuclear Sidenuk is 15 – 20 days, meanwhile time for seeding seeds paddy Ciliwung is 14-19 days. The seeding process for seed paddy Nuclear Sidenuk and seeds paddy Ciliwung is the same in the fields. Seeding time for seeds paddy Nuclear Sidenuk is 15-20 meanwhile time for seeding seeds paddy Ciliwung is 14 – 19 days. A number of theories say that the quality of planted seeds is influenced by age seed moment move plant. Napisah & Ningsih (2014) stated that sown seeds for 30 days will improve the quality less rice good because the

seeds are already old. Seeds aged old will hard and long adapt on the spot new, resulting in children who don't uniformly, grow the roots still shallow, so in the end produce growth plants that are not perfect. Masdar quoted in Sari et al. (2020) while at age nursery 21 days to above, the seeds were transferred already separated from seeds and not own backup resulting in food stress that occurs in plants moment moved. Plant paddy need energy and a long time to recovered, this influential to growth plants and will result in income business farmer.

There are a number of difference results study about influence time seedling to the productivity plant rice. Putra (2017) found that productivity paddy highest that is paddy that time sow 10 days then moved for planted. Besides that, research conducted by Yenisbar (2021) obtained results that productivity highest paddy originate from seed with a seedling period of 14 days, though there is a significant difference between seeds sown for 14 days with sown seeds for 21 days.

c. Planting Process Data

This section presents data about the planting process rice by farmers paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng Regency Gowa. The data served in table following this.

Table 10.   Planting Process Data Table

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Seed Time planted	15-20 days	14-19 days
Planting Technique	Jarwo	Jarwo
Tool	-	-

Source: Primary Data, 2023

Based on Table 10. is obtained information that time transfer from place nursery to the fields for seed paddy Nuclear Sidenuk is in the range of 15-20 days, for paddy Ciliwung in the range of 14-19 days. Farmer paddy Nuclear Sidenuk and rice Ciliwung use technique plant Jarwo and no use tool help.

d. Irrigation Process Data

This section present data regarding technique irrigation by farmers paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng regency Gowa. The data served in Table 11.

Table 11.   Irrigation Process Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Irrigation Engineering	Irrigation	Irrigation
Length of Watering Time	During the growth period	During the growth period

Source: Primary Data, 2023

Based on Table 11. is obtained information that second farmer use technique the same irrigation that is technique irrigation is carried out during the growth period.

e. Weeding Process Data

This section presents data regarding the weeding process carried out by farmers paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng regency Gowa. The data is served in Table 12.

Table 12.   Weeding Process Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Amount weeding	4 times	3 times
Weeding Time	Weeding 1 = 30 days Weeding 2 = 45 days Weeding 3 = 60 days Weeding 4 = 75 days	Weeding 1 = 15 days Weeding 2 = 30 days Weeding 3 = 45 days

Source: Primary Data, 2023

Based on Table 12. is obtained information that farmer paddy Nuclear Sidenuk weeding started 4 times moment plant paddy was 30 days old, then weeding second moment age plant 45 days, weed third in age 60 day crop, and weeding fourth in age plant 75 days. Whereas farmer paddy Ciliwung do weeding 3 times, weeding first time done moment age plant 15 days, weeding second moment aged crop was 30 days, the third moment plant was 45 days old. plant paddy Nuclear Sidenuk done weeding 4 times, while in plants paddy Ciliwung done weeding 3 times. Jamilah (2013) found that data there is different productivity between plant rice that gets conduct different that is form time weeding. Research results the get that plants weeded rice 20 days after plant own productivity highest compared to plants weeded 40 days after planting, and 60 days after plant. Besides that is, the research that was done Hasibuan et al. (2017) obtain results that time weeding no own influence significant to growth and productivity plant rice.

f. Fertilization Process Data

This section present data regarding technique fertilization by farmers paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng regency Gowa. The data served in table following.

Table 13.   Fertilization Process Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Amount fertilization	2 times	2 times
Time time fertilization	Fertilization 1 = 20 days Fertilization 2 = 40 days	Fertilization = 15 days Fertilization 2 = 30 days
Fertilization Technique	scatter	Scatter

Source: Primary Data, 2023

Based on the data contained in Table 13. then obtained information that farmer paddy Nuclear Sidenuk do 2 times fertilization that is moment plant aged 20 days and 40 days, meanwhile farmer paddy Ciliwung also did fertilization as much as 2 times but in age plant different that is moment plant aged 15 days and 30 days. Second farmer use technique the same fertilization that is technique scatter.

g. *Pest and Disease Control Process Data*

This section present data regarding control processes pests and diseases by farmers paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng regency Gowa. The data served in Table 14.

Table 14.   Pest and Disease Control Process Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Period Spraying Time	2 times arrived pest stop Afternoon	2 times arrived pest stop Afternoon

Source: Primary Data, 2023

Based on Table 14. is obtained information that farmer paddy Nuclear Sidenuk and the farmer paddy Ciliwung do 2 sprays until pest stop attack plants, spraying done in the afternoon

h. *Harvest Process Data*

This section presents data regarding the harvest process carried out by farmers paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng regency Gowa. The data served in Table 15.

Based on Table 15. is obtained information that farmer paddy Nuclear Sidenuk harvest paddy moment age about 100 days after plant whereas farmer paddy Ciliwung harvest paddy about 90 days after plant. Second farmer use Combine Harvester tool for harvest. Plant paddy Nuclear Sidenuk harvested about 100 after plant whereas paddy Ciliwung harvested about 90 days after plant. Harvest time this no certain however be around age the plants mentioned, this because determination time harvest no based on age however based on

results visual observation and observation theoretical. Kobarsih & Nugroho (2015) state that there are two considerations for determine rice already ready harvest or no. First visual observation, how to do it is with see direct condition rice in the fields. Paddy already ready harvested if 90-95% grain grain on panicles already colored yellow or yellow golden. Consideration the done because at the moment that grain currently are in good quality. Second is with do observation theoretically, how through analysis description varieties paddy and measure water content with tool test moisture. Based on description varieties paddy right age for do harvest is 30-35 days after flowering evenly. Precise water content for do harvest is 22-23% of the time yesterday, and 24-26% of the time season rain.

Table 15.   Harvest Process Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Harvest Time	About 100 days after plant	About 90 days after plant
Tools Used	Combine Harvester	Combine Harvester

Source: Primary Data, 2023

3. Description Marketing Comparison

This section presents data regarding the marketing process carried out by farmers paddy Nuclear Sidenuk and rice Ciliwung in the District Bajeng Regency Gowa. The data served in Table 16.

Table 16.   Marketing Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Form Rice Sales	Milled Dry Grain	Milled Dry Grain
Price Per Kilogram	5,500/kg	5,500/kg
packaging used	60 kg sack	60 kg sack
Objective Sale	collectors grain	collectors grain

Source: Primary Data, 2023

Based on Table 16. is obtained information that farmer paddy Nuclear Sidenuk and the farmer paddy Ciliwung sell results harvest in form grain dry packaged grind use sacks of 60 kg to collectors grain with price 5,500/kg.

4. Description Support Comparison

This section present data regarding part support for business farmer paddy Nuclear Sidenuk and rice Ciliwung in the district Bajeng regency Gowa. The data served in table following. Based on Table 17. is obtained information that farmer paddy Nuclear Sidenuk and the farmer paddy Ciliwung join in group farmer for

share experience about handling pests and diseases as well as get help the government is also fertilizer subsidized.

Table 17.   Supporting Data

Indicator	Nuclear Rice Farmers Sidenuk	Ciliwung Rice Farmers
Join in Farmers Group	Join	Join
Form Activity Farmers Group	Share knowledge handling pests and diseases	Share knowledge handling pests and diseases
Benefit Farmers Group	Get fertilizer subsidy	Get help government and earn fertilizer subsidy

Source: Primary Data, 2023

5. Income Comparison

This section present data regarding income business farming by farmers paddy Nuclear Sidenuk and rice Ciliwung in the District Bajeng Regency Gowa. The data served in Table 18.

a. Analysis Farm Business Income

Based on Table 18. is obtained information that average yield production paddy Nuclear Sidenuk in the district Bajeng regency Gowa is 1,662,682 kg/business farmer or around 9,003,693 kg/Ha. The value more big compared to results production paddy Ciliwung which has an average value of 1,059 kg/business farmer or 5,440.09 kg/Ha. Second business farmer is same as results production for IDR 5,500/kg so that the average acceptance business farmer paddy Nuclear Sidenuk is IDR 9,144,751/business farmer or of IDR 49,520,312.27/Ha. Temporary that, the average reception business farmer paddy Ciliwung is IDR. 5,824,525.67/farm business of 29,920,508.56/Ha.

Average total cost business farmer paddy Nuclear Sidenuk is IDR 1,906,760/business farmer or IDR 10,325,415.16/Ha, while the average total cost business farmer paddy Ciliwung IDR 1,838,653/business farmer or IDR 9,445,136.986/Ha. Reduction results reception business farmer minus the total cost business farmer so obtained income business farm, average income business farmer paddy Nuclear Sidenuk is IDR 7,237,991/business farmer or IDR 39,194,897.11/Ha. While the total income business farmer paddy Ciliwung is Rp3,985,872.33/business farmer or IDR 20,475,371.58/Ha.

Table 18.   Structure Cost

No.	Description	Mark			
		Nuclear Rice Farmers Sidenuk		Ciliwung Rice Farmers	
		Average/ Farm	Average/Ha	Average/ Farm	Average/Ha
1	Production Grain (Kg)	1,662,682	9,003,693	1,059	5440.09
2.	Price (Rp/Kg)	5,500		5,500	
3	Reception	9,144,751	49,520,312.27	5,824,525.67	29,920,508.56
4	Cost Production				
	a. Cost Variable				
	Seed	79,040	428,014.44	75,840	389,589
	Fertilizer	95,133.33	515,162.45	165,466.66	850,000
	Pest/ Disease Drugs	129,953	703,718	131,146.7	673,699
	Labor	658,000	3,563,176.9	538,600	2,766,780.82
	Labor Machine	923,333	5,000,000	973,333	5,000,000
	Engine Fuel Irrigation	12,066.7	65,343	12,666.7	65,068.5
	b. Cost Still				
	Tax Land	9,233.33	50,000	9,733.33	50,000
5	Total Cost	1,906,760	10,325,415.16	1,838,653.33	9,445,136,986
6.	Income	7,237,991	39,194,897.11	3,985,872.33	20,475,371.58

Source : Primary Data, 2023

b.   Comparative Test Analysis (T-Test)

Before do a comparative test, then previous earnings data clean farmer paddy Nuclear Sidenuk and rice Ciliwung prerequisite test in the form of normality test and homogeneity test.

1. Normality Test

Test the normality of the data using help SPSS application with the Shapiro Wilk Normality Test formula shown in the table following this. Based on normality test results obtained mark significance of 0.140 > 0.05 for income data farmer paddy Nuclear Sidenuk in the district Bajeng regency Gowa which means the data normally distributed. Normality test results on income data farmer paddy Ciliwung in the district Bajeng regency Gowa obtain mark significance of 0.171 > 0.05 which means the data is normally distributed.

Table 19.   Data Normality Test Results

		Tests Of Normality Shapiro-Wilk		
	Rice Type	Statistics	Df	Sig.
Income	Sidenk	,911	15	,140
	Ciliwung	,917	15	, 171

A. Lilliefors Significance Correction
Source: Primary Data 2023.

2. Homogeneity Test
     Data homogeneity test was performed use help SPSS applications shown in the table following this.

Table 20.   Data on Homogeneity Test Results

	Test of Homogeneity of Variances			
		Levene Statistics	df1	df2	Sig.
Income	Based on Means	17,281	1	28	,000
	Based on Median	15,791	1	28	,000
	Based on Median and with adjusted df	15,791	1	18,526	,001
	Based on trimmed mean	16,631	1	28	,000

Source: Primary Data, 2023.

     Based on homogeneity test results obtained mark significance $0.000 < 0.05$ which means that the data being tested No characteristic homogeneous. However, still can done *independent sample t test* because the data is normally distributed.

3. T-Test Comparison Test
     Comparison tests done use the independent sample t-test formula for the SPSS application. Following This displayed results test. Based on independent sample t-test results obtained Sig value. (2-tailed) of $0.000<0.05$ which means H0 is rejected so that can concluded that there is a significant difference between income clean farmer paddy Nuclear Sidenuk with farmer paddy Ciliwung in the Regency Gowa.
     The productivity of Nuclear Sidenuk rice for one year in three planting periods is at an average of 9.019 tons/ha. The average value of Nuclear Sidenuk rice production is also in accordance with the description of the Nuclear Sidenuk variety issued by BATAN which states that the average production yield is 6.9 tons/ha and has a potential yield of up to 9.1 tons/ha of milled dry grain. The

average is also close to the productivity value of Nuclear Sidenuk rice distributed in Badung Regency, Bali in 2017 on 10 ha of land, obtaining a yield of 9.01 tons/ha and also close to the productivity value of Nuclear Sidenuk rice distributed in Kebumen Regency, which is 8.03 tons/ha. Not only in Java and Bali, other than in Gowa Regency where the research was conducted, there are several districts that have also developed Nuclear Sidenuk rice. Pangkep Regency noted that in 2017 the harvest of Nuclear Sidenuk rice reached an average production yield of 9 tons/Ha (Sari, 2017).

Table 21.   Data on T-Test Results

		Equal Variances Assumed	Equal Variances Not Assumed
Lavender's Test for Equality of Variances	Sig.	0.000	
	F	17,281	
t-test for Equality of Means	Q	5,926	5,926
	Df	28	18,036
	Sig. (2-tailed)	0.000	0.002
	Mean Differences	3252118,667	3252118,667
	std. Error Difference	548780,136	548780,136

Source: Primary Data, 2023.

Meanwhile, in this study, Ciliwung rice obtained lower production results, which were at an average of 5.42 tons/Ha so there was a difference of 3.60 tonnes/Ha. CIliwung rice production results in this study did not differ much from the estimated potential production yield of Ciliwung rice which was estimated at 4.8 tons/Ha. These results are also not much different from the results of research conducted by Amir & Wantidewayani (2012) who obtained the production results of growing Ciliwung rice in Takalar Regency of 6 tons/Ha. These results are much lower than some superior varieties used as a comparison in the study.

CONCLUSION AND SUGGESTION

Conclusion

The results of the comparative analysis of production inputs are similar in land area, the number of seeds used, and machine labor. The results of the comparative analysis of production processes found that there were similarities in the land preparation process, planting techniques, irrigation processes,

fertilization techniques, pest and disease control processes, and harvesting methods carried out by farmers. The results of the comparative marketing analysis show that there are no differences in the form of rice sales, prices, packaging, and sales destinations between Nuclear Sidenuk rice farmers and Ciliwung rice farmers. Based on the results of the T test, it can be concluded that there is a significant difference between the net income of Sidenuk Nuclear rice farmers and Ciliwung rice farmers.

Suggestion

This study obtained complex results, but the main difference in this study was the variety used. Therefore, more research is needed to dig deeper into the advantages and disadvantages of the Sidenuk Nuclear rice variety which can be used as information that can be disseminated to farmers so that they are more familiar with and interested in planting Sidenuk Nuclear rice which has proven to have high productivity. In addition, it is also necessary to study the considerations of farmers who have and have not used Sidenuk Nuclear rice for planting.

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