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POLICY BRIEF

Oil Palm Plantation Intercropping Strategies for Enhanced Land Use Efficiency, Local Community Participation, and Improved Smallholder Livelihoods: Lessons from Bengkulu and South Kalimantan

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Maja Slingerland, Suria Tarigan, Ika Sumantri, Nahrowi, Sudradjat, Hariyadi, Aritta Suwarno, Joko Purnomo, Lotte Woittiez, Rosa de Vos, Jusrian Yanda

Key Issues

1. **Land use efficiency.** Oil palm plantation spacing is quite wide, namely 9 m x 9 m. Intercropping oil palm plantation with food and crops can be optimized when the plants are 1-4 years old, because the land covered by the oil palm canopy in that period is only about 20%.
2. **Farmer Empowerment and Livelihood Improvement.** Intercropping enables farmers, particularly landless farmers, to fill in income gap till first oil palm harvest.
3. **Social, Economic, and Environmental Sustainability.** Intercropping generates additional income and reduces the need to clear other land thereby preserving biodiversity and GHG emissions. It can also reduce oil palm weeding costs and erosion, as well as increase soil fertility and biodiversity needed to host pollinators and natural enemies of pests.
4. **Intercropping Typology.** There are differences in preferences, adoption and challenges between Large Private Plantations (LPPS) and Smallholder Plantations (SHS) in the implementation of oil palm plantation intercropping.

Summary

Oil palm plantations in Indonesia are a crucial sector for local economic growth, particularly in regions like Bengkulu and South Kalimantan. However, the initial unproductive years of oil palm trees leave large portions of land underutilized. To address this, an intercropping system—growing other food or feed crops between the rows of young palms—has been proposed. This approach aims to improve land-use efficiency, provide additional income to small-scale farmers, and reduce environmental impacts by decreasing the need for new land clearing. The program aligns with several Sustainable Development Goals, such as no more hunger, poverty reduction, life on land and climate action, while supporting sustainable economic growth in rural communities. Intercropping in oil palm plantations, however, faces multiple challenges, including limited capital access for smallholders, market access for harvested crops, increased labor demand and the need for training in intercrop farming. Large private plantations may additionally resist intercropping due to concerns about competition for soil nutrients and interferences with plantation management operations. Solutions include connecting smallholders and larger private plantations to investors, input suppliers, technical guidance and off takers, through partnerships between government, NGOs, private sector and knowledge institutes. Government policies to promote intercropping through incentives, enhancing infrastructure, clear guidelines, and market access support could significantly enhance sustainability and the livelihood of smallholder farmers.

Introduction

Oil palm plantations in Indonesia, particularly those learned from practical experience in Bengkulu Province and South Kalimantan Province, are undeniably an important sector for the local economy. Its ability to grow the economy and create jobs has made the oil palm plantation sector a mainstay of the national agricultural economy. However, the early growth period of unproductive oil palm plants often results in the underutilization of a significant amount of oil palm land. One solution to overcome this is to implement an intercropping system that utilizes the space between palm rows to grow food and feed crops and contributes to national food supply. This intercropping not only aims to improve land use efficiency but also focuses on improving the participation of local communities and the livelihoods of small-scale oil palm farmers who depend largely on oil palm plantations for their livelihoods.

Enhancing land efficiency also aims to lessen the severity of plantations' negative environmental impacts by offering prospects for increasing economic outputs of the same oil palm area, thereby slowing down the growth of oil palm plantations beyond Other Designated Areas (APL) and preserving local ecosystems. Therefore, the intercropping program aligns with the Sustainable Development Goals #01 (no poverty), #2 (no more hunger), #13 (climate action), #15 (life on land), #16 (peace, justice, and strong institutions), and #17 (partnerships for the goals). The SUSTAINPALM program prioritizes economic, social, and environmental balance. This premise led to the development of an intercropping strategy to achieve sustainable development in smallholder oil palm plantations.

Common types of intercropping include:
a) Horticulture crops, such as bananas, papayas, melons, and water melons, b) Food and feed crops, such as maize, dryland rice, ground nuts, mung beans, soybeans and jack beans.

The application of intercropping in oil palm plantations must be done correctly and carefully so as not to interfere with the growth of oil palm plants. The selection of intercrops must also consider to market demand, input requirements, labor availability, farmer knowledge, land location, soil quality, and water availability. There are two intercropping models, namely a) farmers conduct intercropping on their own land; and b) farmers invite other parties to conduct intercropping.

Problems and Challenges

The problems and challenges in the adoption and implementation of intercropping differ according to the typology of planters, namely a) smallholder plantations (SH) and b) large private plantations (LPP).

a) Smallholder Plantations

Challenges in the application of intercrops in Indonesian oil palm plantations include:

- Limited access to capital: Intercropping requires additional capital to procure seeds, fertilizers, pesticides, and other inputs. This can be a constraint for oil palm smallholders who have limited capital and access to formal credit or government subsidies.
- Difficulty in marketing the harvest of intercrops: Intercrop products, especially perishable fruits, are difficult to market due to limited market access and price fluctuations. Market preferences demand good quality, which often cannot be adequately met. Buyers demand quality criteria in storage and transportation infrastructure, which farmers often find challenging to meet.
- Lack of knowledge and experience of intercropping: Many oil palm farmers do not have sufficient knowledge and experience of intercropping as a practice or cultivation of specific crops.

b) Large Private Plantations

- Negative perception: Some LPPs have a negative perception of intercropping, assuming that intercrops can interfere with the growth of oil palm trees and reduce yields due to competition for soil nutrients.
- Pest and disease risk: Intercrops can host new pests and diseases that could potentially attack oil palm trees.
- Logistics: Large plantations are concerned about disruptions to oil palm maintenance operations and often do not have the capacity to add new supply chains to their business.
- Intercrops are labor intensive: horticultural crops in particular are labor intensive and can disrupt plantation operations.

Discussion

a) Land Use Efficiency

Utilization of Space Between Palm Trees: In the early stages of oil palm growth (1-3 years), the space between palms can be used to grow food crops (e.g., corn, beans, vegetables, bananas, and watermelons) or feed crops (e.g. jack bean) to raise livestock (e.g., cows, goats, and sheep), optimizing space utilization.

Income Diversification: Utilizing oil palm land for intercropping provides smallholders with the opportunity to earn additional sources of income through agricultural or livestock products.

Increases Land Productivity: Intercropping allows plantations to produce more products in a single cycle, reducing dependence on oil palm as the sole source of income.

b) Local People Participation

Smallholder Empowerment: Both oil palm smallholders and landless farmers can be actively involved in the implementation of the intercropping program, with technical training and resource support to ensure successful dual farming practices.

Formation of Farmer Cooperatives or Groups: Local communities can be encouraged to form or strengthen farmer cooperatives, with the aim of accessing inputs, managing intercropped production and access to wider markets.

Government and NGO Involvement: Collaboration of SH with local governments, village governments, NGOs, and the private sector and universities to provide training, technical assistance, and financing to smallholder oil palm and intercropping farmers, so that the program can run effectively.

c) Livelihood Improvement of Smallholder Oil Palm Farmers

Diversification of Income Sources: Through intercropping, oil palm farmers can reduce financial risk by having more than one source of income, especially in the early, unproductive period of oil palm growth.

Livelihood landless farmers: They can access income through intercropping SH & LPP oil palm land.

Strengthening Food Security: Intercropping food crops (such as maize, vegetables, or beans) is not only saleable, but also plays a role in improving food security at the farmer household level.

Access to Market: Modern management, utilizing agribusiness principles, and digital platforms enhance access to markets by shortening supply chains and eliminating intermediaries. Connecting buyers from the start and assuring product quality and quantity will strengthen market access and improve the economic competitiveness of smallholder farmers, especially in remote rural areas such as in Bengkulu and South Kalimantan.

d) Ecological and Economic Sustainability

Reduction of New Land Clearing: Utilizing existing land for intercropping can reduce pressure to clear new land, especially in forest areas. This is in line with efforts to conserve biodiversity and reduce GHG emissions by reducing deforestation.

Ecosystem Benefits: Intercropping can help improve soil structure, increase soil fertility through nutrient cycling, and reduce erosion. Using intercrops or their residues as feed for livestock can generate manure to fertilize the palms and intercrops.

e) Infrastructure Development and Technical Support

Agricultural Infrastructure: The development of supportive agricultural infrastructure, such as provision of irrigation, access to farm equipment and fertilizers, and processing of agricultural products, will be key factors for the success of intercropping.

Research and Development: The government, higher education institutions, and research agencies are expected to invest in research to identify the most suitable intercrop combinations to be integrated with oil palm plantations in various locations of oil palm centers, considering local ecosystems, geographical conditions, and economic value.

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Policy direction

1. The central government should improve regulations related to intercropping, especially during the replanting period of SH and LPP land. To date, there is no specific regulation/policy at the Ministry of Agriculture level that encourages the adoption of intercropping in oil palm plantations. While, there is unclear understanding among LPPs that planting crops other than oil palm in concession area is prohibited.

2. The central government, through the Ministry of Development Planning or Bappenas and the Ministry of Finance as well as financial institutions (banks) are working on a plan to provide access to capital or incentives, either in the form of subsidies, low-interest loans, or direct assistance to farmers, especially SH, participating in intercropping programs to encourage wider participation.

3. Local governments, especially at the district level, assisted by relevant institutions (NGOs) and universities, provide training and counseling to LPPs and SHs on intercropping techniques, livestock rearing, and yield management to eliminate negative perceptions of intercropping.

4. Local governments, in collaboration with the Ministry of Agriculture and assisted by universities or NGOs, develop clear and accessible technical guidelines for smallholders to implement efficient, profitable and sustainable intercropping.

5. The central government, especially the Ministry of Trade, and local governments facilitate the creation of access to markets for intercropping products through partnership programs, improved road access, and better distribution facilities. It enables farmers to sell their products at competitive prices.

Case Study

a) Intercropping on Large Private Plantations

PT Agricinal in Bengkulu has carried out intercropping oil palm plantation with banana in collaboration with PT. Arconesia, a start-up company. PT. Agricinal provides free land for intercropping that involve 50 young farmers managed PT. Arconesia. In this case study, PT. Arconesia implements intercropping business model. PT. Arconesia provides capital, inputs and off-takers as well as agronomic guidance to guarantee quality and quantity. The off-taker directly purchases all banana production, eliminating the need for a middleman. From this practice, farmers can generate a profit of IDR 6 million/ha/year. Linking farmers with off-takers constitute the key factors of the success of this business model. Intensive monitoring showed that oil palm tree development in intercropping was at least equal to that in monoculture.

b) Intercropping on Smallholder Plantations

PT Arconesia in Bengkulu supports intercrop-ping oil palm with watermelon. Oil palm SH may intercrop their own land. Alternatively, land for intercropping is provided by oil palm SH and matched to local young farmers. PT Arconesia implements intercropping business models tailored to the skills and financial capacity of the watermelon farmers. It provides inputs for cash or credit, agronomic guidance when needed, off-takers, and a variety of profit sharing arrangements. In the case of strong agronomic guidance farmers are trained to be more skilled for next cycles. The off-taker directly purchases all watermelon production, eliminating middle- men. Implementing this intercropping can generate a profit of IDR 12 million/ha/year.

c) Intercropping with food or feed crops

PT CPKA oil palm company in South Kalimantan has replanted low producing oil palm fields they recently acquired. Intercropping with corn and jack bean for food and feed has been practiced by ULM dan IPB for income, but also positively affected soil quality. Crop residues of corn will further improve the soil. Jack bean seed will be sown as cover crop for new replanted areas.

Conclusion

Intercropping in oil palm plantations developed based on the study in Bengkulu is a solution that can improve land use efficiency, empower local farmers, including young farmers in the villages around the plantation, and diversify the income of smallholder oil palm farmers. The business model of intercropping in Bengkulu can be replicated and scaled-up to other regions in all oil palm plantation centers in Indonesia by considering local ecosystems and geographical conditions. A comprehensive policy push, legislation, training, financial incentives, and market access, are essential to ensure the successful implementation of this program. With the right policies, intercropping can contribute significantly to farmers' welfare and environmental sustainability in both regions.

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