Jurnal Pendidikan Ekonomi & Bisnis, 11 (2) 2023, 104-116
JURNAL PENDIDIKAN EKONOMI & BISNIS
http://journal.unj/unj/index.php/jpeb

Green Economy's Impact on Food Security Program Evaluation

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Article Info

Article history:
Received: 26 July 2023
Accepted: 12 October 2023
Published: 30 October 2023

Keywords:
Organic Fertiliser; Food Safety; Green Economy; Sustainable Climate Change.

Abstract

Sustainable green economic concepts are essential for food security initiatives. Utilising organic fertilisers allows for the long-term preservation of natural ecosystems in the Pinrang Regency and the economic prosperity of local farmers through the sale of agricultural products such as fisheries and plantations. By conducting in-depth interviews with participants, participating in direct observation, and reviewing pertinent materials, the researcher actively examines the study hypothesis in the framework of qualitative research. This qualitative study seeks to understand how organic fertiliser use affects agricultural production. Additionally, the study tries to determine whether this farming approach may improve farmers' quality of life. The study found that a green economy program that improves agricultural productivity could raise farmers' living standards. According to the study's findings, incorporating a green economy program into agricultural practices can enhance agricultural quality, farmers' green economy proficiency, and farmers' collective responsibility for the preservation of the environment.

Abstrak

Program ekonomi hijau yang berkelanjutan sangat penting untuk inisiatif ketahanan pangan. Penggunaan pupuk organik memungkinkan pelestarian ekosistem alami di Kabupaten Pinrang dalam jangka panjang dan kesejahteraan ekonomi petani lokal melalui penjualan produk pertanian seperti perikanan dan perkebunan. Dengan melakukan wawancara mendalam dengan para partisipan, turut berpartisipasi dalam observasi langsung, dan mengkaji bahan-bahan terkait, peneliti secara aktif menguji hipotesis penelitian dalam kerangka penelitian kualitatif. Penelitian kualitatif ini berusaha untuk memahami bagaimana penggunaan pupuk organik mempengaruhi produksi pertanian. Selain itu, penelitian ini juga mencoba untuk menentukan apakah pendekatan pertanian ini dapat meningkatkan kualitas hidup petani. Studi ini juga menemukan bahwa program ekonomi hijau yang meningkatkan produktivitas pertanian dapat meningkatkan standar hidup petani. Menurut temuan studi, memasukkan program ekonomi hijau ke dalam praktik pertanian dapat meningkatkan kualitas pertanian, kecakapan ekonomi hijau petani, dan tanggung jawab kolektif petani terhadap pelestarian lingkungan.

How to Cite:
Utama, Z. M., Samad, A. W., & Ishaq, M. (2023). Green Economy's Impact on Food Security Program Evaluation. *Jurnal Pendidikan Ekonomi & Bisnis* *11*(02), 104-116. https://doi.org/10.21009/10.21009/JPEB.011.2.1

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ISSN
2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

INTRODUCTION

In order to affect climate change and the environment in the long run, it is necessary to increase the effectiveness of the green and blue economies. A prior study by Tziperman (2022) noted an uncertain model of cloud formation as evidence that climate change can be applied to green and blue economy activities. Clouds influence climate and the environment via a humid convection process in the atmosphere (Hordofa et al., 2023). In addition, Tziperman (2022) uses a model of cloud production to explain the climate change process. In the event of hurricanes, forest fires, extreme drought, hot air pressure, and extreme rainfall, this model of climate change and the environment in the atmosphere of the humid convection process can be simulated as the same model of change that can help amplify the north pole and global warming, along with a plethora of other natural catastrophes.

Furthermore, Fu and Ng (2020) mentioned that Hong Kong's advantage in the Greater Bay area is based on development in the areas of natural resources that have advantages to support industries with different geographical characteristics, making the city a global leader in preventing the effects of climate change and the environment. This was found through analysing differences between national development programs. Initially, Hong Kong will be developed into a green finance centre. Guangzhou will become a green finance innovation and reform zone, and ultimately, Macau will become a green finance digital platform city. In order to facilitate the issue of bonds by Hong Kong-based enterprises, a green finance certification scheme was incorporated into the Hong Kong framework for green financial administration regions. This was done to boost market conditions, openness, and product approval. By acting as the Government's representative in setting up the Hong Kong Special Administrative Region (HKSAR) on green finance area in green bond issuance, the Hong Kong Monetary Authority has bolstered this green finance program. The proceeds from this offering will be used to fund public-sector initiatives that enhance environmental sustainability and reduce greenhouse gas emissions.

Bretton Woods, New Hampshire, is a microcosm of the widespread occurrence of crises that have weakened the financial system, had far-reaching effects and reversed logically contradictory effects on financially significant international practices, as described by Green (2020). This example exemplifies the return of what was formerly called the "original Keynesian theory" in economics. This case study explains how the Anglo-American colonies with ties to England could influence the credit allocated to Bretton Woods and used for their transactions. This eventually saw widespread application in transatlantic transactions centred on transforming the City of London. The Keynesian theory's credit law disrupts the credit dynamics of the financial system, which in turn threatens the stability of the domestic and international credit accords established at Bretton Woods.

To reiterate John Maynard Keynes's economic views, the Bretton Woods financial treaty was not drafted under the influence of English law. Furthermore, to ensure that the financial development made the financial system of British capitalism remained and continues to be fundamental in post-war economies, London's involvement in influencing the development of international financial infrastructure (at least of international gold market infrastructure) was conducted with allied countries to exert influence on United States finances. Keynesianism is the economic theory of total spending and its effect on economic development or collapse and inflation (Green, 2020). Increasing government spending and cutting taxes could assist the global economy in breaking out of the current stalemate by stimulating demand. During the time of change in England, Bretton Woods provided money, which, when used, added to the strain on the London economy.

The current economic climate threatens the ability of families to offer healthy meals. The issue of climate change has had a devastating effect on the economy. Hossain et al. (2021) remarked that the Arctic region around the north pole faces regional unpredictability and circumpolar circumstances, making food security an urgent concern. The aforementioned study has analysed the factors affecting the region's ability to produce food and its food security systems to ascertain what has made the issue of food security in the region so unpredictable. These factors are strongly affected by both natural and societal/political/economic/cultural factors. Environmental, geophysical

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

(including exploration of natural resources, groundwater, and its physical mapping), economic, political, and cultural facets of the world are all impacted differently by global climate change and its effects. These alterations in politics, economics, society, and culture, so the argument goes, offer hope for expanding global trade and are naturally absorbed by regional ecologies.

The impacts of climate change on the local environment, land use, and natural resource management systems are significant. This pressure is affecting the conventional food supply chain, which includes farmers' production methods and food security measures. Technological development and globalisation are straining traditional food security, particularly agriculture in the Nordic countries of the Arctic, to maintain climate change and the environment in circumpolar regions while increasing reliance on imported food supply in countries across the region, particularly in Europe. In many Arctic communities, this situation has devastated the availability of nutritional food. To aid in the fight against climate change and protect the environment, organic fertilizers are essential for restoring the ecosystem's natural processes and guaranteeing the food's safety and nutritional content.

Using organic fertiliser in agricultural production benefits the green economy, according to a study on one of the organic fertiliser products developed with the use of nanotechnology in Japan (Yomari International, 2021). Some of these advantages include: First, fertilisers for plants that are made up of organic materials derived from vegetable sources; Second, plant food that is ready to be directly absorbed by plants and does not require the process of photosynthesis; and food. Third, fertilisers for plants that are ready to be produced without the use of fossil fuels. Fourth, it saves up to 90% compared to chemical fertilisers, compound fertilisers, or conventional fertilisers, and save up to 40% compared to the use of certain other organic fertilisers for food, which is essential for plants to have. Fifth, soil acidity can be returned to normal levels with returned to normal levels with organic fertilisers.

In addition, it helps plants adjust to changing weather conditions. Seventh, promote rapid plant growth, allowing for more frequent harvests, targeted harvests, or simultaneous harvests (including rice tillers). Eighth, provide an option for ponds that can be stocked with fish or prawns that are more content, robust, and less stressed, leading to greater yields. Moreover, since it may be used with insecticides, pesticides, and combined with chemical fertilisers, but only in small amounts when applied, the time it takes is lowered without compromising the efficacy of the consequences. Later, it prevents pests (except for rats and similar critters) and functions as an "antibiotic" for damaged plants (e.g., mildew and curled shoots). In the end, it makes plants stronger against disease. In the absence of use, organic fertiliser does not expire (in fact, its quality improves the longer it is held). Assuming all goes according to plan and fertiliser is applied as specified, the result can be a 40-60% larger harvest than would otherwise be achieved.

Data from the Pinrang food security performance report illustrates the food security programme in the Pinrang Regency through green and blue economy activities (Dinas et al., 2018). Pinrang food security performance report is based on current achievements pursued by the following policies: (a) a rise in green economy and blue economy production, as evidenced by a broader range of food options; (b) the optimisation of green economic and blue economic activities with a high level of economic efficiency based on the competitive advantage of the Pinrang community; and (c) the fortification of institutions within each implementer of green economy and blue economy activities. The data on land availability (Samad et al., 2022) and investment potential in Pinrang provided by Bappelitbanda Pinrang Regency (Bappelitbanda et al., 2021), the region has the potential to house agricultural fisheries covering 17,143.23 ha, with yields from fisheries production in 2020 totalling 42,075.01 tonnes. There are 56,097.80 hectares (ha) dedicated to rice cultivation and 10,815 hectares (ha) dedicated to maize. In 2020, the world produced 638,983 metric tons of rice, but only 122,02 metric tons of maize were harvested. Meanwhile, the overall planted area is 41,177.65 ha, and the total output of Coconut Deep to sugar palm products is 19,070.47 metric tons.

A study by Raksun (2016) found that organic and non-organic fertilisers increased agricultural output, with the latter increasing by between 3 and 20%. Meanwhile, using organic fertilisers on the same plots of land will enhance output by 20-23%. Subsequent studies employing organic fertilisers created with nanotechnology in Japan found that the fertile land in Pinrang

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

Regency increased yields by 40-60% (Yomari International, 2021). Given the region's agricultural prospects and production, a maximum profit of IDR 4.911 trillion is possible from using nanotechnology-enhanced fertilisers in Pinrang Regency (Bappelitbanda et al., 2021). There was a 40 per cent increase in rice production, from an estimated 638,983 tonnes to 894,576 tonnes. According to both lines of research, there is a need to close a research gap to develop a green economy. This can be accomplished by restoring the land to settings that are optimal for the growth of plants and by helping farmers, who are a valuable human resource, achieve more tremendous financial success.

METHOD

In order to test the research hypothesis, the scientific method employs qualitative analyses. This study was conducted to evaluate the theory by looking into the ties between the two scenarios proposed by Jain (Jain, 2019). This notion explains the correlation between Japanese nano-organic fertilisers and increased food production in Pinrang Regency. In order to obtain data for hypothesis testing, researchers in this study ask participants questions or suggest subjects of conversation during one-on-one or small-group interviews with users. We then had them complete surveys and give further instructions. The researcher also took notes on relevant activities or behaviours by watching how individuals or small groups of respondents interacted with one another. Scientists can study phenomena naturally or conduct experiments in well-controlled settings. Here, depending on the sort of observation, the researcher is an active part of the events they are investigating. Qualitative research, which takes in any documents, media, and historical or modern data, also includes document analysis or library archive analysis. Diaries, stories, journals, and other forms of written and visual media are all examples of documents. The principles of the green economy can be seen at Figure 1.

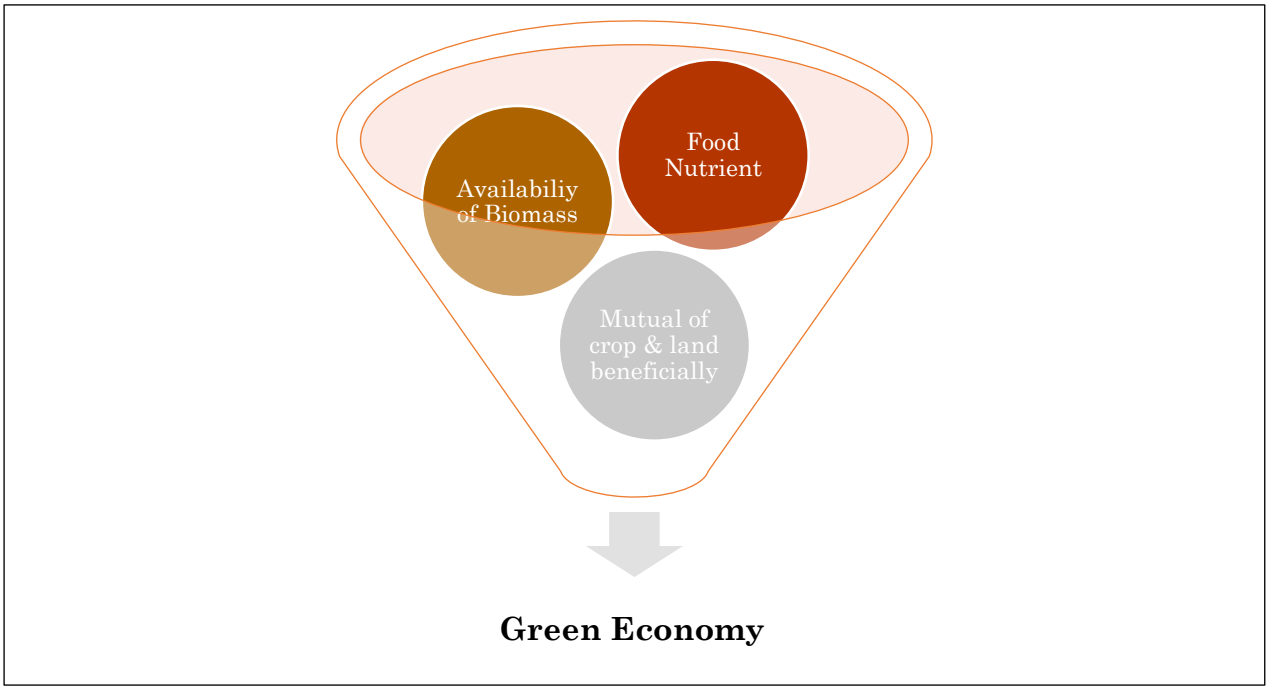

Figure 1. The principle of green economy

According to Figure 1, organic fertilisers restore soil fertility by giving plants the nutrients they require to thrive, fostering a green economy. More biomass is produced when the environment is favourable for plant growth, and biomass availability is required to raise the likelihood of natural recycling. The availability of biomass and the presence of food nutrients will benefit the farmer, the land beneficiary, and the crop all at once. Using the nexus integration approach to managing water, energy, and food availability, Purwanto (2021) demonstrated that policies that lead to knowledge and implementation gaps have connections between variables in water-energy-food (WEF) management

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

systems (D'Angelo et al., 2022). Food security in the WEF in the local context and the implications of local interventions through the policies pursued are planned in the management of the WEF sector via the development of a conceptual and quantitative framework and the use of system dynamics modelling with stakeholder involvement, as shown by an analysis using the nexus approach, which integrates cross-sectoral management and governance and a scale of agricultural development priorities (Yu & Khan, 2022). To better illustrate the challenges of integrating WEF into food security policy at the local level, this study used the Indonesian province of Karawang Regency as a case study (Purwanto, 2021).

RESULTS AND DISCUSSION

A preliminary study by Arafah (2011) found that using organic fertilisers increased profits by IDR 1,582,480 per hectare (23.19%) in their study of organic fertiliser use in Pinrang regency. Profit differences of IDR 580,600/ha, or 7.42%, were observed between treatments that utilised manure-type and straw-type organic fertilisers. Raksun (2016) confirmed that improving the soil using green granule organic fertiliser improved plant development and yield by influencing the soil's physical, chemical, and biological properties. Fertilising with the suitable types and amounts of green granules can boost output by 2.8 tons/ha, or 23%. According to the same research (Gama et al., 2016), using Beka-Pomi organic fertiliser increased rice production by 10% to 40%. Meanwhile, demonstration plots or demonstration plots of organic fertilisers combined with chemical fertilisers according to the treatment requirements have increased rice productivity by 18-36%, or 1 to 2.5 tonnes/ha (PPL et al., 2018).

Wells and Johnson (2020) classified the methods by which organic fertilisers and vegetable materials are employed to boost agricultural output into four main groups. We can now use organic fertiliser with confidence that our families and communities will not be negatively impacted by its production or application. Second, what safety measures are in place to reduce the impact of any storage-related issues?. The pressure on the population chain must be reduced to maintain both productivity and land fertility, but using organic fertilisers by the procedures for their usage, followed by the use of other fertilisers, and together as an additional complement to the organic fertiliser, may help do just that (Bumb & Baanante, 2020). Agricultural and environmental factors have contributed to soil degradation. To begin with, organic fertilisers restore soil fertility and increase crop yields and food production by providing plants with the nutrients they need to flourish. When conditions are optimal for plant growth, a greater quantity of biomass is produced, increasing the potential for recycling.

In addition to ensuring that plants have access to the organic nutrients they need to thrive and satisfy the fertility requirements of vegetables, the residue left over from plants using organic fertilisers will help to reduce soil erosion. Thirdly, it is feasible to boost crop output while generating mutually beneficial requirements for land and crops by applying organic fertilisers in places with high fertility potential (areas with high fertility, better soil, and favourable agroecological circumstances). The need to clear forests and convert the land for agricultural use would be mitigated if there were less pressure to cut down trees. Using only phosphate chemical fertilisers or other heavy materials, followed by organic fertilisers for annual periodic land maintenance, has been shown to increase and maintain the productivity of soils with a high level of acidity. Particularly in developing countries, fertilising has a great deal of untapped potential to boost food production. Last but not least, when combined with other additions, organic fertiliser can considerably impact soil capital preservation, climate change mitigation, environmental protection, and future food security.

Agriculture and food security policies like those mentioned above have become a major part of the determinant of prosperity in a developed country, as shown by the globalisation of the sustainability of food production and natural resources on the ground (Balkrishna et al., 2022). The value of international trade accounts for roughly two-thirds of the global economy statistics (Hung, 2023). In truth, the fast-moving supply chain management system is responsible for the freshness of the food served to us at the table (Abbas et al., 2023). All foods originate in agriculture, but a new dimension of food processing has evolved to alter traditional eating habits (Li, 2011). We eventually

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

get our hands on the finished goods after they have been processed in industry, packaged, and distributed to retailers (Pashkevich et al., 2022). In today's globalised world (Mitze & Makkonen, 2023)., it is common knowledge that dairy and meat products account for over half of the world's processed food supply (Balkrishna et al., 2022).

Bumb and Baanante (2020) stated that fertiliser producers in developed and underdeveloped nations have access to substantial reserves used to finance ongoing investments. This is essential information for those working on agricultural fertiliser plans. Disparities in fertiliser pricing have discouraged investment in recent years due to the expense of producing each type of fertiliser and the price of organic fertilisers. Companies in countries like China, India, and Pakistan form partnerships to ensure there will always be enough fertiliser (Arafah, 2011), both synthetic and organic, for their markets (Fu & Ng, 2020). Sub-Saharan Africa may not be attractive for investment in fertiliser production due to poor supporting infrastructure and physical land infrastructure (Shihab & Utomo, 2022), the impact of environmental changes and the instability of policies pursued. There are also problems for investors looking to expand their holdings. However, imports are used rather than investments to meet the demand for fertiliser in these regions (PPL et al., 2018). These imports highly depend on the global market (Mulyani et al., 2022). They are also affected by the availability of foreign exchange and their ability to fulfil the constraints by international trade factors (Bumb & Baanante, 2020).

In Morse (Morse & MacNamara, 2020), Adam Smith first used the term "modal" to characterise the factors that determine production in the 18th century. Working capital in agriculture is linked to investment programs in fertilisers (Bumb & Baanante, 2020). The production process is first examined, focusing on how much it costs to acquire each component to make the final product (PPL et al., 2018). It also looks at the costs incurred to transform into tangible inputs before production begins (Arafah, 2011). Bump and Baanante (2020) outline the manufacturing process as follow (see Figure 2).

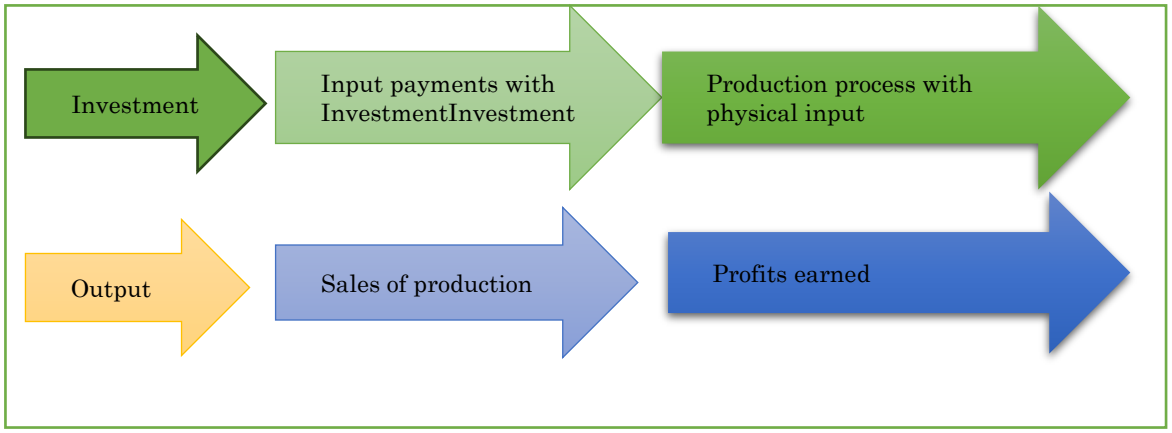

Figure 2. Investment input payments

Figure 2 illustrates that the economic model described above begins with the investment of capital, which is the foundation of the production process consisting of tangible physical objects such as land or natural resources (minerals, plantation products, and the like), followed by the input of payment and the production process with physical input. The production output goes to the market through sales and marketing, then earns a profit. The amount of labour, the costs required, and human-made capital such as machinery are needed.

The physical form of tangible objects like land (Yomari International, 2021) or natural resources (e.g., minerals, plantation products), the amount of labour, and the necessary capital that is produced by humans, like machines (Fu & Ng, 2020), are all considered capital in the aforementioned classical economic model (Yomari International, 2021). It is assumed in this classical economic model that capital is a physical object or service that is employed in the production process to generate final products (Staley, 2017). However, the conventional economic

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

model (Balkrishna et al., 2022) fails to consider educating workers on maximising the value of their labour while minimising the resources they need (Bumb & Baanante, 2020).

Pinrang Regency's agricultural potential includes 17,143.23 hectares of pond fisheries, rice and corn agricultural land (Syakirotin et al., 2022) and plantation land (Bappelitbanda et al., 2021). In 2020, the region produced 42,075.01 tons of fish. 56,097.80 hectares (ha) and 10,815 hectares (ha) are dedicated to growing rice for agricultural reasons. Rice production was 638,983 tons in 2015, whereas corn production was 122.02 tons (Raksun, 2016). From the Coconut Inland to Aren, the plantation land spans a total of 41,177.65 hectares, and its productivity yields vary from 19,070.47 tons (Bappelitbanda et al., 2021). Constant irrigation assistance is offered (Suprida et al., 2022), and with correct maintenance, a 40% increase in output is achievable (Yomari International, 2021).

An experimental dose of organic fertiliser created from nanotechnology was administered to a paddy field of roughly 25 acres as part of the aforementioned novel treatment (Morse & MacNamara, 2020). Fertilisation is performed thrice, as prescribed by the dosage (Wells & Johnson, 2020). Fertilisation's effects are visible in the yields (Morse & MacNamara, 2020), which were calculated by dividing the total weight of 11.5 bags by three. The first four sacks weighed 120 Kg, the following four weighed 117 Kg, and the final three weighed 115 Kg. The total sack total was 11.5. In this treatment, yields are higher in terms of kilograms per bag (Suprida et al., 2022) than they were in the previous harvest (Morse & MacNamara, 2020), but the total number of sacks produced drops from 12 (the previous yield) to 11.5 (Irwan et al., 2022). In contrast to the organic fertiliser production study, this is the norm. The present harvest is smaller because the treatment was only given three times instead of five.

The second study developed rice fields by fertilising previously unused land (Morse & MacNamara, 2020). This was accomplished by applying a complete fertiliser to the soil five times (Wells & Johnson, 2020). The yields of the second experiment were significantly higher than the first despite the treatment area being significantly less (less than 20 acres). Previously, the paddy field only generated three sacks in a season, but that number has been boosted to 8 this season. There was a 250% increase in output from the previous season because of the usage of Japanese nano-organic fertiliser (Morse & MacNamara, 2020; Yomari International, 2021). The current economic paradigm (Irwan et al., 2022) is undergoing rapid evolution in its development. The conceptualisation of the elements (Luneto & Kaslam, 2022) influencing production transforms a more intelligent and sophisticated perspective.

In a study conducted by Kaihara et al. (2021), it explores the concept of intelligent vision within the context of a smart society and its impact on economic and social systems. Smart describes economic factors and novel economic characteristics that influence social systems (Halim et al., 2022). The term 'smart' used to describe the present advancements in information technology lacks a solid foundation, and the exploration of the consequences of intelligent production in the realms of systems science and engineering within the economic and social domains is still in its nascent stages (Samad et al., 2022). Hence, using a systems approach within the economic framework entails the strategic development, organisation, and management of a "smart platform" as a foundational infrastructure encompassing many economic and social elements (Kaihara et al., 2021). This method aims to optimise the utilisation of production components, ultimately establishing an integrated economic and social system (Gama et al., 2016).

The proposed methodology entails conceptualising the intelligent platform as a network encompassing several stakeholders and supply chain elements (Arafah, 2011). This paper examines four conceptual frameworks about "intelligence" concerning the platform's design, planning, and operation (Kaihara et al., 2021). These frameworks are analysed from the perspective of system optimisation. This paper introduces, first, the utilisation of an intelligent platform's "market mechanism" to effectively manage supply and demand imbalances in the economic domain (Dirgahayu et al., 2022). The intelligent platform enables autonomous and decentralised decision-making within artificial intelligence systems (Azmi et al., 2022). Second, the paper discusses enhancing design, planning, and operation flexibility in innovative platforms by adjusting "flexibility variables" within decentralised decision-making control (Jain, 2019).

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

Furthermore, the paper explores the incorporation of policymaking mechanisms within economic business analysis of food security investment program in Pinrang Regency, 2022) and social systems of intelligent platforms, utilising "policy variables" to address the deficiencies in market mechanisms that may result in the absence of particular economic value and social effects (Azmi et al., 2022; Samad et al., 2022) and Lastly, fourth, the paper proposes the utilization of "complementary elements" in innovative platforms, involving stakeholders and supply chain factors, to increase the level of temporal or partial adjustments. These adjustments are made under the control of decentralised decision-making systems (Kaihara et al., 2021).

Investment programs play a significant role in fostering social and economic development, hence contributing to establishing an intelligent economic system. The study conducted by Samad et al. (2022) examines investment opportunities in organic fertiliser, warehouse receipt systems, and rice milling. The research explores the economic viability of these projects, which are structured within an intelligent platform. The authors use a financial analysis approach to analyse the potential benefits, challenges, and obstacles associated with each Investment. The findings indicate that the organic fertiliser investment, warehouse receipt system, and rice milling investment projects are financially feasible. This conclusion is supported by positive net present value, internal rate of return, return on investment (ROI) investment, profitability index, and declared profitability.

Regarding investment projects within the economic and social framework, Cen and Bartle (2022) suggested to use a "reward-based model" for fundraising purposes. This model allows individuals to contribute to public project financing, providing an opportunity for investment without expecting financial returns. Within the "reward-based model" investment concept framework, individuals who provide funding are granted non-monetary incentives, typically in the form of rewards, to acknowledge their contributions. Furthermore, investment projects can be executed using a novel framework that emerges when these initiatives yield a consistent and continuous flow of future income. This particular model has been commonly called "The investment loan model," resembling a financial arrangement akin to a bank loan for an investment project.

In this model, the funder is entitled to a predetermined return on their investment profit. One illustration of this category of investment endeavour is evident in the use of community bonds at the Centre for Social Innovation in Canada. The centre functions by issuing bonds secured by mortgages on the properties it acquires or has. These bonds are utilised to finance investment projects with a not-for-profit objective. The investors who contribute funding for these projects hold a legal entitlement to assert their rights on the mortgages, which is an obligation for the centre to deliver a return on their investment. An additional investment option is the "pure investor model," when the investor assumes the role of a funder and obtains rights or equity in the project. The investor then receives returns subject to variability, such as dividend distributions based on the shares held.

Contemporary international securities and exchange institutions have introduced a novel approach to financing investment projects, whereby crowdsourcing platforms are utilised with securities brokers. This integration of platforms facilitates a streamlined investment model, hence enhancing accessibility and convenience for potential investors. Specific crowdfunding platforms offer comprehensive and transparent data, facilitating potential investors and lenders in making well-informed investment choices regarding the project at hand. This information provision mitigates the danger of financial loss while also motivating individuals to explore and expand their investment prospects. Quirk et al. (2020) stated that statistical criteria are used to determine whether or not a study hypothesis should be accepted or rejected. This is a key argument showing how the research being done is relevant to policymaking at the government level (Green, 2020), based on pragmatic scientific conclusions and future opportunities as an epistemic autonomy. This study is part of a scientific investigation into the electric vehicle inner workings.

Finding out if your hypothesis backs up your assumptions is the most crucial part of scientific study (Quirk et al., 2020). This is why the scientific method was used to compare the two experiments. If the treatment works (Quirk et al., 2020), then using organic fertiliser is consistent with the hypothesis statement (Jain, 2019). Researchers hypothesized that using organic fertiliser would increase yields by 40%, from 638,983 tons to 894,576 tons (Yomari International, 2021). This

ISSN 2302-2663 (online)
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is how hypotheses are tested (Jain, 2019). The total amount of Rupiahs earned by farmers over three harvests. 4.272 quadrillion, if you are selling them for Rp. the rate of five thousand dollars per ton of kilograms (Quirk et al., 2020)

Application of organic fertiliser is anticipated to increase output by 40%, from 638,983 tons to 894,576 tons (Quirk et al., 2020), based on testing of two treatments for paddies fields (Jain, 2019): a complete fertiliser application and an incomplete fertiliser application. For the experiment before and after different treatments (Quirk et al., 2020), the socialisation of how to treat using organic fertiliser (Greece) is acceptable provided that the number of samples tested is limited for each two experiments. If the price of IDR 5,000 per Kg calculated in tonnes yields farmers' profits of up to IDR 4.272 trillion in three harvests, then the experiment is acceptable. This discussion aimed to ascertain whether or not the farmer would be prepared to utilise organic fertiliser at a cost per hectare (Bumb & Baanante, 2020). Yomari International found that those mentioned nanotechnology-based organic fertiliser producers' per-hectare production costs were only IDR 3,070,000 (or 10%), higher than the average of all other fertiliser brands (Yomari International, 2021). However, the farmers will pay IDR 900,000 for the organic fertiliser if the money is collected after harvest. The price paid is proportional to the yield (Arafah, 2011).

Several groups of farmers expressed interest in adopting the organic fertilisers (Green, 2020) that were applied before the demonstration plots of the experiment were completed (Quirk et al., 2020). That is why the next planting season's demonstration plots must encompass more than 30 farmers and an area bigger than 3 hectares (Quirk et al., 2021). It is believed that more experiments are needed before the food security investment program (Morse & MacNamara, 2020) can be fully implemented in Pinrang Regency. This is so that yields can be evaluated over a larger area and that locals can be assured that they will accept and use the organic fertiliser (Fu & Ng, 2020). The regional Government of Pinrang regency welcomed the Pinrang food security investment program as an effort to develop the agricultural industrial area as an investment design of development (Fu & Ng, 2020) to improve the welfare of the local population, as described by Bumb and Baanante (2020); Fu and Ng (2020). The plan cannot be implemented without backing local governments' water, energy, and food management policies (Purwanto, 2021).

The study's goals (Jain, 2019) are that the third experiment on using organic fertilisers must be carried out during the upcoming planting season to increase agricultural output and account for production discrepancies from the previous period (PPL et al., 2018). Second, the receipt warehouse system allows farmers to prepare for potential price fluctuations after the harvest (Fu & Ng, 2020), cushioning the blow of price declines (Balkrishna et al., 2022) that would otherwise deplete their income and leave them in an untenable position during the planting season (Bappelitbanda et al., 2021). Investment strategy design (Dinas et al., 2018) necessitates an optimum logistics system (Fu & Ng, 2020) to transmit rising production to consumers. However, following agricultural projections in Pinrang Regency (Bappelitbanda et al., 2021), more research is needed to provide value-added agricultural seeds, agricultural systems, and logistics systems to ensure the quality of the products produced is maintained (Quirk et al., 2020). Developing a broader area is necessary to fully appreciate the benefit of the Investment in increasing agricultural productivity in Pinrang (Fu & Ng, 2020).

An integrated warehouse infrastructure is required for transportation, loading onto ships, and storage (Fu & Ng, 2020), as shown by data analysis of the rise in rice output (Dinas et al., 2018), which climbed from 638,983 tons to 894,576 tons (Arafah, 2011). There is undeniably a need for an excellent logistics system to transfer increased output to different places and even for export (Hossain et al., 2021). Therefore, the additional production materials will not disrupt or burden the economy (Staley, 2017), ultimately reducing selling prices due to investments in warehouses connected to container ports (Morse & MacNamara, 2020). An educational institution (Green, 2020) that can ensure that its graduates can do so is necessary for the Pinrang agricultural program to become Indonesia's most significant agricultural production (Fu & Ng, 2020; Hossain et al., 2021). Therefore, expanding the Pinrang area is necessary to fully realise the aforementioned massive investment or enhanced productivity outlined above (Fu & Ng, 2020).

ISSN 2302-2663 (online)
DOI: doi.org/10.21009/JPEB.011.2.1

As public awareness of food security increases, it is expected that agricultural development through the Pinrang food security program (Gama et al., 2016) and discussion on food security (Bappelitbanda et al., 2021) would increase agricultural production by 40% in the following years. The Pinrang people's literature explains the importance of increasing rice production with specific organic fertilisers (Gama et al., 2016) in order to close or minimise the gap in rice production through the introduction of product varieties (Bappelitbanda et al., 2021). This food security investment initiative intends to use improved seeds and organic fertilisers to increase yields (Bumb & Baanante, 2020). Increased food production is possible by adopting improved seed varieties, which offer fewer wasted seeds, better germination rates, and more efficient fertiliser use. Maintaining a weed-free environment will help the plants resist pests and illnesses and lessen the pressure you feel to micromanage their early development. By incorporating these factors and using fertiliser effectively, agricultural yields can be increased by 20–23% (Raksun, 2016).

One factor in the success of rice crops is how well they are managed with production inputs. Production can reach its full potential when the best inputs are used, increasing output and farm profitability. Farmers typically have a good sense of the optimal usage rate for agricultural inputs like organic fertiliser. However, not all farmers administer the proper dosage because of gaps in understanding. Raksun (2016) showed that farmers grow rice anywhere from 0.5 to 1.0 hectare (on average 0.75 ha per farmer). Seed types widely available from their field, those from the area government, or have been routinely used for several years are all examples of these variants. More than 60% of the rice seeds used by the community are sourced from the informal economy as surplus grain from the previous season's crop. In addition, no farmer uses purely organic fertilisers while establishing rice fields; instead, they always use a combination of both fertilisers. Most people think it is best to avoid using fertiliser in large quantities.

CONCLUSIONS AND SUGGESTION

The results of the experiment tests conducted before and after the experiment treatment were given to rice plants with complete fertiliser application, and rice plants with incomplete fertiliser application support the organic fertiliser application hypothesis, which forecasts a 40% increase in production. This prediction is supported by the experiment results supporting the organic fertiliser application hypothesis. It is permissible for an increase in the price of paddy in each kg computed in tonnes because this could benefit farmers throughout three harvests. The only samples that should be analysed are those taken before and after treatment. The total number of samples that can be examined for just two of these sites is capped at a certain number due to a restriction. It is believed that more experimental demonstration plots are needed to implement the food security investment program in Pinrang Regency fully; however, investors must immediately take the initiative to follow up on the investment program after seeing yields in a larger area and ensuring that the community is willing and ready to use the organic fertiliser in the upcoming season.

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