

## Stakeholders Mapping in Integration System Development Sustainable Cattle-Oil Palm

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### Abstract

*Integrating cattle and oil palm cultivation systems presents the opportunity to maximize land and resource utilization while reducing detrimental environmental effects. The long-term viability of this system relies heavily on a profound comprehension of the players engaged in developing the cattle-oil palm integration system. Stakeholder analysis is crucial for discerning pertinent stakeholders' expectations, interests, and collaborative dynamics. The area is known for its focus on integrating cattle and oil palm, and it receives support from various stakeholders, including government agencies, communities, universities, and the private sector. Stakeholder analysis is employed to examine data about stakeholders. The creation of the cattle-oil palm integration system involves 33 stakeholders who have distinct roles and responsibilities according to relevant rules. These stakeholders are categorized into four positions Subject, Key Players, Context Setters, and Crowd. Each stakeholder has unique interests and influences. Conflicts of interest arise among parties. However, there is also a chance to establish a mutually beneficial relationship between them to enhance the beef cattle population and promote the growth of sustainable palm oil plantations. Collaboration among all stakeholders is necessary to build a cattle-oil palm integration system to generate equitable and sustainable advantages for everyone concerned.*

**Keywords:** Cattle, oil palm, Stakeholder, environmental durability.

### Introduction

The oil palm and cow plantation integration program was initiated in 1989 to facilitate the achievement of self-sufficiency in meat production by 2014. This initiative was subsequently extended from 2015 to 2019. The cattle-oil palm integration program is a component of implementing the Minister of Agriculture Regulation number 105 of 2014, which focuses on merging plantation and livestock businesses. This program should be implemented in all regions with significant potential for oil palm plantations.

The agricultural industry in Indonesia plays a crucial role in enhancing rural livelihoods, serving as the primary source of income for the country. The primary emphasis in addressing global concerns about food security and environmental sustainability is now on sustainable agriculture. One approach in this situation is to enhance livestock and plantation output by implementing an integrated agriculture system that may optimize

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farmer earnings and minimize input expenses (Yuhendra, 2022). While farmers are becoming more cognizant of the ecological consequences of monoculture, this heightened awareness frequently does not translate into substantial alterations in farming practices at the community level, primarily due to farmers' constrained capacity or resources to implement changes (Berg et al., 2023). Oil palm plantations are identified as one of the prospective agricultural sectors emphasized in the Master Plan for the Acceleration and Expansion of Indonesian Economic Development (MP3EI). Following the execution of the strategy, small-scale farmers have been provided with the chance to enhance their assets for cultivating oil palm plantations (Alwarrtzi et al., 2015). A practical approach to improve the country's ability to produce its beef and promote environmental sustainability in the oil palm plantation industry is to implement a system that combines cow farming with oil palm cultivation. If properly managed, the integration of cattle and oil palm can have a synergistic effect that enhances ecosystem function, resulting in higher soil nutrient content and enhanced soil structure (Azhar et al., 2017; Grinnell et al., 2022; Latif & Mamat, 2002; Tohiran et al., 2019). According to Devendra (2011), utilizing livestock manure as organic fertilizer might help enhance the production of fresh fruit bunches (FFB).

The South Kalimantan Province is a prominent development hub for expanding oil palm and rubber plantations in the agricultural sector. Most of South Kalimantan's land is occupied by oil palm plantations over 13 districts and cities, except Banjarmasin and Hulu Sungai Tengah. Oil palm plantations have the highest land utilization per unit compared to other plantations. The merger of cattle and oil palm cultivation effectively harnesses this potential to attain self-sufficiency in meat production. Cows also possess the same potential. The cow population in South Kalimantan, particularly beef cattle, has the most significant potential for livestock production. Goats also have a substantial presence in the region. The beef cattle population is distributed across many areas and cities in South Kalimantan (Siska, D., 2018).

The combination of cattle and oil palm cultivation systems presents the opportunity to utilize land and resources while reducing adverse environmental effects efficiently. The viability of this system relies heavily on a comprehensive comprehension of the parties engaged in developing the cattle-oil palm integration system. Stakeholder analysis is crucial for discerning collaboration expectations, interests, and dynamics among pertinent stakeholders. To attain success in environmental initiatives for sustainable agricultural progress, it is imperative to engage several stakeholders and comprehend their thoughts and preferences, as stated by Berg et al. (2023).

New regulatory procedures for technology are being established in this exceptional situation involving private and public entities. Several forms of knowledge and diverse distributions of authority highlight the interdependence between private and public actors. Every player has a distinct domain of skill in novel innovation. The collaboration between public and commercial entities is acknowledged as a means to address difficulties and perhaps bridge the knowledge divide between the agricultural sector and the digital economy (Pauschinger & Klauser, 2022). Successful collaboration can be achieved by prioritizing the integration of functions. This integration encompasses administrative functions across several policy domains and tiers of government, including active participation from citizens. Communities and non-governmental organizations participate in resolving issues and carrying out actions.

The significance of acquiring knowledge, data, and the sharing of personal experiences (Baumgart-Getz et al., 2012; Bertolozzi-Caredio et al., 2021; Santeramo et al., 2016), along with the necessity to enhance the integration of available tools and strategies (Bertolozzi-Caredio et al., 2021; Novickyte, 2018; Tadesse et al., 2015), and fortifying collaboration to address deficiencies in cooperation (Bertolozzi-Caredio et al., 2021; Cordier, 2015; Severini & Sorrentino, 2017), Collaborative relationships exhibit a range of levels and degrees of intimacy. To assess the extent of collaboration between projects

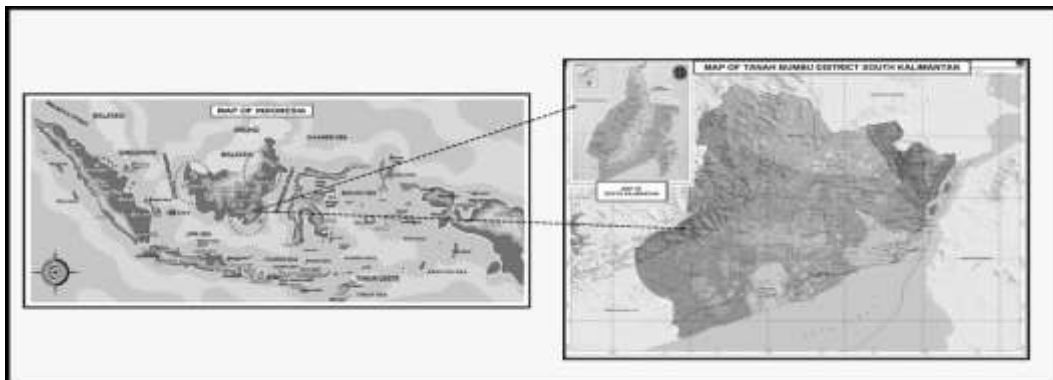
or organizations and each stakeholder, one can refer to the guidelines provided by Borden and Perkins (1999). They have identified 13 characteristics that can either facilitate or impede collaboration between entities. The aspects encompassed in this list are goals, communication, sustainability, evaluation, political climate, resources, catalysts, policies, laws and regulations, history, connectivity, leadership, community growth, and knowing the Community. Frey et al. (2006) provide a framework for assessing the extent of collaboration across projects, organizations, or stakeholders, whether for assessment or planning. They identify many levels of collaboration, including coexistence, communication, cooperation, coordination, coalition, partnership, or coordination. Stakeholder analysis, in this context, refers to a strategic method of fostering mutual understanding and achieving equilibrium among economic, social, and environmental factors in developing a cattle-oil palm integration system.

Hence, additional study is imperative to identify the key stakeholders involved in developing the palm oil cattle integration system, including the central government, regional government, Community, universities, and the corporate sector, explicitly emphasizing sustainability factors. This study employs the stakeholder analysis methodology to address the knowledge deficit by proposing stakeholder analysis as the primary technique for developing and executing a sustainable integration system between cattle and oil palm. By comprehending the preferences and impact of stakeholders, it is anticipated that resolutions that integrate economic and environmental durability while enhancing the social dimensions of sustainable agricultural advancement might be discovered.

## Methodology

### 1. Research Site

The study was conducted between March and July 2023 in Tanah Bumbu Regency, South Kalimantan Province. This region is crucial for developing a cattle-oil palm integration system involving community palm oil plantations, state-owned plantations, private plantations, and independent community plantations. This study is founded on extensive privately owned plantations. Figure 1 represents the specific geographical area where the research was conducted.



Resource:

<https://kalselprov.go.id>

<https://peta-kota.blogspot.com/2011/05/peta-pulau-kalimantan.html>

<https://www.tataruang.id/2022/03/14/gbar-peta-indonesia-lengkap>

Figure 1. Research Site

The location selection in Tanah Bumbu Regency was purposefully done (purposive sampling) due to several factors. Firstly, the area is a focal point for integrating cattle and oil palm. Secondly, there is extensive support from various stakeholders such as government agencies, communities, universities, and the private sector, all working to increase the cattle population and establish sustainable palm oil plantations, mainly through the cattle-oil palm integration model. Lastly, the location provides valuable insights into the dynamics of groups that contribute to developing the cattle-oil palm integration system.

## 2. Data Collection

The collected data comprises both primary and secondary sources. The preliminary data collection involved conducting direct and comprehensive interviews with preselected informants, utilizing a standardized questionnaire. Additionally, secondary data was acquired from relevant agencies or institutions, including BPS, the Plantation and Livestock Service, and the SISKAS Supporting Programme (SSP).

The researchers documented the results of detailed interviews with informants in field diaries using tools that measured stakeholder influence and interests. Literary analysis involves systematically examining secondary sources, such as government reports and official correspondence, to extract information. Concurrently, field observations were conducted by meticulously examining the actual circumstances at the research site and enhancing the knowledge from a broader viewpoint, leading to the implementation of a focus group discussion (FGD).

## 3. Analysis of Data

The research employs a quantitative descriptive analytical approach, utilizing a stakeholder analysis instrument framework for data analysis. The data collected for the institutional integration system of cattle and oil palm in South Kalimantan Province was organized into a table and analyzed using descriptive analysis. The data was obtained through interviews, observations, document tracing, and documentation. The data was scored to determine the extent of influence and interest. Stakeholder analysis is employed to examine data about stakeholders. Reed et al. initially presented The stakeholder analysis model (2009). The sequential steps involved in doing stakeholder analysis are as follows:

Identify the individuals or groups with a vested interest or are affected by a specific project or decision.

The purpose of stakeholder identification is to identify and differentiate stakeholders from non-stakeholders. An identification process was conducted to ascertain the participation of various partners in developing a cattle-oil palm integration system. The stakeholder identification results indicate that stakeholders originate from government agencies, society, universities, and the corporate sector.

Stakeholder mapping is identifying and analyzing individuals or groups with an interest or influence in a project, organization, or decision-making process.

Stakeholder mapping is derived from the examination of both the interests and the level of influence that stakeholders possess. Quantitative methods are used to measure the amount of importance and power. The story of good and impact held by each stakeholder is determined by combining their different interests and sources of force.

Establishing the connections and interactions among stakeholders

Stakeholder analysis involves categorizing parties and organizations into a matrix depending on their level of interest and influence. The response data regarding each party's degree of impact and interest (score) is categorized based on the indicator type and subsequently compared to generate coordinates. Later, the data is transformed into a

matrix representing stakeholders' interests and influences, known as the stakeholder grid (Figure 3). The location within the Quadrant of the stakeholder grid analysis matrix visually demonstrates the position and function of each party within the institution, namely:

- Quadrant I (subject) shows groups with a high interest in the activity but low influence, including members of the organization who carry out the action and are responsive to the implementation of the movement but are not policymakers.
- Quadrant II (Key Players) is a group of actors with a high degree of interest and influence in making activities successful, such as community leaders, heads of related agencies, and heads of government.
- Quadrant III (Context Setter) represents the actors with low importance and high influence. Their interests are needed to ensure two things: (a) their interests are not otherwise affected, and (b) their interests and influence do not change the situation.
- Quadrant IV (Crowd) actors who have low interest and low influence in achieving policy goals and results.

Stakeholder analysis will comprehensively assess the connections between stakeholders and the trajectory of these connections, determined by their respective interests. Stakeholders who share common interests are inclined to form cooperative partnerships, while those with divergent interests are likelier to compete. To comprehend the essence of cooperation and competition, one must know the mechanisms, consequences, and elements that facilitate the formation of cooperative or competitive associations.

## Results and Discussion

### 1. Stakeholders Identification

The outcomes of stakeholder analysis for constructing a cattle-oil palm integration system are categorized into three distinct phases. Three main components are involved in stakeholder management: stakeholder identification, mapping, and understanding the interaction between stakeholders. Data collecting methods involve doing field observations and interviews. The in-depth interviews targeted informants from all stakeholders involved in developing the cattle-oil palm integration system. The informants utilized in this study comprised local administrative groups, governmental groups, membership organization groups, banking institutions, organizational services, firm executives or designated personnel, and relevant scholars due to their expertise in the research subject.

The stakeholder identification results indicate that stakeholders originate from government agencies, society, universities, and the corporate sector. The coconut-oil cattle integration system involves 33 stakeholders, as shown in Table 1.

Table 1. Results of Stakeholder Identification

Classification	Stakeholder
Central Government	1. Directorate General of Plantations 2. Directorate General of Animal Husbandry and Animal Health 3. Feed Directorate 4. Directorate of Palm Oil and Other Palm 5. Palm Oil Plantation Fund Management Agency (BPDPKS)
Local Government	6. Badan Perencanaan Pembangunan Daerah (BAPPEDA) 7. Dinas Perkebunan dan Peternakan 8. Balai Veteriner 9. Dinas Ketahanan Pangan dan Pertanian
Community	10. Cluster Tani Maju

	11. Cluster Makmur Bersama 12. Cluster SISKARanch 13. Cluster Mahesa Makmur 14. Cluster BAS 15. Cluster Mustika 16. Cluster Arteri Berkah Bersama 17. Gabungan Pengusaha Kelapa Sawit Indonesia (GAPKI) 18. Asosiasi Petani Kelapa Sawit Indonesia (APKASINDO) 19. Serikat Petani Kelapa Sawit Indonesia (SPKS) 20. Perkumpulan Forum Petani Kelapa Sawit Indonesia (POPSI) 21. Gabungan Pelaku Usaha Peternakan Sapi Potong Indonesia (GAPUSPINDO) 22. Perhimpunan Peternak Sapi dan Kerbau Indonesia (PPSKI) 23. Gabungan Pelaku dan Pemerhati Sistem Integrasi Sapi-Kelapa Sawit (GAPENSISKA)
Academy	24. Lambung Mangkurat University 25. Islam Kalimantan Muhammad Arsyad Al Banjari Banjarmasin University
Business	26. PT. Buana Karya Bhakti 27. PT Simbiosis Karya Agroindustri 28. PT Batulicin Agro Sentosa 29. PT Temu Sari 30. PT Sajang Heulang 31. PT Gawi Makmur Kalimantan 32. South Kalimantan Bank 33. Indonesia Bank Region South Kalimantan

The stakeholders in developing the cattle-oil palm integration system include government entities such as the central and regional governments. However, their roles differ from one another. The involvement of key stakeholders from many major government departments, including the Directorate General of Plantations, the Directorate General of Animal Husbandry, the Directorate of Feed, and the Directorate of Palm Oil and Other Palm Oil, is crucial. The Palm Oil Plantation Fund Management Agency (BPDPKS) is a significant player due to its jurisdiction in establishing a system that integrates cow farming with oil palm cultivation. These jobs involve facilitating the implementation of SISKARanch by issuing a range of pertinent rules and regulations, both at the national and regional levels.

Stakeholders from regional government entities, including provincial and district-level governments and relevant agencies, play a crucial role as regulators and supervisors in developing the partnership cattle-oil palm integration system. They can serve as catalysts for community empowerment by offering policy direction, allocation of resources, and technical assistance to farmers and palm oil firms. Regional governments can foster collaboration between farmers and palm oil firms through conversation, meetings, and coordination.

The stakeholders in the Community include a collective of planters-breeders in Tanah Bumbu Regency, South Kalimantan Province. Their primary responsibility is to implement the integrated cattle-oil palm partnership system effectively. Stakeholders from various community sectors within the organization can also facilitate establishing a collaborative cattle-oil palm integration system, contributing to sustainable agricultural development and empowering farmers, and offering technical support, instruction, resource availability, and direction to farmers and oil palm enterprises to implement a cattle-oil palm integration system.

The stakeholders involved in the higher education sector include Lambung Mangkurat University (ULM) and Muhammad Arsyad Al Banjari Banjarmasin Islamic University of Kalimantan (UNISKA). The stakeholders in this domain possess valuable knowledge and skills in agriculture, animal husbandry, and partnerships. They can utilize these resources to offer farmers and palm oil enterprises support, training, and direction.

The stakeholders in the private sector consist of palm oil entrepreneurs and banks. Private stakeholders have a facilitating role in the development of SISKAs collaborations. The alliance offers mentoring, training, and technical support to farmers. Palm oil firms can also enhance farmers' access to resources such as cattle breeds, animal feed, animal health services, and applicable technologies, in addition to corporate social responsibility initiatives. Bank Indonesia also provides banking services for the South Kalimantan Region to help SISKAs KUINTIP by offering guidance in business management for SISKAs KUINTIP sites or clusters. Bank South Kalimantan is prepared to assist livestock enterprises in the Siska cluster by providing KUR (people's business credit) at a 3% interest rate.

## 2. Stakeholder mapping

The influence and interest matrix is created by analyzing the informant's questions, which are quantified using scores. These scores are then categorized based on the criteria of impact and interests of the central government, local government, Community, higher education institutions (academy), and private businesses. Multiple research, including the ones mentioned, offer data that supports the efficacy of adaptation measures at the local and agricultural levels in enhancing adaptive capacity. The effectiveness of adaptation is contingent upon the proficiency of local actors and institutions, encompassing governmental, business, and civil society entities, working in collaboration to provide institutional backing and inducements to farmers and local populations (Abid et al., 2017).

### a. Central government.

The implementation of a cattle-oil palm integration system has a substantial influence on the agricultural and economic sectors of a nation, particularly for the central government. Integrating cattle and oil palm systems in agriculture can enhance food security and promote economic development (Drechsel et al., 2001; Schut et al., 2016; Vanlauwe et al., 2014). Among the Directorate General of Animal Husbandry and Animal Health, the Directorate of Palm Oil and Other Palms, the Feed Directorate, and the Oil Palm Plantation Fund Management Agency (BPDPKS), the Directorate General of Plantations holds the most significant influence. At the same time, the BPDPKS has the most minor effect. At the topmost level of interest lies the Directorate General of Animal Husbandry and Animal Health, followed by the Directorate General of Plantations, Feed Directorate, Directorate of Palm Oil and Other Palms, and Oil Palm Plantation Fund Management Agency (BPDPKS).

The central government possesses a degree of power and an interest in advancing the oil palm cattle integration system, primarily to broaden the economy's scope. By efficiently utilizing available land and resources, we can decrease reliance solely on the agriculture industry and enhance food security, enhance farmers' income, improve production and efficiency, expand infrastructure, empower farmers, manage the environment, oversee and regulate activities, and boost exports. The central government may contribute significantly by establishing a cattle-oil palm integration system to attain self-sufficiency in beef production and sustainable palm oil plantations. This can be accomplished by implementing the Indonesian Sustainable Palm Oil Plantation Certification (ISPO) and associated regulations.

As stated by Buckwell et al. (n.d.), certification programs aim to provide a uniform set of rules for sustainable farming operations. This approach enhances the rapport between

manufacturers and customers and fosters consumer trust. Moreover, the rise of sustainable intensification (Bird, 2014; Southern et al., 2011; Weltin et al., 2018) results from institutional changes, including taxation, land ownership rules, access to capital, and enhanced forms of leadership and governance. The regulations governing developing a cattle-oil palm integration system include Law No. 18 of 2009 and Law No. 41 of 2014, which pertain to animal husbandry and health. Law No. 11 of 2020, Presidential Decree 48 of 2013, Government Regulation No. 26 of 2021, Minister of Agriculture Regulation 105 of 2014, and Minister of Agriculture Regulation 18 of 2021 are also relevant. These regulations address various aspects such as job creation, cultivation of pet animals, implementation of the agricultural sector, integration of palm oil plantation businesses with beef cattle cultivation businesses, and facilitation of surrounding community gardens.

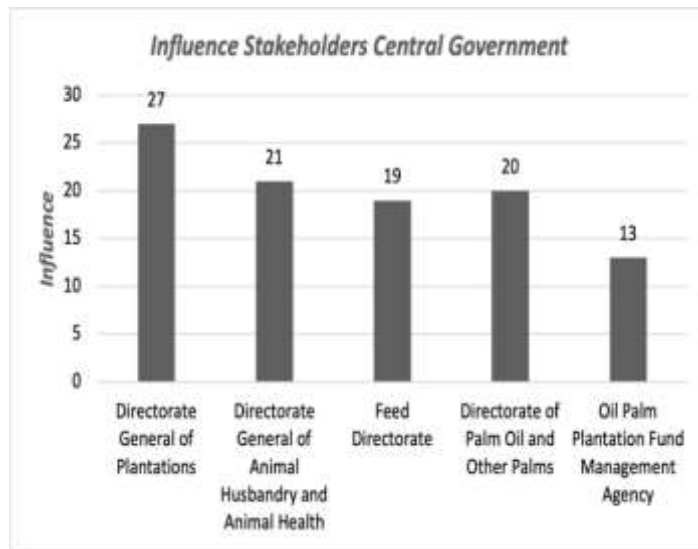


Figure 2. Influence Stakeholders Central Government

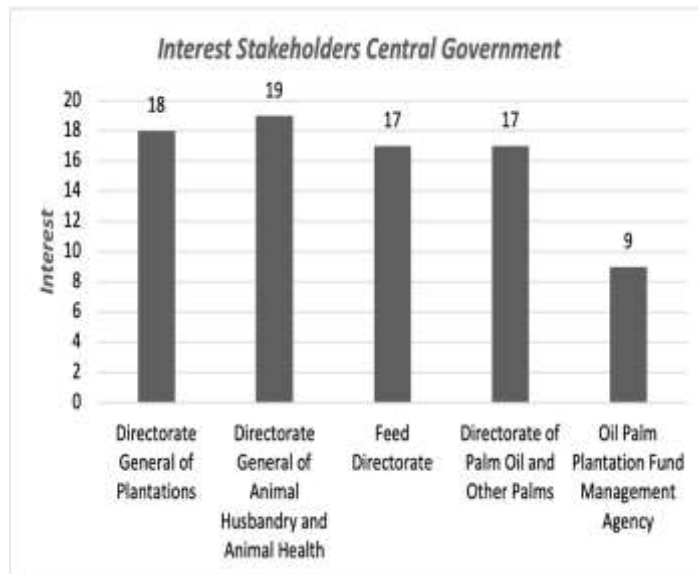


Figure 3. Interest Stakeholders Central Government

b. Local Government

Establishing a cattle-oil palm integration system requires the involvement of various entities, such as the regional government, which comprises the South Kalimantan Regional Development Planning Agency, the Provincial Plantation and Livestock Service, the Veterinary Center, and the Food Security and Agriculture Service. The picture below



illustrates the significant effect and interest of the South Kalimantan Plantation and Livestock Service in the development of the cattle-oil palm integration system. The South Kalimantan Plantation and Livestock Service is involved in developing a partnership system that integrates cattle and oil palm. Their role is to regulate and supervise this system. They serve as catalysts for local economic growth and community empowerment through their provision of policy direction, allocation of resources, and technical assistance to farmers and palm oil firms. According to Bracke et al. (2004), both central and regional government stakeholders can enhance their understanding (through transparency and education), improve ethical and political decision-making, alleviate public concerns about animal welfare, acquire permits for production and sales, and elevate the standard of animal welfare—real-life encounters encountered by animals.

When developing cattle-oil palm integration projects at the provincial level, it is essential to consider the region's potential and features. The South Kalimantan Disbunnak, a branch of the local government, has a crucial role in formulating policies that promote the advancement of the SISKU KUINTIP program. These policies include offering incentives and tax exemptions to planters and breeders and facilitating training, research, and infrastructure development. At the Tanah Bumbu Regency Food Security and Agriculture Service, the cattle-oil palm integration program is implemented with careful consideration of the unique area conditions and possibilities. Collaboration among district governments, palm oil businesses, and planter/breeder organizations can be established by providing land, training, financing, or product marketing. Synergy is essential to enhance program implementation and maximize benefits for all stakeholders involved. According to a study conducted by Abid et al. in 2017, the first system refers to a public institution or entity with substantial public infrastructure and a hierarchical structure to cater to farmers at the lowest level. These bodies exist at many levels of government, including federal, provincial, district, and union council levels. The primary objective behind establishing these businesses was to enhance agricultural output in the region by offering cost-effective services to farmers. The company provides vital services such as extension or consultant services for enhancing agricultural and livestock productivity, pest detection, subsidized water-saving technologies, soil and water analysis, marketing information, and loan facilities.

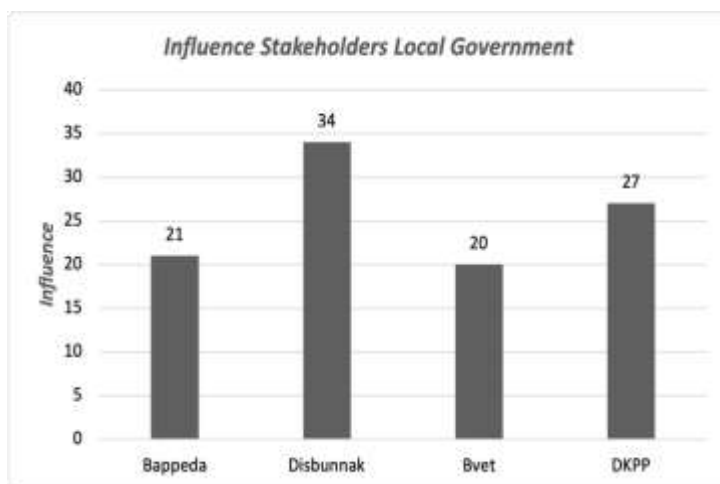


Figure 4. Influence Stakeholders Local Government

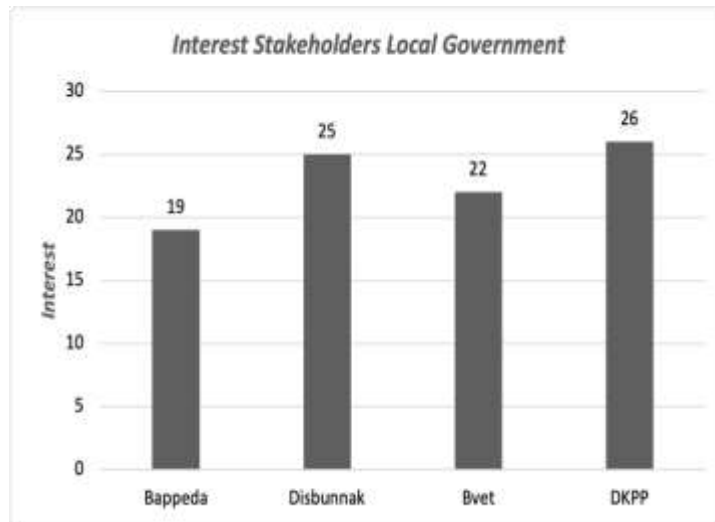


Figure 5. Interest Stakeholders Local Government

### c. Community

Establishing a cattle-oil palm integration system involves stakeholders, such as planter/breeder collectives and associations representing plantations and animals. The picture below illustrates the significant influence of GAPKI in developing the cattle-oil palm integration system. GAPKI plays a crucial role in advocating and defending the interests of palm oil business actors. They also strive to establish regulatory policies that promote the sustainable development of the cattle-oil palm integration system, known as SISKKA. The association can also support coordination among members to exchange valuable knowledge and expertise in developing and managing cattle-oil palm integration systems. This may involve offering collective resources, such as processing, distribution, and technological advancement facilities. Additionally, our association may assist in streamlining the certification process for integrated goods, thereby enhancing their market competitiveness. In addition, it can address challenges that may arise during establishing a cattle-oil palm integration system and ensure compliance with legislation about sustainable practices.

Establishing a cattle-oil palm integration system involves multiple stakeholders, such as planter/breeder groups (Abid et al., 2017). These are community-led informal groups or networks farmers utilize to access diverse services. These links primarily involve tightly-knit social networks and agricultural cooperative partners that function based on trust and reciprocity, offering mutual support during times of necessity. The reference is from Schut et al. (2015). Innovation capacity pertains to the aptitude of individuals and organizations to effectively employ their competencies, including knowledge, abilities, and experience, to constantly recognize and prioritize obstacles and prospects for innovation within a changing system. Figure 7 demonstrates that the planter/breeder group is intensely interested in integrating cattle and oil palm. This occurs due to the utilization of vacant land between rows of oil palms by collectives of breeders and planters, which can be employed for grazing or cattle rearing. Groups or cooperatives of farmers can lease or utilize the land for cattle farming. In addition, cluster members use palm oil waste as animal feed. Empty fruit bunches, palm fiber, and palm oil meal, which are byproducts of palm oil production, can be used as cattle fodder. This trash serves as an economical and environmentally-friendly source of livestock feed. In addition to that, the efficient use of current resources and facilities, as well as the strategic coordination between management and sales.

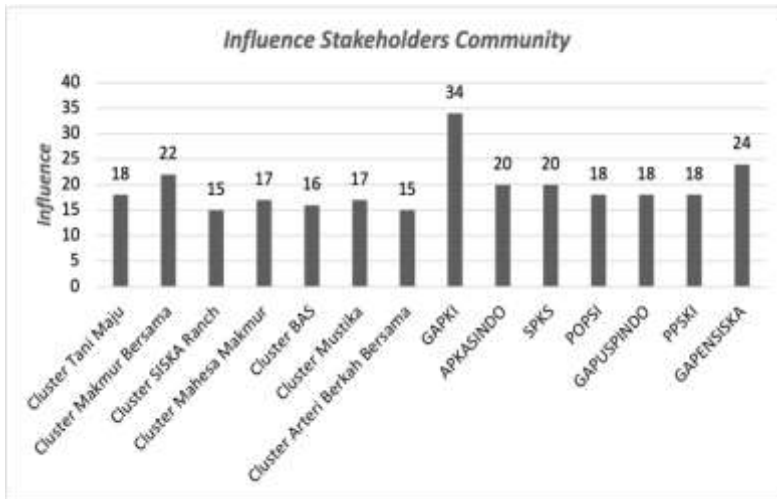


Figure 6. Influence Stakeholders Community

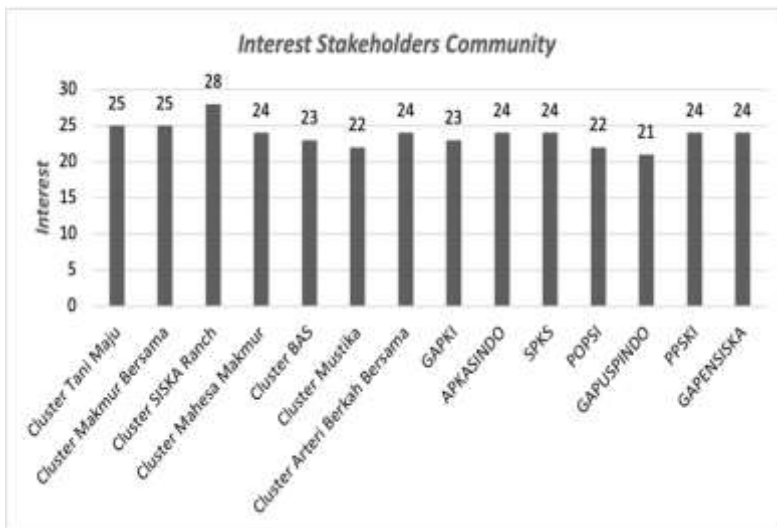


Figure 7. Interest Stakeholders Community

d. Academy

The establishment of a cattle-oil palm integration system in South Kalimantan requires the involvement of various stakeholders, including two universities, namely Lambung Mangkurat University and Islam Kalimantan Muhammad Arsyad Al Banjari Banjarmasin

University. The figure below illustrates the implementation of the cattle-oil palm integration system. Lambung Mangkurat University institution has a significant impact and keen interest in advancing the cattle-oil palm integration system. Universities are crucial in gathering data, conducting scientific investigations, and assessing the findings. Collaboration among researchers in agriculture, animal husbandry, the environment, and economics can be employed to examine different facets of cattle-oil palm integration.

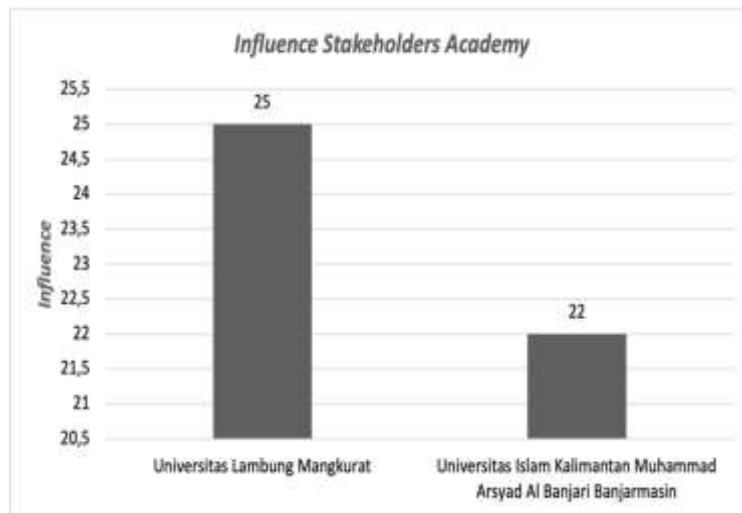


Figure 8. Influence Stakeholders Academy

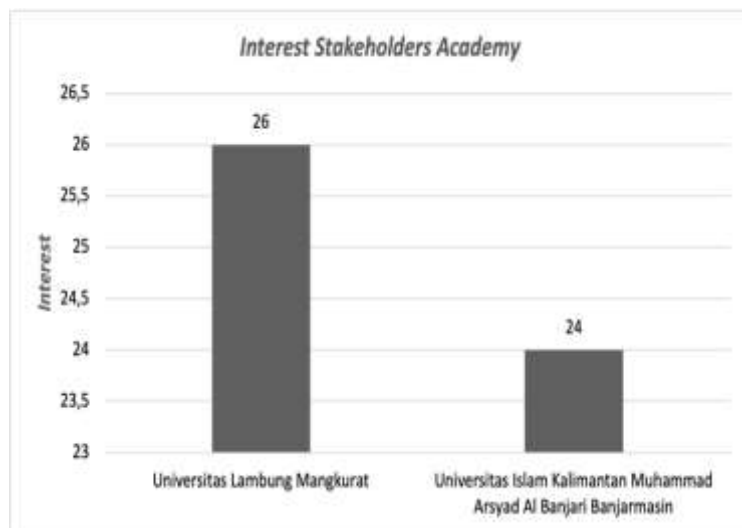


Figure 9. Interest Stakeholders Academy

#### e. Business

Establishing a cattle-oil palm integration system in South Kalimantan entails the participation of many commercial entities, such as corporations and financial institutions. PT. Buana Karya Bhakti plays a significant and crucial role in advancing the cattle-oil palm integration system. The palm oil company's Corporate Social Responsibility program offers financial assistance and capital access to cattle breeders in the SISKKA cluster, which is the reason for this. In addition, the company's corporate social responsibility initiatives contribute to developing essential infrastructure, including feed processing facilities, improved water accessibility, and animal waste processing centers. Optimal infrastructure will enhance the efficiency and productivity of the SISKKA cluster. The references used are Robinson et al. (2015), Schut et al. (2016), and Vanlauwe et al. (2014). Institutional innovation is crucial in facilitating sustainable intensification, mainly providing access to capital, inputs, extension services, and markets. Palm Oil Company's Corporate Social Responsibility initiatives can offer infrastructure, financial assistance, and capital access to cattle breeders in the Palm Oil Cattle Integration System (SISKKA) cluster.

The Corporate Social Responsibility (CSR) program can offer this assistance. The Corporate Social Responsibility program can contribute to building the essential physical infrastructure cattle breeders require in the SISKKA cluster. This encompasses the building

or enhancing livestock infrastructure, such as enclosures, pathways, storage spaces for animal feed, water systems, or facilities dedicated to animal health. Farmers may enhance the quality of their operations by having sufficient infrastructure and boosting output. Palm Oil Company's Corporate Social Responsibility initiatives might offer financial support or grants to construct essential infrastructure for cattle breeders in the SISKa cluster. This may encompass financial assistance or subsidies for creating or enhancing barns, acquiring livestock equipment, or investing in agricultural technology that improves efficiency and output. The Corporate Social Responsibility initiative aims to facilitate cattle breeders in the SISKa cluster by providing convenient and cost-effective access to essential resources such as feed, water, land, and livestock seeds. In addition, CSR programs can also assist market access, both locally and regionally, to broaden selling prospects and enhance the income of livestock farmers. The CSR initiative offers commercial support to cattle breeders in the SISKa cluster. This encompasses providing support in business planning, formulating marketing strategies, enhancing operational effectiveness, mitigating risks, or formulating plans to secure external funding. By providing appropriate support, farmers can improve their enterprises' efficacy and long-term viability. The palm oil corporation offers assistance in infrastructural development, financial aid, and access to finance. CSR initiatives will enhance the capacities of cow breeders in the SISKa cluster, augment operational efficacy, and fortify the sustainability of cattle farming enterprises through integration with oil palm plantations.

The findings of a study conducted by Abid et al. (2017) indicate that private organizations, such as non-governmental organizations, operate at many levels, ranging from regional to local, and primarily engage in commercializing and disseminating agricultural supplies and services to farmers. Private institutions offer vital services such as agricultural loans, input distribution, agricultural consultancy services, agricultural equipment, weather information, and marketing information. This aligns with the financial institution, Bank South Kalimantan, which holds significant influence and importance. Bank South Kalimantan provided KUR to assist the SISKa KUINTIP initiative in South Kalimantan. Utilization of existing resources and support, such as KUR (credit guarantee program), capital assistance, production facility assistance, marketing assistance, and other aid forms. To gain access to KUR, farmer groups (clusters) must fulfill specific criteria, including being a member of a business group, having a productive business, possessing a well-defined and achievable business strategy, providing guarantees or collateral, and maintaining a commendable track record.

Furthermore, the Corporate Social Responsibility program can offer financial training and instruction to cattle breeders within the SISKa cluster. This encompasses a growing comprehension of financial management, the formulation of budgets, the administration of income and expenses, and familiarity with financing schemes and risk management. By possessing a solid comprehension of financial matters, farmers can enhance their ability to manage their finances and efficiently maximize the utilization of money.

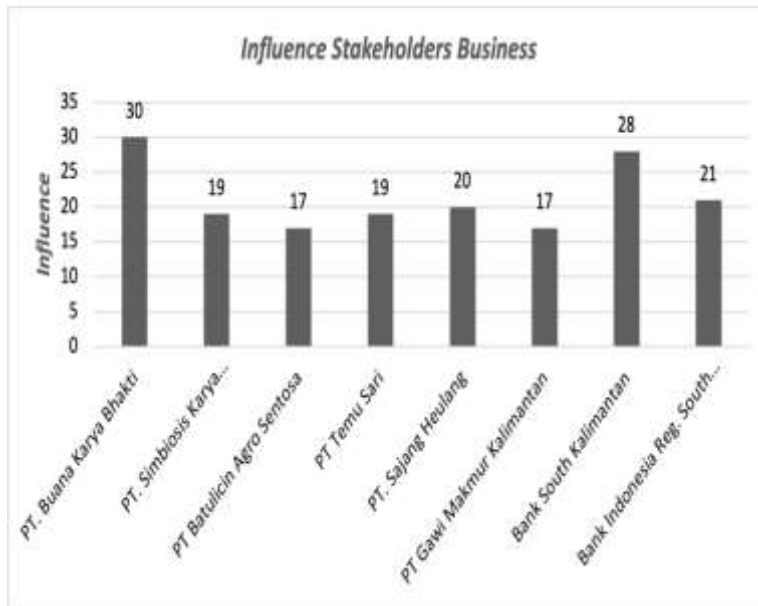


Figure 10. Influence Stakeholders Business

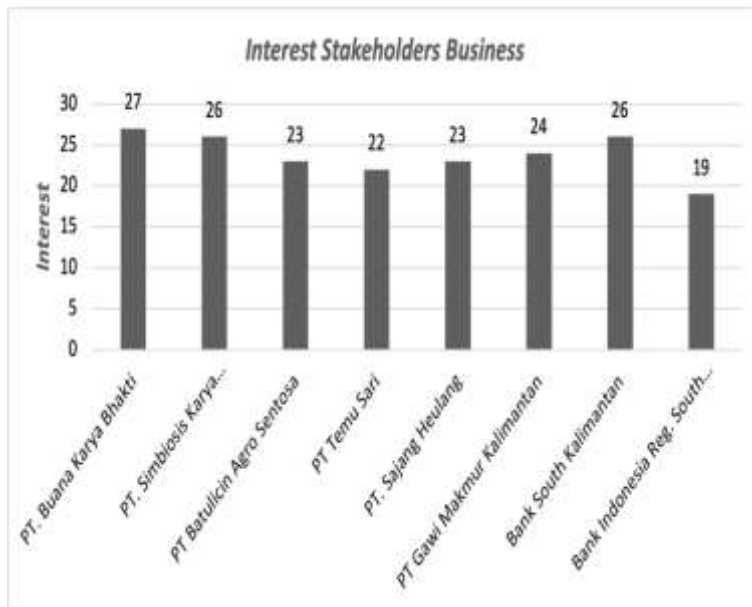
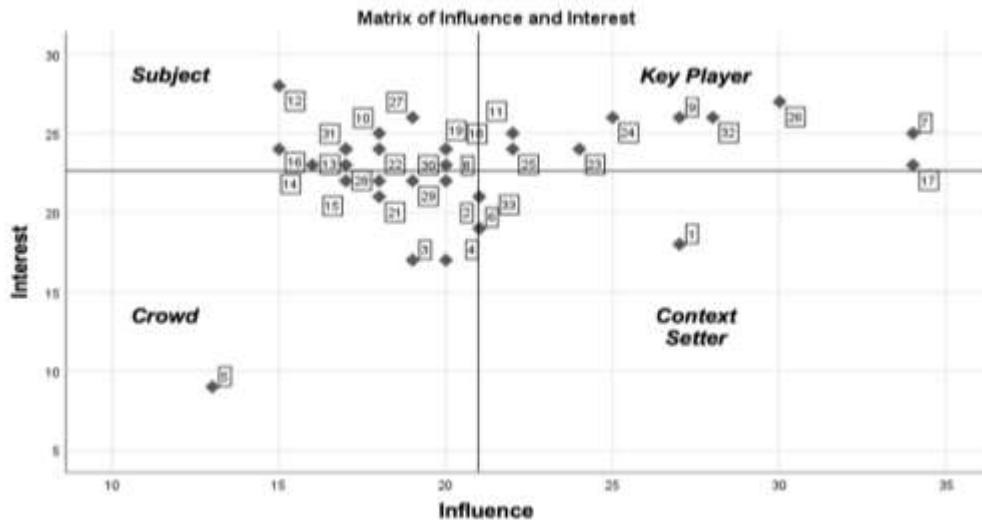


Figure 11. Interest Stakeholders Business

### 3. Stakeholders Relationship

Next, we need to assess and compare the scoring outcomes of each stakeholder's level of interest and influence. This will be done by constructing an interest and influence matrix using a stakeholder grid. The matrix categories (Figure 12) delineate the position and function of each stakeholder involved in the development of the cattle-oil palm integration system, as outlined below:



Description: 1. DGP; 2. DGAH; 3. FD; 4. DPO; 5. BPDPKS; 6. Bappeda; 7. Disbunnak; 8. BVet; 9. DKPP; 10. Cluster Tani Maju; 11. Cluster Makmur Bersama; 12. Cluster SISKA Ranch; 13. Cluster Mahesa Makmur; 14. Cluster BAS; 15. Cluster Mustika; 16. Cluster Arteri Berkah Bersama; 17. GAPKI; 18. APKASINDO; 19. SPKS; 20. POPSI; 21. GAPUSPINDO; 22. PPSKI; 23. GAPENSISKA; 24. UNLAM; 25. UNISKA; 26. PT.BKB; 27. PT.SISKA; 28. PT.BAS; 29. PT.Temu Sari; 30. PT. Sajang Heulang; 31. PT. GMK; 32. Bank South Kalimantan; 33. Bank Indonesia Reg. South Kalimantan.

Figure 12. Matrix of Influence and Interest

The categories in the matrix above can describe the position and role played by each stakeholder in developing the cattle-oil palm integration system. The positions and roles of these stakeholders are Quadrant I, which is placed by the subject group; Quadrant II, which the critical player group identifies; Quadrant III, which the context setter group determines; and Quadrant IV, which is the crowd group.

a. Subject

Stakeholders classified as category I (subjects) are individuals or groups with significant interest in the matter at hand but limited ability to exert influence. The stakeholders in the issue comprise the SISKA Ranch Cluster, Arteri Berkah Bersama Cluster, Tani Maju Cluster, Mahesa Makmur Cluster, Makmur Bersama Cluster, BAS Cluster, PT. Gawi Makmur Kalimantan, PT. Symbiosis Karya Agroindustry, SPKS, APKASINDO, PPSKI, PT. Sajang Heulang, and the Banjarbaru Veterinary Center. The success of building a cattle-oil palm integration system is highly dependent on these thirteen stakeholders, while their impact on the management of SISKA development is limited. Therefore, it can be concluded that all stakeholders in Quadrant I are significant stakeholders, yet their participation is necessary for managing the development of SISKA. Stakeholder involvement can be achieved by empowering groups and engaging them in the various stages of SISKA development. This can be done by providing technical help, training, resource access, and direction to farmers and oil palm firms to implement a cattle-oil palm integration system.

Cluster member farmers encounter significant technological barriers, mainly due to their limited proficiency in SISKA implementation approaches. According to a study conducted by Schut et al. (2016) on the attributes of sustainable intensification challenges encountered by different stakeholder groups, it is evident that farmers experience a higher proportion (40%) of technological impediments, such as limited proficiency in growing practices. The commercial sector, civil society, and government are subject to more significant economic constraints than other sectors. Specifically, they encounter hurdles of 37%, 30%, and 25%, respectively, such as insufficient financing to supply farm

resources. Government stakeholders engage in more significant political limitations than other stakeholder groups, particularly regarding the restricted cooperation among stakeholders in the agricultural industry (20%).

#### b. Key Player

Key players refer to stakeholders who possess significant influence and demonstrate a substantial level of interest. The stakeholders belonging to the Key Players group are of utmost importance as they have considerable value and exert a strong influence on the successful development of a cattle-oil palm integration system in South Kalimantan. The Key Players comprise universities, the Food Security and Agriculture Service, and Bank South Kalimantan, PT. Buana Karya Bhakti, Plantation and Livestock Service, GAPKI, and GAPENSISKA.

The Plantation and Livestock Service, Food Security, and Agriculture Service hold significant significance and exert substantial influence as local governments offer guidance and technical assistance for administering cow farming integrated with oil palm. This entails enhancing feed quality, implementing effective livestock health management practices, and employing strategic reproductive techniques to improve cow productivity. Atmoko et al. (2023) found that population growth is closely linked to the simultaneous development of the cattle sector with other sectors, including plantations, fisheries, and mining. The research findings demonstrated that the local government devised and constructed a prototype for a highly efficient integration system between cattle and oil palm. This includes identifying the optimal site, organizing the layout, and overseeing the handling of animals and palm oil residue. The department can offer training and education programs to farmers and livestock breeders to enhance their proficiency in effectively managing this integrated system. This can improve the revenue and well-being of cluster members. Effective collaboration between the Plantation and Livestock Service and the Food Security and Agriculture Service is crucial to ensure the smooth implementation of the cattle-oil palm integration system, resulting in optimal benefits for planters, livestock breeders, and the environment.

An integration system between cattle and oil palm requires the involvement of several stakeholders, such as palm oil corporations, academic institutions, and industry groups. PT. Buana Karya Bhakti is an exemplary oil palm company that contributes to the development of SISKKA in Tanah Bumbu Regency, South Kalimantan Province. PT. Buana Karya Bhakti exemplifies the diversification of revenue streams in the palm oil industry. Establishing a livestock business enables corporations to mitigate their reliance on volatile palm oil prices. By allowing livestock to graze on oil palm plantations, the productivity of plants can be enhanced by utilizing oil palm waste as animal feed and using livestock manure as organic fertilizer. Palm oil firms possess the ability to exert influence over laws and regulations that are connected to their industry. This pertains to a study conducted by Atmoko et al. (2023) that examines the stakeholder analysis of oil palm plantation firms that offer undergrowth on their estates for grazing purposes.

Universities contribute to advancing technology and developing best practices in integrating cattle and oil palm. Universities supply the necessary specialists to oversee and administer cattle-palm oil integration initiatives, conduct research and contribute to policy creation and the advancement of cattle-palm oil integration systems. This pertains to a study conducted by Atmoko et al. (2023) on stakeholder analysis in buffalo production. The significance of scientists and academics lies in their conducting studies that serve as a foundation for policymakers' deliberation and the creation of publications and policy papers. GAPKI and GAPENSISKA collaborate to ensure that government policies effectively promote and foster the establishment of a cattle-oil palm integration system.



### c. Context Setter

Context setters are stakeholders who possess significant influence yet have relatively low importance. The parties involved in the context setting are the Directorate General of Plantations, the Regional Development Planning Agency, the Directorate General of Livestock and Animal Health, and the Bank Indonesia region of South Kalimantan possess a significant influence value, which has the potential to impact the advancement of a cattle-oil palm integration system. The Central Government possesses significant power to facilitate the implementation of the cattle-oil palm integration system by issuing pertinent policies and regulations, both at the national and regional levels.

The Bank Indonesia Regional of South Kalimantan wields significant influence as it fulfills a crucial function in facilitating investment in the agricultural industry, particularly in establishing a cattle-oil palm integration system. This is achieved through the provision of financial assistance and other forms of support to stimulate the expansion of this sector.

### d. Crowd

Crowds are stakeholders characterized by their limited level of interest and influence. These stakeholders necessitate little monitoring and assessment, but they are of low priority. The stakeholders participating in the Crowd include FD (Directorate of Feed), DPO (Directorate of Palm Oil and Other Palms), BPDPKS (Indonesian Oil Palm Plantation Fund Management Agency), Mustika Cluster, PT. BAS (Bumi Agro Sejahtera), PT. Temu Sari, and GAPUSPINDO (Indonesian Cattle and Palm Oil Farmers Association). While FD, DPO, and BPDPKS have significant roles in empowering and supporting the economic activities of oil palm farmers, their contributions to the development of the cattle-oil palm integration system have been limited. Mustika Cluster, PT. Temu Sari, PT. Batulicin Agro Sentosa and the GAPUSPINDO Association have failed to fulfill their roles. There is a lack of independence and consensus between planters or breeders and the firm. There is a lack of facilitation in the development of a partnership cattle-oil palm integration system, as well as a lack of technical help, training, access to resources, and direction to farmers for implementing such a system. This leads to conflicts of interest among farmers, plantation owners, and the government about grazing lands. The term "crowd" refers to a large group of people gathered together in a particular place.

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## Conclusion

A total of 33 parties are engaged in developing the cattle-oil palm integration system, each assigned distinct tasks and responsibilities per relevant rules. Their roles include the

topic, leading players, context setter, and Crowd. Stakeholders possess diverse interests and exert varying degrees of influence. Stakeholders have conflicting interests. However, there is also a potential to establish a mutually beneficial relationship between the two to enhance the growth of the beef cattle population and promote the development of sustainable palm oil plantations. Collaboration among all stakeholders is necessary to build a cattle-oil palm integration system to generate equitable and sustainable advantages for everyone concerned.

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#### References

- Abid, M., Ngaruiya, G., Scheffran, J., & Zulfiqar, F. (2017). The role of social networks in agricultural adaptation to climate change: Implications for sustainable agriculture in Pakistan. *Climate*, 5(4). <https://doi.org/10.3390/cli5040085>
- Alwarrizti, W., Nanseki, T., & Chomei, Y. (2015). Analysis of the Factors Influencing the Technical Efficiency among Oil Palm Smallholder Farmers in Indonesia. *Procedia Environmental Sciences*, 28, 630–638. <https://doi.org/10.1016/j.proenv.2015.07.074>
- Atmoko, B. A., Prabowo, B. W., Sumantri, I., Prastowo, S., Widyas, N., Satya, T., & Widi, M. (2023). Conceptual Framework for Assessing Sustainability of Swamp Buffalo Production Systems. *Journal of Buffalo Science*, 12, 44–54.
- Azhar, B., Saadun, N., Prideaux, M., & Lindenmayer, D. B. (2017). The global palm oil sector must change to save biodiversity and improve food security in the tropics. In *Journal of Environmental Management* (Vol. 203, pp. 457–466). Academic Press. <https://doi.org/10.1016/j.jenvman.2017.08.021>
- Baumgart-Getz, A., Prokopy, L. S., & Floress, K. (2012). Why farmers adopt best management practice in the United States: A meta-analysis of the adoption literature. *Journal of Environmental Management*, 96(1), 17–25. <https://doi.org/10.1016/j.jenvman.2011.10.006>
- Berg, H., Dang, S., & Tam, N. T. (2023). Assessing Stakeholders' Preferences for Future Rice Farming Practices in the Mekong Delta, Vietnam. *Sustainability (Switzerland)*, 15(14). <https://doi.org/10.3390/su151410873>
- Bertolozzi-Caredio, D., Bardají, I., Garrido, A., Berry, R., Bijttebier, J., Gavrilesco, C., Harizanova, H., Jendrzewski, B., Meuwissen, M. M. P., Ollendorf, F., Pinsard, C., Rommel, J., Severini, S., & Soriano, B. (2021). Stakeholder perspectives to improve risk management in European farming systems. *Journal of Rural Studies*, 84, 147–161. <https://doi.org/10.1016/j.jrurstud.2021.04.004>
- Bird, J. (2014). Game changers for irrigated agriculture the right incentives exist? *Irrigation and Drainage*, 63(2), 146–153. <https://doi.org/10.1002/ird.1838>
- Borden, L.M., & Perkins, D.F. (1999). Assessing Your Collaboration: A Self Evaluation Tool. *J Extension*. 37 (2):67-72.
- Buckwell, A., Nordang Uhre, A., Williams, A., Poláková, J., H Blum, W. E., Schiefer, J., Lair, G. J., Heissenhuber, A., Schießl, P., Krämer, C., & Haber, W. (n.d.). Sustainable Intensification of European Agriculture is a review sponsored by the RISE Foundation.

- Frey, B.B., Lohmeier, J.H, Lee, S.W., Tollefson, N. (2006). Measuring Collaboration Among Grant Partners. *Amer J Evaluation*. 27: 383-392. <http://aje/sagepub.com/cgi/content/abstract/27/3/383>.
- Devendra, C. (2011). Integrated tree crops-ruminants systems in South East Asia: Advances in productivity enhancement and environmental sustainability. In *Asian-Australasian Journal of Animal Sciences* (Vol. 24, Issue 5, pp. 587–602). <https://doi.org/10.5713/ajas.2011.r.07>
- Drechsel, P., Gyiele, L., Kunze, D., & Cofie, O. (2001). Population density, soil nutrient depletion, and economic growth in sub-Saharan Africa. [www.elsevier.com/locate/ecolecon](http://www.elsevier.com/locate/ecolecon)
- Grinnell, N. A., van der Linden, A., Azhar, B., Nobilly, F., & Slingerland, M. (2022). Cattle-oil palm integration – a viable strategy to increase Malaysian beef self-sufficiency and palm oil sustainability. *Livestock Science*, 259. <https://doi.org/10.1016/j.livsci.2022.104902>
- Latif, J., & Mamat, M. N. (2002). A Financial Study of Cattle Integration in Oil Palm Plantations. In *OIL PALM INDUSTRY ECONOMIC JOURNAL* (Vol. 2, Issue 1).
- Novickytė, L. (2018). Income Risk Management in Agriculture using Financial Support. *European Journal of Sustainable Development*, 7(4). <https://doi.org/10.14207/ejsd.2018.v7n4p191>
- Pauschinger, D., & Klauser, F. R. (2022). The introduction of digital technologies into agriculture: Space, materiality and the public–private interacting forms of authority and expertise. *Journal of Rural Studies*, 91, 217–227. <https://doi.org/10.1016/j.jrurstud.2021.06.015>
- Reed SM, Graves A, Dandy N, Posthumus H, Huback K, Morris J, Prell C, Quin CH, Stringer LC. 2009. Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*. 90:1933-1949.
- Robinson, L. W., Ericksen, P. J., Chesterman, S., & Worden, J. S. (2015). Sustainable intensification in drylands: What resilience and vulnerability can tell us. *Agricultural Systems*, 135, 133–140. <https://doi.org/10.1016/j.agsy.2015.01.005>
- Santeramo, F. G., Goodwin, B. K., Adinolfi, F., & Capitanio, F. (2016). Farmer Participation, Entry and Exit Decisions in the Italian Crop Insurance Programme. *Journal of Agricultural Economics*, 67(3), 639–657. <https://doi.org/10.1111/1477-9552.12155>
- Schut, M., Klerkx, L., Rodenburg, J., Kayeke, J., Hinnou, L. C., Raboanarielina, C. M., Adegbola, P. Y., van Ast, A., & Bastiaans, L. (2015). RAAIS: Rapid Appraisal of Agricultural Innovation Systems (Part I). A diagnostic tool for integrated analysis of complex problems and innovation capacity. *Agricultural Systems*, 132, 1–11. <https://doi.org/10.1016/j.agsy.2014.08.009>
- Schut, M., van Asten, P., Okafor, C., Hicintuka, C., Mapatano, S., Nabahungu, N. L., Kagabo, D., Muchunguzi, P., Njukwe, E., Dontsop-Nguezet, P. M., Sartas, M., & Vanlauwe, B. (2016). Sustainable intensification of agricultural systems in the Central African Highlands: The need for institutional innovation. *Agricultural Systems*, 145, 165–176. <https://doi.org/10.1016/j.agsy.2016.03.005>
- Severini, S., & Sorrentino, A. (2017). Efficiency and coordination in the EU agri-food systems. In *Agricultural and Food Economics* (Vol. 5, Issue 1). SpringerOpen. <https://doi.org/10.1186/s40100-017-0086-9>
- Siska, D., Penelitian, B., Pengembangan, D., Provinsi, D., Selatan, K., Dharma Praja, J., Perkantoran, K., & Kalsel, P. P. (2018). THE DEVELOPMENT OF PRIORITY AREA FOR PALM OIL-COW INTEGRATION IN SOUTH KALIMANTAN. 13, 19–25.
- Southern, A., Lovett, A., O'Riordan, T., & Watkinson, A. (2011). Sustainable landscape governance: Lessons from a catchment-based study in whole landscape design. *Landscape and Urban Planning*, 101(2), 179–189. <https://doi.org/10.1016/j.landurbplan.2011.02.010>
- Tadesse, M. A., Shiferaw, B. A., & Erenstein, O. (2015). Weather index insurance for managing drought risk in smallholder agriculture: lessons and policy implications for sub-Saharan Africa. In *Agricultural and Food Economics* (Vol. 3, Issue 1). SpringerOpen. <https://doi.org/10.1186/s40100-015-0044-3>
- Tohiran, K. A., Nobilly, F., Zulkifli, R., Ashton-Butt, A., & Azhar, B. (2019). Cattle grazing in oil palm plantations sustainably control understory vegetation. *Agriculture, Ecosystems and Environment*, 278, 54–60. <https://doi.org/10.1016/j.agee.2019.03.021>

- Vanlauwe, B., Coyne, D., Gockowski, J., Hauser, S., Huising, J., Masso, C., Nziguheba, G., Schut, M., & Van Asten, P. (2014). Sustainable intensification and the African smallholder farmer. In *Current Opinion in Environmental Sustainability* (Vol. 8, pp. 15–22). Elsevier. <https://doi.org/10.1016/j.cosust.2014.06.001>
- Weltin, M., Zasada, I., Piorr, A., Debolini, M., Geniaux, G., Moreno Perez, O., Scherer, L., Tudela Marco, L., & Schulp, C. J. E. (2018). Conceptualizing fields of action for sustainable intensification – A systematic literature review and application to regional case studies. *Agriculture, Ecosystems and Environment* (Vol. 257, pp. 68–80). Elsevier B.V. <https://doi.org/10.1016/j.agee.2018.01.023>
- Yuhendra. (2022). *Integrasi perkebunan kelapa sawit dan peternakan sapi potong di Provinsi Riau: Analisis Ekonomi dan Keberlanjutan*. Disertasi. Institut Pertanian Bogor.