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AN ANALYSIS OF INVESTMENT OF FOOD SECURITY ON GREEN ECONOMY PROGRAM: CASE STUDY IN PINRANG REGENCY

Mas Wigrantoro Roes Setiyadi[1], Zahera Mega Utama[2]

[1]*Universitas Professor Doktor Moestopo (Beragama) - UPDMB*
Email: maswig@gmail.com
[2]*Universitas Professor Doktor Moestopo (Beragama) – UPDMB*

Abstract

The purposes of the research is to analyse the potency of sustainable green economy in the activities on the use of organic fertilizers that it is confirm that the sustainability of natural resources on agricultural land produce an agricultural product at the same time, such as the production of fisheries and plantations with 40 percent production increase followed by an investment in warehousing, grain milling. and export ports in an agricultural industrial area. The results show that the achievement of increasing agricultural production with green economic activities can provide welfare to the community with a twice and even higher in economic growth. The research method used is the Scientific Research Method to test the research hypothesis in which the researcher is directly involved in process. This research intended to determine the nature relationship of the application of the organic fertilizer and the increased of agricultural production, which they are arranged in a hypothesis. The implication of the research of food security in the green economy will encourage the improvement of the quality of human resource competencies as seen from the togetherness of farmers and the unity in carrying out their cooperation on duties and responsibilities in preserving the environment.

Keywords: food security, green economy, agricultural industry, economic growth, sustainability, environment.

Introduction

The potential of food security in Pinrang Regency in a green and blue economic activities shows, based on data of the Pinrang food security performance report, (Pinrang Food Security Service, 2018) is pursued by the local government policies through: (a) an increasing in production on green and blue economic activities in the form of diversity of food resources, due to an institutional strengthening of institutions in each implementation of green and blue economy program and activities, followed by strengthening of the wisdom of local culture in the Pinrang community, (b) optimizing the green and blue economic program and activities on economic efficiency that it is based on the regional competitive advantages of Pinrang agriculture as the national rice barn, (c) improving the regulation of food product distribution that they are refers to a competitive and equitable market mechanism for all green and blue economic actors, (d) optimizing the implementation of food security programs as a part of efforts to increase economic growth that it could provide higher farmers' incomes, then to ensures the availability and distribution of agricultural products on micro, small and medium enterprises.

Due to optimizing of the activities of the green economy and blue economy have an impact on the sustainability of climate change and the environment. According to Tziperman (Tziperman, 2022) on the process of climate

change through a model of the cloud formation which they are further affect the climate and the environment through a convection of moist process in the atmosphere with an uncertain establishment model then it being an example on climate change that it can be considered. This model of climate change and the environment in the atmosphere which it allows to be simulated as a model to help amplifying the north pole and global warming that appears in the event of hurricanes, forest fires, extreme droughts, hot air pressure and extreme rainfall, as well as many other natural disasters.

In comparing the development programs on green and blue economy in the other countries in the whole world on preventing the impacts of the climate change and the environment, according to Fu and Ng (Fu & Ng, 2020) based on the development program in areas with natural resources that they have an advantage to support industry activities and the different geographical characteristics, put Hong Kong's advantage on green economic country in the Greater Bay area. Starting with the development plan of Hong Kong as a green finance centre, then Guangzhou city as an innovation and reform zone of green finance, and Macau as a digital platform city that provide complements green finance. Specifically, the Hong Kong framework for a green financial administration area was launched to support bond issuance for Hong Kong companies based on green finance certification scheme to increase product transparency and accreditation and the market confidence. The Hong Kong Monetary Authority has strengthened this green finance initiative by representing the Government in establishing the Hong Kong Special Administrative Region (HKSAR) green financial area in green bond offerings to finance public capital-based projects in order to improve environmental sustainability and safeguard climate change.

In environmental outlook on the development of economic with green economy and blue economy activities, according to Green (Green, 2020) based on the experience in the fall down of the Bretton Woods city, a small town in the State of New Hampshire illustrates the case of general prevalence of the crises that it collapses the financial system with far-reaching and repercussion impacts, having contradictory logic on financial practices and significantly affect to the international financial strength of the United States that they were indicates the re-emergence of classical economic ideas of previously known as the original Keynesian theory. The case explains how the Anglo-American region's close ties with Britain's in control the Bretton Woods credit for the first time that it was supposed to be and it was only used for further transactions that it has far-reaching impact on the use of translantic transactions on the transformation in Britain that it took a place in the City of London as a centred. These transactions dynamically affect financial credit which simultaneously weakens the domestic Bretton Woods finance and credit agreements for the two countries, the United States and the United Kingdom such as stated in the Keynesian theory. The provisions of the Law of Keynesian Theory in England on creating and developing of the Bretton Woods financial agreement were not intended to reconfirm the economic ideas of John Maynard Keynes. But the aim is to continue the dominance of the pound sterling as the international currency and the London's involvement in influencing the development of international financial infrastructure for at least, to the infrastructure of the international gold market that it carried out on the allies to exert influence in United States finances which it will ensure that the financial developments put the system of British capitalism remained and continues to be a financial fundamental in post-war financial conditions. Keynesian theory is known as the economic theory of total expenditure in the economy and its effect on the economic growth or collapse (Green, 2020, p. 81). The purposed of the theory is to increasing the government spending and lowering taxes to increase demand and pull the global economy on out of its undeveloped problem. At the same time of the financial reforms in England, which it provides the Bretton Woods credit on the actual implementation were added burden in London economy.

The economic collapse in finance affects food securities for the community chain and food supplies. The crisis of economic under the climate change that it occurred has disrupted countries

food supply such as failure of agricultural climate change. Food security will be priorities for community on chain and food supply. According to Hossain, Nilsson, and Marti (Hossain, Nilsson, & Marti, 2021) in recent years, the food security has become a crucial problem that affects the condition of the Arctic region in the north pole, which it is regionally uncertain and experiencing circumpolar conditions. A study has been conducted to answer why the problem of food security in this region has become so uncertain that it requires a broad exploration covering the factors that they were affect the ability to produce food for community chain and food supply. They affect food security systems throughout the whole region. This effect of food security factors has a significant impact, both naturally of geopolitics, social economy, and cultural aspects. Global climate change and its impacts of the geopolitics are disproportionate in nature, both in each region that contributes to the transformation of the environment, geophysics (exploration of natural resources, groundwater, and their physical mapping) and economy, as well as on the political and socio-cultural characteristics of the whole region in human life. At the same time, these political, economic, social, and cultural transformations have an offer for growth opportunities in globalization and incorporate naturally on the regional ecosystems.

All the impacts of the climate change took a place to the region under the pressure of the changes of the climate itself, the environment, the use of land, and the natural resource management. The pressure of the changes has an impact on the traditional food supply chain through the farmers production mechanisms and food security system at the whole region. Furthermore, the impact of the technological advances and the globalization of information technology are putting the pressure on both traditional food security, especially agriculture in the Nordic countries of the Arctic to maintain climate change and the environment in the circumpolar region at the same time. They putting the supplies of the food securities decreasing throughout the region and put the supply of imported food which it will continue increase, especially European countries. This situation has dire implications for the availability of safe and nutritious food for many communities in the Arctic.

In the provision of food safety and nutritious in the climate change support of the environment of good life and the organic fertilizers that they are needed to restore the natural functions of the environment. Based on the results of the research on this study, one of the organic fertilizer products that it produced from nano technology in Japan, (Yomari International, 2021), the food production by the organic fertilizers, brings benefits such as (1) The food of the plant are ready-to-eat by them directly to absorbed into plants nutrition's. The absorbs occur without process of photosynthesis, (2) The fertilizers are provided organic ingredients from vegetable sources, (3) These organic fertilizers will stimulate plants to bear fruit in outside of the season, (4) Save up to 90% of the cost of fertilizing plants compared to the chemical/compound/conventional fertilizers and saves 40% of costs to compared to the other certain organic fertilizers, (5) These organic fertilizer, contains 13 nutrients and with 4 active ingredients based on the results of 10 years of research, which shows that the active ingredients are much needed by plants/plants, (6) The organic fertilizer is able to improve soil conditions from acidity and returned them to its normal level (7) Make plants able to sufficient with the changing of weather, (8) Make plant able to accelerate the higher growth that it put farm harvests are faster or as the same with the harvests target on the scheduled or the sustainability on the simultaneous of the addition of rice tillers, (9) Other fertilizer alternatives for suitable use in ponds water animal such as fish ponds or shrimp ponds for even more comfortable in health of fish and shrimp, strong in growth and less stressful, then finally more productive (10) At the same time, the fertilizer can be used together with insecticides, pesticides and mixed with other chemical fertilizers, but only in small doses of used for it is function on efficient purpose in working time of used to reach results of 100% effectiveness, (11) the functions as "antibiotics" for diseased on plants (mouldy, curly shoots, as well as preventing other pests except rats and so on) at the end make strengthens plant immunity, (12) These organic fertilizer does not have an expiration date (the longer the better of the

quality) if it is not in used. If everything is done correctly, (13) through the application of fertilizers according to the provisions, this fertilizer can produce 40-60% yields up than normal harvests.

By providing an organic fertilizer on agricultural program in Pinrang Regency, (Bappelitbanda Pinrang Regency, 2021), based on the potential and land area of available plantation for investment opportunity through the agricultural fisheries which it is reached 17,143.23 hectare with production results reaching 42,075.01 tons fishery in 2020. The area of land for agriculture plantations for rice is 56,097.80 hectare and corn 10,815 hectare. Rice production in 2020 reached 638,983 tons while corn reached 122.02 tons in the same year. Meanwhile, the plantation of crop plantation area is 41,177.65 hectare with production result reaching 19,070.47 tons differ from coconut to sugar palm.

In Raksun's research (Raksun, 2016) showed that the utilization of non-organic fertilizer resulted in increasing the production of the agriculture plantation reached from 3 to 20 percent. Meanwhile, the utilization of an organic fertilizers will increase production result from 20 to 23 percent. Subsequent studies with the organic fertilizers developed by Yomari International corporation with nanotechnology in Japan, were able to produce 40-60 percent increase in production yields (Yomari International, 2021).

With the prospects of the paddy production and the whole agricultural production (Bappelitbanda Kab Pinrang, 2021) in Pinrang Regency, the using of the organic fertilizers with nano technology is target it to achieve the increase in agricultural productivity, with a maximum profit of IDR 4,911 trillion. Based on the analysis of production growth of 40% of paddy from 638,983 tons to 894,576 tons.

Literature Review

The research of food security that it is utilities' an organic fertilizer in Pinrang has been carried out by Arafah (Arafah, 2011) which it shows the difference in profit between the treatment with an organic fertilizer but different product name which it is obtained from the two of different fertilizer namely manure organic fertilizer on result of Rp1,582,480 per hectare, or increase the productivity of 23.19% and the straw organic fertilizer with result increase the productivity of Rp580,600 per hectare or increase of 7.42%. The same research was carried out also by Raksun (Raksun, 2016) which it was showed that the utility of organic fertilizer of the type of bio green granules fertilizer improved the physical, chemical and biological properties of the soil, giving a positive influence on the growth and yield of plants in the soil. The fertilization process with a certain dose of bio green granule can do increase production yield by 2.8 tons per hectare or 23%. The same study was conducted by Gama, Oktaviani and Ririn (Gama, Oktaviani, & Rifin, 2016) which it is also showed that the performance of Beka-Pomi organic fertilizer increased rice production between 10% to 40% yields. Meanwhile, other research through the utilities of the organic fertilizers with nano technology had been reached results on the demonstration plots treatment on the rice plantations that it was combined with chemical fertilizers as according to the treatment requirements carried out in Bojonegoro (PPL Disperta Bojonegoro, 2018) increase the productivity from 18% to 36% of paddy production which it is equivalent from 1 to 2.5 tonnes per hectare.

The purpose of the utilization of organic fertilizers is to increasing agricultural productivity, as according to Well and Johnson (Wells & Johnson, 2020) mention that an organic fertilizers and plant ingredients are used and categorized into several processes. First, the organic fertilizers solve plant health, safety and environmental clean problems caused by the use of the organic fertilizers itself and be a sources of vegetable ingredients. Second, as the precautionary measure that it taken to mitigate the problems that arise in the storage process, and post-production handling. Third, to determine the risk of the use of the organic fertilizer that it is arise as the results of the use of organic fertilizers itself and their vegetable ingredients that it could cause harmful on climate changes and environmental.

To preserve agricultural productivity on one side and land prolificacy on the other side, according to Bumb and Baanante (Bumb & Baanante, 2020) the use of organic fertilizers in accordance to the

procedures of uses then followed by the use of other fertilizers together as an additional complement to the organic fertilizers, can help restore tension of the plant chain populations and environmental degradation in several ways. First, organic fertilizers provide much-needed plant nutrients to restore soil fertility, thereby increasing crop yields and food production. Second, more soil fertility for crops means more biomass available for replacing them in order to maintain a supply of organic matter for growth and meet the fertility needs of vegetables, the residue of which it is plants use as organic fertilizers help reduce soil erosion. Thus, Third, the use of organic fertilizers and other complementary materials, which they are managed properly can create a mutually beneficial that it need for land and plants along with the growth of the plant production through the use of organic fertilizers in the areas of high potential fertility for better soil and favourable agroecological conditions, and in addition, increase the food production can reduce pressure to clear the rich forests in life habitats for other plantation in food production, that it could put the forest clearing eventually be reduced. Fourth, the application with only one time uses in the same with chemical phosphate fertilizers and other heavy materials, followed by the application of organic fertilizers as annual land of maintenance function, could increase and maintain the productivity of soils that it contains a high acidity level, which it is the way of periodic maintenance applications. This will continue to provide great potential, especially in developing countries in increasing their food production. Finally, with organic fertilizers and their use with other complements, they can make an important contribution to the fulfilment of food that it is needs between generations in a sustainable manner by maintaining natural resource capital in the soil, climate change and the environment can be well maintained.

In the current development of globalization, the sustainability of food production and natural resources on earth, according to Balkrishna et.all., (Balkrishna, et al., 2022), shows that the agriculture production of food security policies such as mentioned above has become a major part of determinant of prosperity of humankind in the whole country. Statistical analysis shows that globally, agricultural products account for nearly two-thirds of the value of world trade. In fact, all the food served to the people that it is even fresh from other locations which it was obtained every day from fast-paced supply chain management systems. Food processing is also emerging as a new dimension that they change of the way food to consumed in all of the originate of the agricultural sector. The products of food and animal are processing to enter to the industry such as processing before being packaged and then sent to the market and finally to customer. In today's globalization, it is recognized that dairy and meat products provide a global supply of around 50% of all processed foods to the people to consume.

In relation to the policy implementation in agriculture, Purwanto's research (Purwanto, 2021) using the nexus integration approach in the management of water, energy and food availability shows that policies implementation that they create knowledge gaps and their enforcement have an interrelationship between variables in water, energy and food management systems (WEF). The analysis using a nexus approach that integrates cross-sectoral management and governance and priority scale of agricultural development shows that the relationship between food security policy on the WEF in the local context and the implications of local interventions through policies that they are planned for management of the WEF sector through the development of a conceptual and quantitative framework using system dynamics modelling through stakeholder involvement and co-development in the policy-making process, can provide added value for improving food security, climate change and a better environment. This research was conducted in the Karawang Regency in Indonesia as an illustrative case study that it is expected to represent all the challenges of food security and the associated variables at the local level in food security policies with WEF integration.

Research Method

This study uses the Statistic Scientific Research Method to test the research hypothesis which they are mention above that it involved in the

researcher to prove on it. In the research method, to prove the hypothesis, according to Jain (Jain, 2019) the involve of the researcher is aimed to know the nature of the relationship between the two situations that they are compiled in the hypothesis. The hypothesis is used to provide a temporary or tentative explanation about the nature of the relationship between Japanese Nano Technology Organic Fertilizers and the increasing of food production in Pinrang Regency. In this study, the researcher uses the hypothesis under the option of several condition of the investment of non-organic and organic fertilizers on a land area of 56,097.80 hectare to produce of 3% increase in production on paddy from 638,983 tons to 658,152 tons. Assuming a price of IDR 5000 per kg which it is count in tons, then next it will generate for farmer profits of IDR 1.282 trillion in 3 harvest times (Raksun, 2016).

In relate it the increasing of production for 40% to 60%, the hypothesis of these research based on previous studies, the hypothesis was arranged to several hypotheses. First hypothesis is the investment of non-organic fertilizer on the land of area of 56,097.80 hectare which it will invest to produce at 3% increase in production from 638,983 tons to 658,152 tons. Assuming that the price of the paddy is IDR 5000 per kilogram which it is next to count it in tons. Based on these forecasting, the farmers' profits will reach IDR 1,282 trillion in 3 harvest times in a year

Second hypothesis is the investment of the non-organic fertilizer on land of area of 56,097.80 hectare which it is invest to produce at 20% increase in production from 638,983 tons to 766,780 tons. Assuming that the paddy price of IDR 5000 per kilogram which it is count it in tons, then the profit of the farmers will reach IDR 3.332 trillion in 3 harvest times in a year.

Third hypothesis is the investment of the organic fertilizer on land of area of 56,097.80 hectare which it is invest to produce at 20% increase in production from 638,983 tons to 766,780 tons. Assuming that the paddy price of IDR 5000 per kilogram which it is next counting it in tons, then the profit of the farmers will reach IDR 3.332 trillion in 3 harvest times in a year.

Fourth hypothesis is the investment of the organic fertilizer on land of area of 56,097.80 hectare which it is invest to produce at 23% increase in production from 638,983 tons to 785,949 tons. Assuming that the paddy price of Rp5000 per kilogram which it is next counting it in tons, then the profit of the farmer will reach Rp3,428 trillion in 3 harvest times in a year.

Fifth hypothesis is the investment of the organic fertilizer on land of area of 56,097.80 hectare which it is invest to produce at 40% increase in production from 638,983 tons to 894,576 tons. Assuming that the paddy price of Rp5000 per kilogram which it is next counting in tons, the profit of the farmer will reach Rp4.272 trillion in 3 harvest times in a year.

Sixth hypothesis is the investment of the organic fertilizer in land of area of 56,097.80 hectare which it is invest to produce at 60% increase in production from 638,983 tons to 1,022,373 tons. Assuming that the paddy price of Rp5000 per kilogram which it is next count it in tons, the profit of the farmers will reach Rp4.911 trillion in 3 harvest times in a year.

Discussion

In relation to fertilizer programs for agriculture, according to Bumb and Baanante (Bumb & Baanante, 2020) the companies that they produce organic fertilizers in the developed and in the developing countries have reserves of funds that thye are always available for investment in fertilizer fields. The difference in fertilizer prices, including the price of organic fertilizer and the production cost of each type of fertilizer, has resulted in increase of income in recent years which it is in turn to hinders investment. In ensuring the availability of adequate fertilizers, companies from countries such as China, India, and Pakistan invest collaboratively in joint ventures to ensure that the supply of fertilizer, including organic fertilizers, it is sufficient to meet their domestic market. In expanding investment, the investment companies for the area that it may not be attractive for investment in producing fertilizers due to supporting infrastructure and poor physical land infrastructure, may affected by political instability issues, or the impact of

environmental changes and unstable policies adopted in the region such as Sub-Saharan Africa. Nevertheless, the fulfilment of fertilizer in these areas is not through direct investment but through imports of fertilizers which they are highly dependent on the global market.

Investment programs in fertilizers are related to working capital in the production process. According to Morse (Morse & MacNamara, 2020), in the 18th century, Adam Smith used the word capital to describe the factors that they influence the production. His analysis starts with the production flow by focusing on the distribution of costs that it occurs across the input factors of the production process and also do analyses on how the costs of production incurred on converted into inputs that are physically tangible before the production. Therefore, the production process is formulated as follows:

Capital → payments for inputs with capital production → processes with physical inputs

➔ Output → sales of production → profit

In the classical economic model as described above, the capital is the foundation of the production process consists of the physical input of tangible objects such as land or natural resources (minerals, plantation products, etc.), the amount of labour, the costs of production, and the machine that it resulting from capital such as human creation is likely. This classical economic model still emphasizes the classical vision of capital, with the understanding that capital is a physical entity that it is entered into the production process to produce output. But this classical economic model is clearly incomplete because much depends on how these physical inputs are used in production to produce outputs; This is worked with the delivering on more correct of knowledge, which they can be imparted to produce output on less minimum capital.

In the development of the current economic model is developing very fast. The vision of the economic factors that it is effect of the develops of production move into a smart vision. According to Kaihara, Kita and Takahashi (Kaihara, Kita, & Takahashi, 2021) Vision of smart as part of "smart society" and "smart economic factors" that affect economic and social systems with the concept of the word "smart" used to characterize economic factors and the new economic characteristics that they affect the social system. The word "smart" as a term in interpreting the development of information technology today, however, the use of term of smart is not yet well established and the studies to conducted on the use of smart production and its implications in terms of systems science and engineering in the economic and social fields are currently just beginning. Therefore, the systems approach of smart in the economic vision is to design, plan and operate a "smart platform" as an infrastructure of economic and social factors from the point of view of optimizing production factors to deliver a new appearance on economic and social system. In the proposed approach, this smart platform is a model of network that they involving multiple stakeholders and supply chain supply factors. There are four "intelligence" conceptual frameworks related to the platform of design, planning and operation that they are discussed from the point of view of system optimization, as follows: (1) The introduction of a smart platform as “market mechanism” that it is used to adjust and meet the needs of the balance of supply and demand conditions in the economy and through the smart platform enables autonomous and decentralized decision making in artificial intelligence systems; (2) Adding more flexibility to design, planning and operation in a smart platform by adjusting "flexibility variables" in decentralized decision-making control; (3) The introduction of policy-making mechanisms in the economic and social system on smart platforms through “policy variables” in order to accommodate the lack of certain economic values and social influences caused by imperfect market mechanisms; and (4) Increasing the degree of flexibility of temporal and/or partial adjustment through the use of “complementary elements” in smart platforms that they are introduced to stakeholders and supply chain factors under the control of a decentralized decision-making system.

In realizing a smart economic system, the investment programs are very influential in social and economic development. Samad, Eric and Ishaq's research (Samad, Hermawan, & Ishaq, 2022) shows research on organic fertilizer investment opportunities with an investment of IDR 500 billion, followed by investment in the warehouse receipt system of IDR 3,200 trillion, as an economic system arranged in a smart platform and followed an investment on milling of paddy into rice of IDR 1,300 trillion and by using an analysis on the opportunities, challenges, threats and weakness approach and the financial analysis approach shows that the smart platform on organic fertilizer investment projects, warehouse receipt system investment projects and rice milling investment projects are feasible then followed by a financial analysis of the positive Net Present Value, the Internal Rate of Return on the Net Present Value level, then the return on investment analysis and the profitability and profit index are declared feasible.

In relation to investment projects in an economic and social model, according to Cen and Bartle (Chen & Bartle) one of the ways to raise funds for investment projects is to use a "reward-based model" which it is provides the opportunity to contribute to the public for financing of the project which it seen as an opportunity for everyone to contribute. investing without expecting a return. In this “reward-based model” investment concept, funders receive non-financial rewards, often rewards in the denote of rewards for their contributions. In addition, investment projects can also be fulfilled through a new model that it is appears in the situation of investment projects by generate a steady stream of income in the future. This model was later called, "Investment lending model" such as bank loans on investment projects, in which the funder receives a fixed return on his investment profits. One example that can be seen in investment projects like this is through the use of community bonds at the Centre for Social Innovation in Canada. Its head office operates by issuing bonds backed by mortgage collateral that they buy or hold to underwrite non-profit investment projects, and the investors have a claim on these mortgages, as an obligation to provide a return on their investment. Another investment alternative is the "pure investor model," in which the investor as the financier of the project acquires rights or equity in the project and receives various returns such as dividends on shares owned. International Securities and Exchange Institutions currently allow financing of investment projects through a crowdfunding platform via securities brokers, which they make the investment model easier. Some funding platforms for projects like this are carried out by providing detailed and transparent information to enable potential investors and lenders who are interested in the investment project to make the right decisions in investing, be able to reduce the risk of losses that they may experience, and encourage them to increase investment opportunities.

In relation to investment project, the Pinrang food security investment program as an idea to increase investment on agricultural production as well as preserve land fertility as referred by Bumb & Baanante (Bumb & Baanante, 2020), the investment project was welcomed by the Regional Government of Pinrang Regency as an effort to develop industrial area of agriculture as a construction of development of the city design (Fu & Ng, 2020) in order to improve a welfare to the farmers and the Pinrang communities as the whole (Green, 2020). In the implementation of the investment project, the policy support is need it to provided an opportunity and the support policy from the local government to take the necessary actions related to water, energy and food management (Purwanto, 2021)

To perform the investment program, the readiness to execute the demonstration plots (demplots) as a sample of the use of organic fertilizers such as the research of the Arafah (Arafah, 2011) is aimed to increase the agricultural production of 40 percent (Yomari International, 2021) through the plantations activities to carried out in the next plantation season by the reasons: first, to increase the production of agricultural products, it is need to increase the difference in production on the previous period or to do to reach the same production but different increase in price (PPL Disperta Bojonegoro, 2018). Currently the goal of the agriculture production is to increase the farmers' income as part of increasing production. Second, to encourage the changes in the farmers' rice prices during the current harvest season that it

can be anticipated by a warehouse receipt system under the conditions that they do not harm harvest time and the price go drops (Balkrishna, et al. , 2022), Third, to encourage changes of the farmer's behaviour in conditions of increase in their income, especially after harvesting time, they do not make a purchases of consumptive goods, (Green, 2020) but more in depleting farmers' income on the next season, which it would result in growth income since some of the farmers do not have capital at beginning of the plantation period.

In the demonstration plot that it was carried out at the first treatment on a 25-acre paddy field with fertilizing shape of organic fertilizer that it was produced by nano technology which it had been prepared in advance at a certain dose as accordingly (Wells & Johnson, 2020). Fertilization dose was given in three times as according to the dose quantity. The results of fertilization seen from the harvest that it has been carried out to produce 11.5 sacks with a weight of each sack divided into three parts, namely, the first four sacks, 120 Kg, then the second four sacks, 117 Kg and the third 3 sacks weighing 115 Kg. The total yield of sack size reached 11.5 sacks.

In comparing with the production of the organic and un-organic fertilizers, the yields of production of the treatment have an excess in kilograms per sack compared to the weight of kilograms per sack in the previous harvest but reduced weight from the number of sacks which it was previously of 12 sacks (previous harvest) to 11.5 sacks now. The reduced of number of sacs at this harvest time, due to the treatment that it had given differently with only three times than it should be at five times.

The second treatment, the fertilization was given to the plantation land under 20-acre that it was not previously used for paddy production then converted into rice plantations by treatment with complete fertilizer of 5 times as accordingly (Wells & Johnson, 2020). Compared to the previous of demplot, the second treatment was produced even the size of the land is smaller that it is under 20-acre, but the results of production are much better. The number of sacks of previous production was only 3 sacks, but currently, it has reached 8 sacks. There was an increase in production with organic fertilizers by 270% from the previous harvest period.

In term to testing the hypothesis on the findings of the research demonstration plot above, according to Staley (Staley, 2017) what it is done in the demplot project is the result of the base of statistical standards on the research hypothesis due to accept or reject it. The crucial argument about pragmatic scientific conclusions and the future opportunities is epistemic autonomy that it is shows the relevance of research to conduct to policy-making at the government level as a scientific effort to understand how the evaluation of experimental data contributes to scientific knowledge.

To test the experiments with the scientific method according to Quirk, Palmer and Schuyler (Quirk, Palmer, & Schuyler, 2020) in scientific research the most important activity is to test whether the hypothesis that it is set before shows that it fits the assumptions of the result of test. The hypothesis is tested with the statement that if the treatment is correct then the use of organic fertilizer is in accordance with the previous statement, it is true.

In this study, the researcher uses the hypothesis that the investment in organic fertilizers could produces a 40% increase in paddy production from 638,983 tons to 894,576 tons. The assumption of the paddy price is IDR 5000 per kg which it is count in tons, then the farmer's profit will reach of IDR 4.272 trillion in 3 harvest times (Yomari International, 2021). The results of this study answered all the first to the sixth hypothesis.

The results of hypothesis testing before and after the treatment that they were given to paddy plants with incomplete of fertilizer application and the other treatment of complete fertilizer application showed that the hypothesis of organic fertilizer application to produce a 40% increase in production from 638,983 tons to 894,576 tons was true. The assumption of the paddy price of IDR 5000 per Kg which it is count in tons, the incomes of the farmer profits will reach of IDR 4.272 trillion in 3 harvests time then it is accepted with the limitation that the sample testing before and after the treatment is limited to the number of samples tested respectively.

In the testing of the treatment before and after, the socialization of the experiment result that it carried out to the farmers and society needs to be

given through a dialogue on food security programs to see their willingness to use of the organic fertilizers at prices level that it matches their needs per hectare. In the analysis of the nano-technology of organic fertilizer mention above, the implicitly can be concludes that the production cost, compared to other brands of fertilizer, took only 10 percent per hectare from an average of IDR 3,070,000 (Yomari International, 2021). However, the farmers are willing to pay for the price of Rp 900,000 for fertilizer on the condition that the payment made after the agricultural products are received harvest. The condition of the price paid is the price of the harvest production time by the investor.

As according to the results of the demonstration plots that it carried out and the treatment that it given to the two different plantation lands, then the farmer groups were interested in using of the given organic fertilizer, it can be conclude that in the next planting season, it is necessary to expand the demonstration plot more for an area of 3 hectares to 30 plantation land owners.

The implementation of the food security investment program in Pinrang district, it is considered that further demonstration plots are still needed, to see the yield of paddy plantations on a wider area, and to ensure that the community is willing to use the organic fertilizer for further season.

To give farmers the opportunity to enjoy long-lasting profits with the stability in the rice prices for all the period of harvest and the price do not fall at harvest time, it requires an optimal logistics system so the increasing in production of paddy can be distributed to consumers under the smart flatform system (Kaihara, Kita, & Takahashi, 2021). On the other hand, to support the production and to ensure the achievement of production targets in accordance with agricultural projections in Pinrang Regency, the next research on food security is needed that it is aims to provide an added value of the agricultural seeds, the agricultural systems, and the logistics systems to ensure that the quality of the products is well maintained. The impact on the increase of food security system in Pinrang's agricultural productivity, the investment goals will only be achieved optimally if it the develops the area on more broadly (Purwanto, 2021)

In various literatures that it is explained in general, the increase of food production, especially rice production in relation to closing or reducing the gap in rice production through the introduction of varieties, it is taken to increase rice production with certain organic fertilizers. The use of superior seeds and certain organic fertilizers programmed in the food security investment program plays a role in influencing the increase in the rice production. By taking the benefits that it can be obtained from the use of superior seeds, among others, the reducing of the number of seeds to avoid over-replanting and the high germination rates and optimal fertilizer application are important to increase food productivity.

In addition, the efforts to maintain strict early growth to reduce weed problems that it will increase the ability of plants to fight pests or diseases, it can be continued fertilizing maintenance. The combination of these factors with the application of the right organic fertilizer can increase the yield of 20% to 23% of the overall agricultural food production (Raksun, 2016).

The success factors in the management of food security are determined by the use of production inputs. Optimaling the use of production inputs will result maximum production and ultimately provide a high profitability of farming, relatively. The recommended dosage for the use of production inputs such as organic fertilization is generally known in mind to farmers. However, in practice, not all farmers apply the recommended dose as accordingly due to the different levels of understanding. Based on the results of Raksun's research (Raksun, 2016) rice plantation is carried out by farmers in an area of 0.50-1.0 hectare (on average 0.75 ha/farmer) differently. These differences include to among others farmers on use the available varieties from their harvests, or the use of seeds from local governments and/or other varieties that it have been used continuously for several years.

More than 60% of the rice seeds that is used by the community today come from the informal sector in the fashion of unhulled rice that it has been set aside from the previous season's repeated harvests.

In addition, farmers also only use non-organic fertilizers (an artificial fertilizers), and no farmers use organic fertilizers to plant rice fields today in Pinrang regency. The use of fertilizer doses is believed to be far from recommended.

Conclusion

The test hypothesis results before and after the treatment that it given to rice plants with incomplete fertilizer application and the other rice plants with complete fertilizer application showed that the hypothesis of organic fertilizer application to produce a 40% increase in production from 638,983 tons to 894,576 tons could be achieved. The assumption of the price of IDR 5000 per Kg which it is count it in tons, put the farmer's profit reaches IDR 4,272 trillion in 3 harvests is accepted with the condition of limitation of the sample testing before and after the treatment.

Recommendation

Based on the analysis of the growth of rice production from 638,983 tons to 894,576 tons, it requires an integrated warehousing infrastructure in the area of warehousing complex with the same of ship loading and transportation. This recommendation of course requires an optimal logistics system to distributed to other areas or even for export purposes. Thus, investment in warehousing goals that it is integrated with container ports support the food do not damaged or even burdens the community which it turn causes the impact of declining selling prices to be avoided later.

On the other hand, to support the production and to ensure the achievement of production as according to the targets as agricultural projections in Pinrang Regency, the next research is needed that it is aims to provide an added value, including agricultural seeds, agricultural systems, and logistics systems to ensure the quality of the products is well maintained.

In addition, educational institutions are needed to ensure that the graduates are able to make the Pinrang agricultural program to be only largest agricultural production in Indonesia. Thus the increase of production in productivity mentioned above at the end or under the condition in the large investment that it will only be achieved optimally if the developing of the area more broadly. With the increased public awareness, agricultural development through the Pinrang food security program with the food security dialogue are expected to increase the agricultural production by 40% in the future.

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