OPEN ACCESS: Research Article

Strengthening local institutions for cattle-palm oil integration to increase beef self-sufficiency and palm oil sustainability (Case Study: SISKA-KUINTIP in Tanah Bumbu, South Kalimantan Province)

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 Abstract

The cattle-oil palm integration system refers to a farming approach that involves the integration of the plantation sub-sector and the livestock sub-sector. It can be achieved by utilizing the vacant area beneath oil palm plants to graze beef cattle. The combination of oil palm and cattle production systems has significant social, economic, and ecological standpoints. The program strategy for establishing a cattle-oil palm integration system highlights the importance of institutional involvement in supporting a priority program that has achieved success in multiple areas. The study was conducted in the Tanah Bumbu District in the South Kalimantan Province. The place selection was conducted via purposive sampling, considering its potential as a prototype for combining cattle and oil palm development. This study employs Interpretative Structural Modeling to categorize local institutions into four quadrants: dependent, linked, autonomous, and independent. Engaging three specialists in delineating the entities involved in the development of the cattle-oil palm integration system, specifically the central government, regional government, community, business sector, and universities. The research findings indicate the presence of 17 active institutions, distributed as follows: 2 in the independent quadrant, 9 in the linkage quadrant, 6 in the dependent quadrant, and none in the autonomous quadrant. Thus, the essential requirements for enhancing this establishment have been delineated. The institutional strengthening strategy was devised using a three-step approach, which involved the establishment of small farmer corporations, the establishment of autonomous cooperatives, and the revitalization of Indonesian planters and breeders associations. We analyze and subsequently include multiple entities that contribute to the enhancement of individual empowerment. The suggested approach for enhancing institutional development necessitates the cooperation of cooperatives, smallholder groups, and palm oil mills, with the assistance of regulatory authorities, financial institutions, and input suppliers, through mutually advantageous partnership initiatives.

Keywords

Beef self-sufficiency, Local institutions, Palm oil sustainability, Smallholders

Introduction

The oil palm plantations in Indonesia have been recognized as the primary sector driving the country's economic growth. They contribute to employment generation and enhance income distribution in society (Susila et al., 2016). Indonesia currently retains its position as the foremost producer of palm oil globally. Therefore, this sector emerges as the primary sector for promoting the domestic economy (Joni et al., 2006), as evidenced by increases in investment, production, and foreign currency (Susila et al., 2016). Moreover, there has been a rise in the affluence of local small-scale farmers, which has made a favorable impact on economic endeavors in small rural communities, while also helping to alleviate poverty. According to (Syahza, 2011), an increase in the welfare index resulting from plantation owning has a notable and beneficial effect on local smallholders by enhancing their purchasing power.

The Minister of Agriculture Regulation No.105/PD300/8/2014 ensures that oil palm plantation businesses and beef cattle cultivation businesses can integrate their operations in a mutually beneficial and sustainable manner. According to (Tiemann & Douxchamps, 2023), integrated agricultural systems exhibit higher levels of sustainability compared to non-integrated systems. The integration of oil palm plantations with cattle farming has the potential to create a lucrative economic opportunity by maximizing calf production (Baliarti et al., 2020). Cattle-oil palm integration refers to a comprehensive agricultural system that merges plantation and livestock activities into a cohesive and interconnected model (Wulandari & Villano, 2021). The concept of sustainable palm oil seeks to eliminate deforestation, greenhouse gas emissions, land conflicts, and labor abuses throughout the worldwide palm oil value chain. This objective is accomplished by endorsing palm oil production as a method to promote progress in tropical nations. It is worth mentioning that smallholder oil palm growers constitute a relatively small demographic and consistently encounter diverse socio-economic limitations (Ogahara et al., 2022).

In various regions of Indonesia, the Regional Government has implemented the oil palm cattle integration system model as a Regional Flagship program. This program encourages collaboration among multiple stakeholders, with the integration of commodities (palm oil and cattle, plantations and livestock) and entities (companies and communities, planters and livestock breeders, government and private sector) being the key to its success. The main actors in this collaboration are entities that provide mutual support, with the agro-industry playing a crucial role in ensuring a favorable business climate and added value. The Central Bank has a crucial role in managing inflation by promoting food security clusters and facilitating the establishment of functioning banks through capital facilitation (KUR) and financial literacy education (Bremer et al., 2022; Darsono, 2023; Siska Supporting Program, 2022). Indonesia has had rapid growth in oil palm plantations, covering an area of over 5 million hectares, as well as significant expansion in beef cattle production, with a population exceeding 180 million head (BPS, 2022).

Furthermore, it has been noted that placing only emphasis on optimizing palm oil production might lead to diminishing and uncertain financial profits, while also exacerbating the issue of inadequate

food accessibility among small-scale farmers (Rival & Levang, 2014). Within the framework of palm oil expansion, it is evident that corporate entities tend to acquire excessive profits, frequently at the detriment of neighboring communities (Obidzinski et al., 2012; Rival & Levang, 2014). The palm oil industry is attracting more attention and concern because of its significant social and environmental impacts, leading to concerns over its sustainability and acceptability. The functionality of an institution can be determined by evaluating the performance of its constituent pieces. Institutional assessment is a thorough method of evaluating and describing the overall ability and effectiveness of an institution.

According to Syahyuti (2002), there are nine factors that lead to the failure of institutional implementation. These factors include the following: 1) The only reason institutions are established is to strengthen horizontal contacts; vertical linkages are not taken into consideration at any point in the process. 2) The role of the institution places a greater emphasis on the distribution of control and pays less attention to the social capital of the local community; 3) The management structure is developed in a formal manner and may potentially have requirements that are not necessary; 4) The social learning procedures are put in jeopardy when there is an unequal distribution of the involvement and growth capabilities of each individual or group; 5) The development of local institutions receives less attention than the development of institutions, which is more focused with structure; Material interests are the driving force behind the creation of institutions; 7) The importance of political considerations is stressed; 8) It is possible for horizontal links to be negatively impacted when institutions undergo internal changes. 9) Merger of modest institutions for communal development. When (Arifin, 2005) defines institutional notions, he divides them into two primary categories: norms, conventions, and rules of the game. Norms and conventions constitute the first category. The formal codification and implementation of institutional ideas in the real world is something that governments are occasionally able to do, but they are also susceptible to unwritten laws that are founded on social conventions and expectations. There has not been an increase in the benefits that have been offered to society or the target groups as a result of the adoption of ineffective approaches and institutional structures and procedures.

The creation of farmer organizations, non-bank institutions, corporations, and industrial clusters as institutions is a common component of many institutional solutions. so enhancing their advantage over their competitors. A great number of studies have focused their attention on this commodity in order to preserve institutional frameworks, establish excellent agricultural practices, and manage stakeholders (Lee et al., 2014; Udaya et al., 2010; Raharja et al., 2020).Through the creation of primary components that address economic, social, and environmental resilience characteristics, the Sustainable Development Goals (SDGs) are a development goal. Businesses, actors, and members of civil society all have the ability to plan, publicize, and contribute to the process of sustainable improvement.

According to (Dhahri et al., 2021), business entities or actors in this context place a greater emphasis on business concepts that are designed to strike a balance between the social, economic,

and environmental impacts of the activities of those involved in sustainable agriculture. This is done in an effort to compete and be efficient in the various aspects of sustainable development related to sustainable agriculture. It is for this reason that corporate entities are not the only entities that contribute to the development of sustainable agriculture by offering potential strength, and rural areas require support from all aspects. Commitment and synergy between one element and other elements are the primary keys to successful potential development (Rampersad et al., 2010). Potential development cannot be accomplished from a single factor on its own. The program of sustainability is partially attributed to the progressively heightened engagement of institutions. Rural locations serve as the setting for participants who play the roles of program actors (Jessen et al., 2022; Nuddin et al., 2023; Salman et al., 2021, 2023).

The purpose of this research is to conduct an investigation into the institutional strengthening of cattle-palm oil integration in order to promote beef self-sufficiency and palm oil sustainability. This is suggested by the description that was presented earlier.

Materials and Methods

The research was conducted in Tanah Bumbu Regency, South Kalimantan Province, from March to July 2023. The selection of Kabupaten Tanah Bumbu as the research location was determined through purposive sampling, taking into consideration that the location can serve as a prototype for the development of the integration of cattle and oil palm based on the following factors: 1) the area being a center for the development of cattle-oil palm integration, 2) the support of multiple stakeholders (public sector, voluntary sector, and private sector) in achieving the target of increasing cattle population and sustainable oil palm plantations, particularly in the model of cattle-oil palm integration, 3) providing an overview of group dynamics in supporting the development of the cattle-oil palm integration system, and 4) the prioritized program in South Kalimantan regarding the SISKA KUINTIP (Oil Palm-Cattle Integration System Based on Core-Plasma Partnership). The present study is descriptive research employing a qualitative approach. The design employed in this research is a case study, whereby the researcher explores a singular unit or phenomenon bounded by time and activities during a certain period. The expected description in this study is the clear and systematic depiction of the structure, hierarchy, and interrelationships among elements obtained based on expert assessment.

The determination of specialists is made by taking into account their interests and skills. When it comes to the cattle-oil palm integration system, the level of interest is determined by the level of social and economic involvement, whereas the level of expertise is determined by the level of knowledge and experience gained as a speaker, consultant, or policymaker. (Shen et al., 2016) suggests that the number of specialists in ISM should be limited, with a minimum need of two members. Additionally, other reports have shown that a panel of experts in ISM analyses should consist of 15-30 participants who share similar characteristics, and 5-10 people who have different characteristics (Fu et al., 2022). Based on expert considerations, namely: extension workers and health workers representing (local administration), Head of the South Kalimantan Plantation and

Livestock Service representing (government), Chair of the farmer-planter cluster representing membership organizations, South Kalimantan Regional Development Bank representing financial institutions, Chair of GAPKI, APKASINDO, GAPUSPINDO, and GAPENSISKA representing organizational services, as well as the Director of PT. Symbiosis Karya Agroindustry, PT. Gawi Makmur Kalimantan, and PT. Batulicin Agro Sentosa representing private companies.

The outcomes of interviews and talks with industry professionals served as a guide for identifying seventeen institutions in Indonesia that require assistance in the process of building an integrated system for oil palm cattle. These institutions are as follows:

The instrument employed in this study was a questionnaire consisting of a list of questions administered to experts through interview methodology. The study employed Interpretative Structural Modelling (ISM) analysis to formulate a complex policy structure based on its constituent elements, establish a hierarchy of relationships among these elements, and classify them into four quadrants (autonomous, independent, dependent, and linkage) (Saxena & Vrat, 1992). The process of conducting an ISM analysis consists of three primary stages, which are outlined below:

Using the questionnaire results, Develop a Structural Self Interaction Matrix (SSIM). This matrix represents respondents' responses expressed in four symbols where:

V: If sub-element I has a contextual relationship to sub-element J, not vice versa.
A: If sub-element J has a contextual relationship to sub-element I, not vice versa.
X: If sub-element I and sub-element j have a contextual relationship.
O: If sub-element I and sub-element j have no contextual relationship.

Convert SSIM to Initial Reachability Matrix by replacing the symbols V, A, X, and O in the questionnaire with numbers 1 and 0 according to ISM rules. Then the matrix will be modified to show all direct and indirect relationships in the matrix to produce the Final Reachability Matrix.

The Final Matrix is then processed to obtain Driver Power and Dependence (DP-D) values to produce a Directional Graph, which shows hierarchical levels and is classified into four quadrants.

The first quadrant exhibits a high degree of autonomy, with its sub-elements typically demonstrating limited or negligible interdependence with the overall system. Sub-elements are included in this sector if their DP value is less than or equal to 0.5, and their D value is less than or equal to 0.5. Furthermore, the subsequent quadrant is characterized by sub-elements lacking independence and heavily relying on others. Sub-elements are included in this sector if the value of DP is less than or equal to 0.5 and the value of D is greater than 0.5. The next quadrant to consider is the linkage quadrant, which contains significant sub-elements that warrant thorough study due to their inherently unstable interactions with other sub-elements. Sub-elements are included in this sector if their DP value is greater than 0.5 and their D value is greater than 0.5. The fourth quadrant represents the independent variables, significantly affecting the other sub-elements within this sector. According to (Saxena & Vrat, 1992), sub-elements are included in this

sector when the DP value exceeds 0.5, and the D value is less than or equal to 0.5.

The first quadrant is autonomous. The sub-items in this sector are generally unrelated to the system or may have little connection. Sub-elements enter this sector if the DP value ≤ 0.5 and the D value ≤ 0.5. Then there is the dependent quadrant, the sub-elements in this position are not independent, very dependent on other sub-elements. Sub-elements fall into this sector if the DP value ≤ 0.5 and the D value > 0.5. Then there is the connecting quadrant. The sub-elements of this sector are very important and must be studied carefully because they have unstable relationships between the sub-elements. Sub-elements enter this sector if the DP value > 0.5 and the D value > 0.5. The fourth is the independent quadrant. The sub-elements of this sector are independent variables that have a great influence on the other sub-elements. Sub-elements fall into this sector if the DP value is > 0.5 and the D value is ≤ 0.5 (Saxena & Vrat, 1992).

Result and Discussions

The relationship between the sub-elements in ISM defined the problem or issue encountered based on the results. This suggested that a comprehensive, systematic model has been created by classifying the closely related sub-elements. In this instance, the constructed model used a well-planned pattern using a combination of words and graphics to represent the structure of a difficult issue or problem, a system, or a study subject.

Table 1. Initial Reachability Matrix (RM)

Sub-Elements	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17
A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
A6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A7	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
A8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A9	1	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1
A10	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
A11	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
A12	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
A13	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
A14	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
A15	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	0
A16	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0
A17	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 2. Final Reachability Matrix

Sub-Elements	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17
A1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
A6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A7	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
A8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A9	1	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1
A10	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
A11	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
A12	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
A13	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
A14	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
A15	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	0
A16	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0
A17	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Based on the results, the RM was developed by using SSIM. In this case, the information of each SSIM cell (V, A, X, and O) was initially translated into an initial RM format, through the transformation into binary digits (i.e., 1 or 0). This transformation activity contained V (1,0), A (0,1), X (1,1), and O (0,0) signs (Poduval et al. 2015), as illustrated in Tables 1. From the results, the matrix was subsequently rectified to obtain a closed phase complying with the transitivity requirements, which required the entire completeness of the circular causal chain (causal loop). In this case, X need to influence Z when Y and Z are both impacted by X. More assessments were carried out to determine the adherence levels of the 0-value cells to the transitivity requirements. When these levels are not observed, changes need to be carried out for appropriate adherence to the transitivity criteria. The final RM is also improved based on the examinations in Table 2
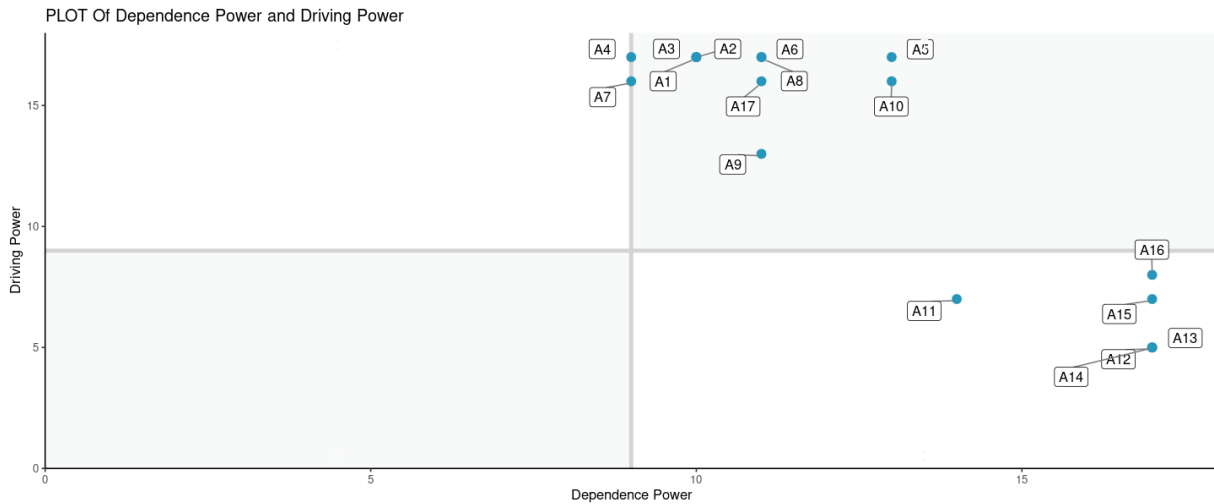
Figure 1. Graph ISM

The institutions are broken down into four quadrants in Figure 1. This indicates that the Directorate of Palm Oil and Other Palm Oil, financial institutions, and other strong driving institutions are found in quadrant IV (independent). The Directorate General of Plantations, the Directorate General of Animal Husbandry, the Directorate of Feed, BPDPKS, Disbunnak/DKPP, Palm Oil Companies, Academics, GAPKI, and the Community (SISKA Cluster) are among the forces seen in quadrant III. Moreover, Quadrant II has a greater number of sub-elements, indicating a low driving force and significant reliance. Based on these findings, there are no sub-elements in the autonomous sector, or quadrant I. Information that improves and permits methodical performance is found in the digraph matrix. Select an organization that actively contributes to the creation of an integrated cattle-oil palm system. They also function as a very useful basic reference.

The Digraph Matrix is a tool that enhances and facilitates the methodical functioning of institutions involved in implementing the most effective business agility model for the cattle-palm oil integration system industry. Moreover, they also function as a very efficient foundational resource. Figure 2 depicts the structural interpretation model of each institution that provides support and exerts impact on the successful development of a sustainable cattle-oil palm integration system.
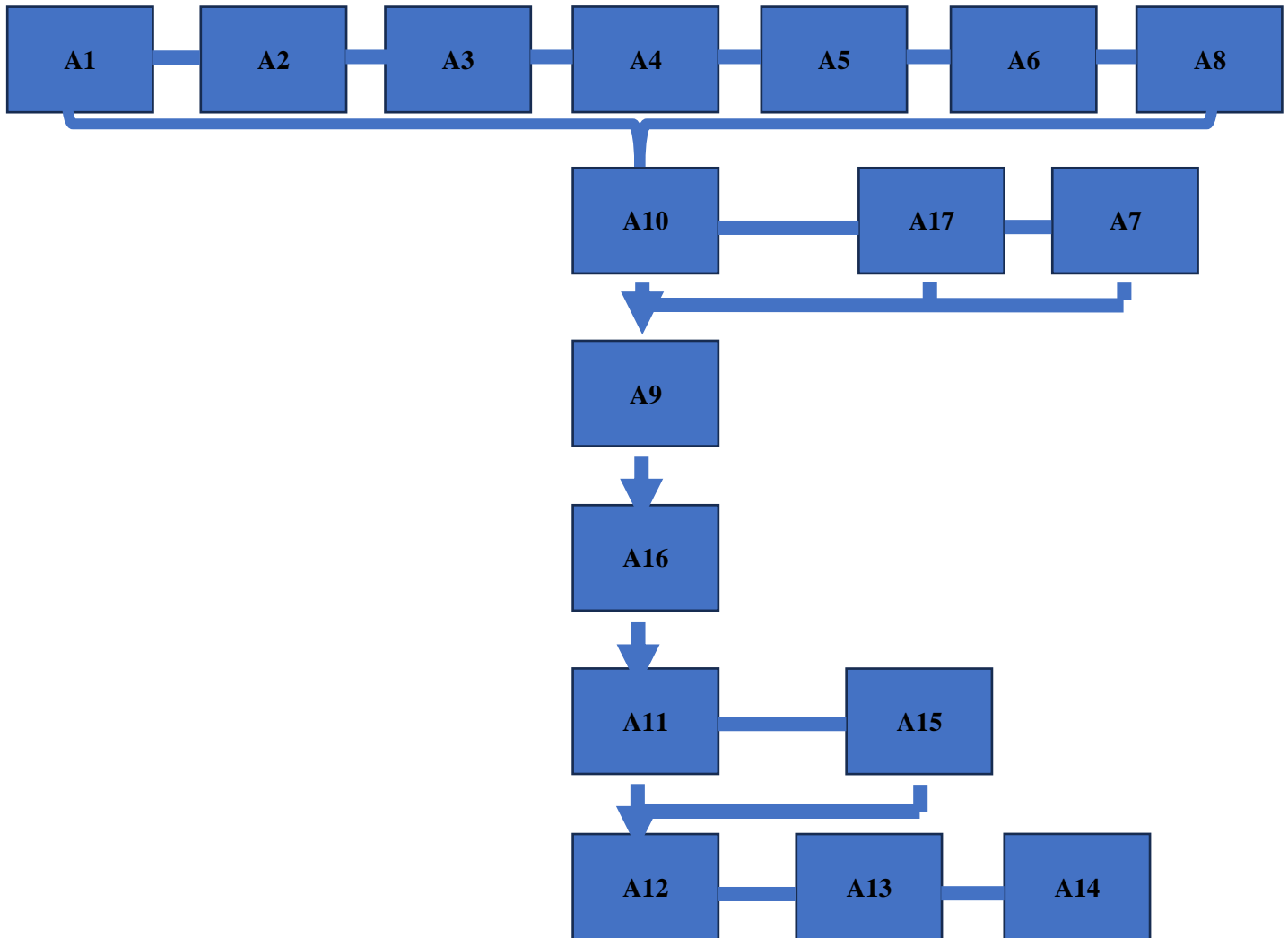
Description: A1. General Of Plantations Directorate; A2. General of animal husbandry and animal health Directorate; A3. Feed Directorate; A4. Directorate of Palm Oil and Other Palm; A5. Palm Oil Plantation Fund Management Agency (BPDPKS); A6. Disbunnak/DKPP; A7. Financial institutions; A8. Palm oil company; A9. Academic; A10. GAPKI; A11. APKASINDO; A12. SPKS; A13. POPSI; A14. GAPUSPINDO; A15.PPSKI; A16. GAPENSISKA; A17. SISKA Clusters

Figure 2. ISM Hierarcy Structure

Figure 2 shows, the sub-elements "SPKS, POSPI, and GAPUSPINDO" are positioned at the lowest level in the ISM structure. Strengthening this institutional model requires support from various parties, both in providing ease of access to capital and in increasing the capacity and performance

of businesses and their members. The revitalization of the association model is based on the fact that the association's function is currently limited to programs and development, training, or capacity-building activities for its members. A number of fundamental issues are also needed to improve the performance of independent smallholders, including mediating issues regarding the legality of their land or agricultural products and certification. Plantation businesses are expected to be guarantors. provide confidence to palm oil processing companies on the downstream side. Furthermore, to complete the analysis, all recommended institutional models are integrated into one main model. The results of the analysis show that the recommended institutional form in order to strengthen planters and breeders in achieving beef self-sufficiency and palm oil sustainability programs is an integrated institutional form where independent cooperatives are the institutional core. Independent cooperatives were formed based on the needs and awareness of independent farmers. This institutional form will be able to run well through its existence. a person who the cooperative's members respect and who establishes rules that all members must follow. However, in the context of strengthening cluster local institutions, support from various parties is also needed, according to the roles and duties of each actor.

These three elements are crucial to the institution and are essential for addressing the problems that affect the development of an integrated oil palm cattle system. Collaboration is necessary for the successful progress of this development. The association can facilitate the cooperation among members to exchange valuable knowledge and skills in the development and management of cattle-oil palm integration systems. This may entail providing shared resources, such as facilities for processing, distribution, and technology improvement. In addition, our organization can help simplify the certification procedure for integrated products, thereby improving their market competitiveness. Furthermore, it may effectively tackle any obstacles that may develop during the establishment of a cattle-oil palm integration system and guarantee adherence to legislation regarding sustainable practices. The implementation of a cattle-oil palm integration system requires the involvement of several stakeholders, including planter/breeder groups (Abid et al., 2017).These are decentralized and non-formal associations or networks that farmers employ to obtain a wide range of services. These linkages largely consist of close-knit social networks and agricultural cooperative partners that operate on trust and reciprocity, providing mutual help in times of need. The citation is derived from the work of (Schut et al., 2015). Innovation capacity refers to the ability of individuals and organizations to successfully utilize their skills, expertise, and experience to consistently identify and prioritize challenges and opportunities for innovation within a dynamic system.

The establishment of a cattle-oil palm integration system necessitates the participation of many stakeholders, such as planter/breeder collectives and organizations representing plantations and livestock. The provided figure depicts the significant influence of livestock and plantation organizations in the development of the cattle-oil integration system. The association has a crucial role in advocating for and protecting the interests of stakeholders in the palm oil sector.

Furthermore, they are striving to implement laws that promote the sustainable expansion of the integrated cattle-palm system, usually referred to as SISKA.

The process of establishing a cattle-oil palm integration system necessitates the involvement of local institutions, which may present certain difficulties and constraints. Several obstacles and limits that may arise in this particular scenario encompass:

1. Constraints on available resources
    Local institutions may have constraints in terms of resources, such as financing, labor, and infrastructure, which can hinder their capacity to establish and manage these integration systems.

2. Shifts in the legal and regulatory framework
    Modifications in rules or governmental policies pertaining to agriculture, the environment, or forestry might impact the functioning of the integration system. Regional establishments may encounter difficulties in adjusting to these alterations.

3. Challenges of a technical nature
    The implementation of a cattle-oil palm integration system encompasses technical elements such as data administration, utilization of technology, and management of natural resources. Local institutions may lack the requisite technical proficiency or access to the essential technologies.

4. Conflict of interest
    Local institutions may need to resolve conflicts of interest among parties, including oil palm farmers, cattle breeders, and local residents. Coordinating tasks and managing conflicts can pose significant difficulties.

5. Insufficient awareness and education
    Lack of sufficient awareness or comprehension regarding the advantages of integrating cattle and oil palm systems can be a constraint. Local stakeholders require education and training to comprehend the potential of these systems.

6. Risks pertaining to the environment and society
    The implementation of the integrated system must consider its environmental and societal implications. Local institutions must effectively mitigate environmental and social risks to prevent any adverse impacts on the community or the environment.

7. The Impact of Climate Change on Weather Patterns and the Lack of Predictability
    The production of palm oil and the circumstances for cattle ranching can be influenced by climate change and the unpredictability of weather patterns. Local institutions must design adaptation plans to address these changes.

8. Enhancement of capabilities
    It is essential to enhance the local institutional capacity in terms of management, planning, and application of technology in order to effectively create and operate a cattle-oil palm integration system.

To address this difficulty, cooperation among the government, research institutions, non-governmental organizations, and the commercial sector can facilitate the establishment of a sustainable integration system and yield advantages for all parties involved.

Conclusion

The research findings indicate the presence of 17 active institutions, distributed as follows: 2 in the independent quadrant, 9 in the linkage quadrant, 6 in the dependent quadrant, and none in the autonomous quadrant. Thus, the essential requirements for enhancing this establishment have been delineated. The institutional strengthening strategy was devised using a three-step approach, which involved the establishment of small farmer corporations, the establishment of autonomous cooperatives, and the revitalization of Indonesian planters and breeders associations. We analyze and subsequently include multiple entities that contribute to the enhancement of individual empowerment. The suggested approach for enhancing institutional development necessitates the cooperation of cooperatives, smallholder groups, and palm oil mills, with the assistance of regulatory authorities, financial institutions, and input suppliers, through mutually advantageous partnership initiatives.

To further investigate the enhancement of the cattle-oil palm integration system, it is imperative to develop a program that establishes institutions in a more tangible manner, fostering collaboration among relevant governmental and non-governmental entities. In addition to that, programs aimed at empowering individuals Established cooperatives are essential for providing support throughout specific seasons. The implementation of the institutional strengthening program necessitates collaboration, synergy, and collaborative management across relevant institutions to foster the development of autonomous growers and competitive independent cooperatives.

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