Oil Palm Management For The Production Of Superior Quality Seeds And Increasing The Yield Of Fresh Fruit Bunches (FFB) With Islamic Economic Approach: A Case Study AT The Marihat Pematang Siantar OIL PALM Research Center

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Abstract. This study is an indepth analysis of oil palm management with a focus on the production of superior quality seeds and increasing the production of fresh fruit bunches (FFB) by applying a sharia economic approach. The case investigated was the marihat pematang siantar oil palm research center. Selection of seeds that comply with sharian principles has become the main concern in this research. This includes aspects of seed quality, transparency and palm oil entrepreneurs. In addition, this study also explores sustainable resource use in the context of oil palm plantations. This includes selecting oil palm varieties that are resistant to pests and diseases as well as using fertilizers to maintain environmental sustainability. Financial arrangements in accordance with sharia law are another focus in this study. Best practices to increase FFB production yields have also been indentified with an emphasis on quality maintenance, sustainable technology and worker training. The results of this study provide important insights into how palm oil industry can be run by considering sharia economic values, creating economic and environmental sustainability and prioritizing aspects of justice and transparency in all aspects of its management.

Keywords: Palm Oil, Fresh Fruit Bunch (FFB), Seedlings, Superiority, Sharia Economic Approach

INTRODUCTION

Palm oil is one of the agricultural commodities that has an important role in the global economy. Palm oil production not only contributes significant income to farmers and industry, but also has a major environmental and social impact. Therefore, sustainable palm oil management is a must. The oil palm research center is an institution that focuses on conducting research related to oil palm. The palm oil industry is one of the most important plantation industries in Indonesia and the world. Palm oil is a major source of vegetable oil used for in various products such as edible oil, cosmetics and biodiesel fuel. Plantation commodities in Indonesia, especially palm oil, are one of the largest foreign exchange contributors in the agricultural sector. Palm head in Indonesia is considered a major commodity that continues to grow along with the increasing demand for palm oil. This activity is not only carried out by large state-owned and private plantations, but also community plantations that are now starting to develop in various provinces outside Sumatra, such as...
Aceh, West Sumatra, South Sumatra, Jambi, Bengkulu, Riau as well as on the island of Kalimantan and several regions on the island of Java. According to Mangoensoekarjo and Semangun (2008) global demand for palm oil is expected to continue to increase along with world population growth. The increasing expansion of certain oil palm plantations has an impact on the need for quality seeds. In 2009 the demand for seedlings reached 5 million, and it is projected that this demand will continue to increase to reach 110 million seedlings in 2020. Unfortunately, the production capacity of quality seeds and sprouts is still very limited to only around 2 million seeds per year. Therefore, careful planning is needed to overcome this challenge (Anonymous, 2009).

To meet the growing demand, it is important to have superior quality oil palm seeds and increase the yield of Tandah Buah Segar (FFB). The Marihat Pematang Siantar Center for Palm Oil Research (PPKS), as a leading research institution in the industry, has an important role to play in developing methods and best practices for sustainable and productive palm oil management. PPKS Marihat focuses more on research and development in the palm oil industry. This case study will discuss how oil palm management with an Islamic economic approach can improve the quality of seeds, FFB production and social aspects in the context of the Marihat pematang siantar oil palm research center. This research aims to identify best practices that can be applied in the palm oil industry to achieve this goal. In this context, it is important to understand how the selection of seeds in accordance with Islamic principles can affect the productivity of oil palm. Sustainable use of resources will also be a concern, including how waste management and fertilizer use can be integrated with Islamic economic principles. The study hopes to provide valuable insights into the potential applications of Islamic economics in the palm oil industry as well as provide a more holistic view of how economic, environmental and social sustainability can be achieved in this context.

RESEARCH METHODS

The research activity was carried out at the oil palm research center located in Marihat, Pematang Siantar, North Sumatra for one month starting on January 16, 2023 until February 16, 2023. Information data collection is carried out by direct and indirect methods. Primary data were obtained through field observations, oil palm seed measurement methods and interviews with staff in charge. Secondary data are obtained through observation from company data and case studies. The results of primary and secondary data activities are presented descriptively.
RESULTS AND DISCUSSION

1. General Conditions of the Garden

The Marihat Palm Oil Research Centre (PPKS) is located in Marihat, Pematang Siantar, Simalungun Regency, North Sumatra Province with a network of 135 km to the south of Medan. This complex is in the concession of PTP Nusantara IV, Marihat has a land height of about 39 meters above sea level, average rainfall of about 3,331 mm per year with an average of 184 rainy days per year and temperatures ranging from 20 degrees C to 33 degrees C. The type of soil there is podzolic soil with an average pH ranging from 5.0 to 6.0. Based on the land suitability classification, Marihat PPKS plantation is included in class S1. PPKS Marihat has a production garden in collaboration with PTPN IV. Garden area Their seed production is 137.28 ha, consisting of 110.27 ha for the female mother tree and 27.01 ha for the male parent tree. Marihat seed production garden locations include Bah Jambi, Balimbingan, Benoa and Dalu Dalu. The planting years for plants used as seed bunch production trees are planting years 1983, 1987 and 2000.

1. Oil palm nursery

The propagation of oil palm involves the initial stage in the cultivation cycle of oil palms. This process encompasses the creation and maintenance of oil palm seedlings intended for plantation. Proper oil palm propagation is a crucial step in ensuring sustainable and productive oil palm cultivation. High-quality seedlings serve as a strong foundation for robust oil palm growth and yielding fresh fruit bunches (FFB) and oil. Utilizing high-quality seedlings significantly guarantees larger production of fresh fruit bunches (FFB) and oil compared to using ordinary or subpar seedlings. Seed quality significantly impacts the yield and quality of fruit bunches, making the use of high-quality seeds an essential requirement in oil palm cultivation. To identify the potential of oil palm seed source plantations, supervision activities are conducted. The objectives of supervising oil palm seed source plantations are: Firstly, evaluating the sustainability of the parent plantation and dura and pisifera parent trees, considering plantation conditions, plant health, population size, genetic purity, and other aspects. Secondly, assessing seed production to determine potential oil palm seed production capacity. Thirdly, evaluating the sustainability of seed sources in terms of management units and compliance with required seed management standards. Technical errors during the propagation process can cause abnormalities in oil palm plants, aside from genetic factors. Here are some abnormalities that occur in seedlings due to: Firstly, Seedlings twisted due to planting with the radicle facing upwards. Secondly, Exposed root of
seedlings due to excessively shallow planting. Thirdly, Yelllowing seedlings due to excessive moisture content in the planting medium. Fourthly, Rotten (dead) seedlings due to waterlogging. Therefore, it's crucial to undertake the following actions during the propagation stage, such as correctly sorting seeds, planning seed planting, arranging polybag positions according to seed codes, marking each plot, recording each planted seed with supervision upon completion of planting. Lastly, ensure that the seedlings remain in a shaded and moist location during propagation.

2. **Soil selection**

PPKS has produced superior palm oil plant material that meets international standards in accordance with the quality management system (ISO 900: 2008) so that it is guaranteed. This superior planting material includes sprouts, clone seeds, and commercial oil palm seedlings that have been selected and tested in plant breeding programs for many years.

3. **Selection of oil palm seeds**

There are various varieties and types of oil palm seeds available today. All available seedlings have specifications that are considered excellent by their manufacturers. These varieties include oil palms with varying midrib height to the ability to bear fruit quickly. However, the selection of seedlings must be adjusted to the region where the seedlings will be planted. Seeds that are considered good by producers will not always grow and develop properly if they do not get proper care from the seedling stage to fertilization. The price of palm head seeds offered does vary. Usually, the seeds sold are already equipped with a certificate and have germinated. This price can be influenced by various factors, including the quality of the seedling, the variety, the age of the seedling, as well as the origin and reputation of the producer or seller of the seed. Selecting seeds that fit your needs and budget is an important step in running a successful oil palm plantation. After the planting medium is ready, the purchased oil palm seeds can be planted by inserting them into the planting media, with a depth of about 1 cm. It is important to pay attention so that the position of the shoots of oil palm seedlings is not reversed because if it is reversed, it is very likely that the seedlings will not grow or even die. After the seedlings are planted in the growing medium, it is important to carry out watering every afternoon, especially during hot weather. In case of inundation. Water around the seedlings, it is recommended to loosen the soil so that water can seep into the soil and not cause rotting and death of oil palm seedlings. The selection of swit oil seeds PPKS Marihat is an important step in the oil palm plantation.
process. To choose seeds that come from trusted sources and have a good track record in oil palm production. Also, pay attention to the following factors:

- **Seedling quality**
  Choose seedlings that are healthy, free from disease and have good growth. Quality seedlings will give better results in the future.

- **Seed code**
  Make sure the seeds have a clear seed code and comply with applicable standards. This helps in proper tracking and identification of seedlings.

- **Seedling age**
  Consider the age of seedlings that are appropriate to the soil and climate conditions at the plantation site. Too young or too old seedlings may not be optimal for growth.

- **Water availability**
  Make sure the seedlings have been given enough water before planting so that the condition remains moist and fresh.

- **Environmental factors**
  Adjust the selection of seedlings to environmental factors on site including soil type and climate.

PPKS is an institution engaged in research and development of superior quality oil palm seeds. In addition, PPKS also distributes oil palm seeds with superior quality to consumers, both individuals and business entities. To prevent the circulation of oil palm seeds originated, PPKS developed a mechanism for distributing superior oil palm seeds with a franchise system. The franchise system is stated in the agreement as regulated in PP Number 42 of 2007 concerning Franchising. In the franchise agreement, there are parties, namely the franchisor and the franchisee, the agreement is made by agreement of both parties. PPKS as a franchisee must maintain the reputation and quality of superior oil palm seeds by supervising franchise recipients. To maintain the trust of the public and consumers, PPKS provides protection and guarantees to its consumers to always get superior oil palm seeds produced by PPKS as regulated in Law Number 8 of 1991 concerning consumer protection.

2 **Temperature and Water**

Oil palm seedlings are very vulnerable to death due to direct exposure to sunlight for a long time. Therefore, oil palm seedlings should be placed under shade protection with temperatures not exceeding 35 degrees C. Generally, PPKS uses paranets as protection for these oil palm seedlings. Water is a crucial component to maintain soil sustainability and provide the necessary water supply for oil palm seedlings. However, you should avoid stagnant water around oil palm seedlings because it can cause rotting of palm seeds and result in the death of the seedlings. The recommended watering should be done in the afternoon,
especially when the weather tends to be hot during the day. Each seedling requires about 0.1 liters of water per day.

3 Nursery Application

Seeds that have been planted and given water every day will develop over time. The growth of seedlings begins on the second day after planting in the growing medium. *Figure 2* illustrates the condition of oil palm seedlings that are 4 weeks old after planting. By that time, the seedlings have produced from 2 to 3 young leaves. From the moment the seedlings are first planted, it is recommended to carry out watering every afternoon, unless there is already rain. Make sure that the soil remains moist and does not experience drought.

![Figure 2 seedlings 4 weeks](image)

In figure 2 also shows the use of paranets with a density level of 75% as protection. This paranet serves to prevent direct sunlight from hitting oil palm seedlings. Exposure to direct sunlight can make oil palm seedlings vulnerable to drought and overheating. When the seedlings reach the age of 8 weeks, as seen in *Figure 3*, the height of the seedlings has reached about 15 cm or even more. At this point, the seedlings should have at least 5 leaves. It is highly recommended to immediately fertilize seedlings aged 8 weeks. The goal is to ensure that the seedlings of these seedlings get enough nutrients. The best fertilization can be done using organic fertilizer from animal manure, but NPK fertilizer can also be applied with a dose of about 5 to 10 per seedling which is then placed around the periphery of the polybag.

![Figure 3. Seedlings 8 weeks old](image)
The leaves of oil palm seedlings that are about 12 weeks or 3 months old have a length that ranges from 15 to 25 cm (figure 4). Up to this age, only watering and fertilizing are required at intervals once every 2 weeks.

After reaching the age of 16 weeks or 4 months, oil palm seedlings usually have a height of about 30 cm with an average number of leaves between 6 to 10 pieces. Control of watering and fertilizing will continue until the seedlings are ready for planting, which usually happens at least after 12 months. According to Prasetyo et al (2018), fertilizer has an important role in increasing the growth of oil palm. On the other hand, Sukmawan et al (2019 and 2020) and Tampubolon et al (2019) stated that watering is also a key factor in the growth of oil palm seedlings. If there is a pest attack on oil palm seedlings, the action that needs to be taken is to spray pesticide liquid to control the pest. One of the pests that often attacks oil palm seedlings, especially those under 3 weeks old is ants. Ants that like to eat the contents of palm heads can inhibit the growth of seedlings. Therefore, it is necessary to pay attention to this issue when conducting oil palm seedlings.
4 Increase Palm Oil Production

To increase oil palm production, the main step needed is to fertilize regularly according to Natalia et al 201, Herdiansyah et al, 2018, Hidayat et al 2020. Generally, fertilization is carried out twice a year especially at the beginning of the rainy season, around September to October. The choice of fertilizer type is very dependent on the location of the oil palm plantation and the problems faced as mentioned by Ole Juliansyah 2018. Some types of fertilizers commonly used include NPK fertilizer and Urea fertilizer. Looking at the condition of people's plantations, there are several problems that cause a decrease in oil palm production, namely untreated palm trees, insufficient fertilization and the use of local seeds. In terms of increasing FFB yields, best practices include quality maintenance, the use of sustainable technologies such as efficient irrigation and training on best practices in plantation management. With the Islamic economic approach, it ensures that the economic benefits resulting from this increase are distributed fairly and in accordance with the principles of Islamic economic justice.

Islamic economic principles on oil palm management for the production of superior quality seeds and increasing FFB production

Islam regulates all aspects of human life including the economy, with the aim of bringing about justice and the fair distribution of wealth in society and at the individual level. The welfare of society depends on the economic system adopted and the distribution of income is closely related to the moral concept of the economy and the methods used by individuals and the State in determining the sources and means of income distribution. In Islamic macroeconomics, distribution is a key element in the effort to create prosperity for all its people. Islam encourages individuals to carry out economic activities with high morality, avoid selfishness and closeness and prevent inequality between those with excessive wealth and those who are lacking. Any economic action aimed at improving personal well-being must be carried out with due regard for the interests of others and society as a whole. The main principle in distribution is justice and honesty because every deed will be held accountable in the hereafter. Distribution aims to provide mutual benefits and benefits without any party being harmed. Imbalances in the distribution of wealth can trigger individual and social conflicts.

- Distribution channels

Distribution channels are systems that play a role in flowing products or services from producers to consumers. In this context, distribution channels include various distribution agencies or dealers who are responsible for delivering products or services to the market. It also involves groups of traders and corporate agents combining physical and brand
elements in the process with the aim of creating added value for specific market segments. According to Warren J. Keagan, distribution channels are channels used by producers to channel these goods from producers to consumers or industrial users. According to Assauri, distribution channels are institutions that market products in the form of goods or services from producers to consumers.

a. Verses and hadiths on distribution

In the Qur’an there is QS. Al Hashr verse 7 which means whatever loot (fa’i) Allah gives to his Messenger (from property) that comes from the inhabitants of the city is for Allah, for the Apostle, relatives, children and people who are on the way so that the treasure does not circulate among the rich among you. What the apostle gives you, accept it, and what is forbidden to you, then leave behind indeed God is very strict in law.

b. Hadith

"Sa’id bin al Musayyab narrated from Ma’mar that the Prophet Muhammad (PBUH) said that no one withholds goods except the wrongdoer. Sa’id himself once withheld oil (reported in Ahmad, Muslim, and Abu Dawud hadith collections). Islamic economic principles towards the management of palm oil considering various aspects are as follows: Firstly, Prohibition of Usury (Interest): Avoiding financing with interest in the development of palm oil plantations. Financing can be sought through Sharia-compliant mechanisms such as Mudarabah or Musharakah, which do not involve interest. Secondly, Justice and Equality: Ensuring fair opportunities for employees and shareholders in the palm oil industry. Profit distribution must be fair and balanced. Thirdly, Prohibition of Speculation and Uncertainty: Avoiding high-risk or ambiguous contracts (gharar) in palm oil transactions. Contracts should be transparent and avoid excessive speculation. Fourthly, Community Empowerment: Involving local communities in the management of palm oil and ensuring fair economic benefits for them, in line with Islamic principles. Fifthly, Social Welfare: Prioritizing social welfare, including giving Zakat and aid to those in need from the proceeds of palm oil production. Sixthly, Quality of Seedlings and Production: Ensuring good quality seedlings for palm oil plantations, avoiding forgery or questionable practices in seedling sales, and maximizing production in accordance with Sharia principles. By applying these Sharia economic principles in the management of palm oil, it is hoped that this industry can become more sustainable, fair, and aligned with Sharia values. This will benefit both the economic and social aspects. The effectiveness of the distribution channels of Marihat Palm Oil Research Center found that the average score of distribution channel effectiveness at the Marihat Palm Oil Research Center meets the criteria.” which is effective. This shows that PPKS Marihat is able to distribute well according to the target.

CONCLUSION

From the previous discussion, the author can draw several conclusions, namely:

To produce superior quality seeds and increase the production of the first fruit bunch by selecting the mother tree, choose oil palm trees that have superior properties such as high productivity, disease resistance and good growth. Second, seed garden care by managing seed gardens well such as soil maintenance, selection of oil palm seeds with healthy seeds, free from disease and have the desired characteristics. Third, pest and disease control by
implementing effective pest and disease control including regular monitoring and preventive measures. Fourth, manage oil palm production land well by fertilizing it in accordance and finally with oil palm management following the principles of Islamic economic principles. Research shows that PPKS Marihat is very good at distributing or distributing superior quality oil palm seeds both to consumers and other business entities.

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