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Collaborative Governance Model in Strengthening the Competitiveness of Leading Commodities to Support Food Security and Independence

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ABSTRACT
This study develops a collaborative governance model to strengthen the competitiveness of leading commodities in Sangihe Islands Regency in support of national food security and sovereignty. Employing a mixed-methods design, the research integrates quantitative tools (Location Quotient, IFAS–EFAS, SWOT) with qualitative approaches (interviews, focus group discussions, and participatory observation). The results identify pig farming as the foremost leading commodity, followed by native chicken and duck eggs, while cattle and broiler chickens remain in need of further development. Structural constraints include weak logistics, limited human resources, and dependence on imported feed. To overcome these challenges, the proposed model fosters multi-stakeholder collaboration involving local government, farmers, the private sector, and academia, reinforced by digital platforms, financing schemes, and quality control systems. The roadmap emphasises synergy between local wisdom (Mapalus) and digital innovation to enhance competitiveness, alleviate poverty, and bolster regional contributions to national food resilience.

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INTRODUCTION

Sangihe Islands Regency has strategic potential for leading commodities, such as nutmeg, coconut, marine fish, and various local food crops. These commodities play an important role in supporting national food security and self-sufficiency(Winarno, 2021) . However, the competitiveness of these leading commodities still faces various challenges. The main obstacles include low synergy between development actors, weak collaboration in policy management, limited innovation, and suboptimal strengthening of local institutions(Nuhung, 2013; Zitri et al., 2022) . This situation highlights the need for a more inclusive and collaborative governance approach so that the potential of leading commodities can develop sustainably(Nurza, 2024) .

One relevant approach is collaborative governance, which emphasises the importance of cross-sector collaboration in the formulation and implementation of public policy(Wahyudi, 2024) . This model shifts the old top-down paradigm towards a more participatory, inclusive, and consensus-oriented approach. Collaborative governance not only involves the

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government as the main actor, but also integrates the roles of the private sector, academics, civil society, and local communities in public decision-making(Merlin-Brogniart et al., 2022) .

In the agenda to strengthen the competitiveness of leading commodities, collaborative governance serves as a strategic foundation for building synergy between actors throughout the value chain, from production and distribution to marketing(Arsana et al., 2021) . This approach encourages open dialogue, knowledge sharing, and the formation of shared commitments to address development challenges(Liu et al., 2023) . This theory also emphasises the principle of networked governance, which is governance based on networks built on mutual trust, shared purpose, and collective responsibility. Through these mechanisms, collaborative governance at the local level can reduce policy fragmentation, increase programme effectiveness, strengthen local capacity through policy co-creation, and increase legitimacy through active public participation.

Meanwhile, strengthening regional competitiveness is also closely related to the selection and management of leading commodities. Flagship commodities are understood as key commodities that have a strategic position both technically (suitability of land and climate) and socio-economically (availability of technology, quality of human resources, infrastructure, and institutional support) to be developed in a region(Ramadhani et al., 2022) . These basic commodities not only meet local needs(Arsana et al., 2020) , but also generate surpluses that can be marketed outside the region, thereby creating added value and expanding employment opportunities(Antara & Sumarniasih, 2023) .

According to Wardhani (2023), there are a number of criteria that must be met by a commodity in order to be considered superior(Wardhani, 2023) . These include its ability to be the main driver of economic development, strong forward and backward linkages, competitiveness in national and international markets, technological sustainability, labour absorption capacity, resilience to internal and external shocks, and orientation towards resource and environmental sustainability. Thus, comparative and competitive advantages are key prerequisites for leading commodities to be able to compete in the open market(Gamaputra & Nuswantara, 2023) .

Within this framework, development in the Sangihe Islands Regency requires a collaborative governance model that can synergise the roles of the government, private sector, academia, and civil society in the management of leading commodities. Various studies indicate that the capture fisheries and local agriculture sectors have high export potential, but issues of productivity and weak integration among development actors reveal strategic gaps that need to be addressed through a collaborative governance approach.

To date, there has been no comprehensive study formulating a collaborative governance model to strengthen the competitiveness of leading commodities in the Sangihe Islands Regency. Thus, this research is important to produce intervention strategies that not only increase the competitiveness of local commodities but also strengthen the region's contribution to supporting national food security and self-sufficiency.

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METHODS

This research was conducted in Sangihe Islands Regency for six months, from June to August 2025. The method used was mixed methods(Creswell, 2009) , with the aim of obtaining a comprehensive understanding of strengthening the competitiveness of leading commodities through a collaborative governance approach. The quantitative approach was used in the initial stage to analyse the relative advantages and competitiveness levels of leading commodities in the research area, followed by a qualitative approach to explore in greater depth the structural, social, and institutional constraints that affect the effectiveness of collaboration between development actors.

The data sources used included primary data obtained through direct engagement with local actors, as well as secondary data from journals, books, policy documents, and official reports. Data collection techniques included focus group discussions (FGDs) to capture collective understanding, questionnaires to gather respondents' perceptions, documentation through archival searches and official documents, in-depth interviews with key informants, and participatory observation at the research site.

Data analysis was conducted in stages. First, the identification of leading commodities was analysed quantitatively using the location quotient method(Olilingo et al., 2021) , to produce a map of food commodities based on local potential. Second, commodity competitiveness was measured using SWOT analysis and the IFAS–EFAS matrix to compile a profile of strengths and weaknesses in the regional and national contexts. Third, the effectiveness of collaborative governance was analysed qualitatively through a study of institutional networks, stakeholder interests, and collaboration patterns to obtain an overview of the actors, relationships, and roles involved. Finally, the model was developed through triangulation of findings, logical framework analysis, and formulation of a policy model based on local wisdom and digitalisation. The final result was the design of a Collaborative Governance Model, which was developed as a policy roadmap for strengthening the competitiveness of leading food commodities in the Sangihe Islands Regency.

RESULTS AND DISCUSSION

Location Quotient Analysis and Mapping of Leading Commodities Based on the Location Quotient (LQ) analysis of livestock production data in Sangihe Islands Regency in 2024, the following results were obtained:

Table 1. Location Quotient Analysis Results for Meat Production

Commodity	Production (kg)	Actual Proportion (%)	Ideal Proportion (%)	LQ	Category
Pig	116,456	56.81	15.00	3.79	BASIS
Free-range chicken	60,660	29.59	20.00	1.48	BASIS
Beef cattle	22,620	11.03	25.00	0.44	NON-BASIC
Duck	1,704	0.83	5.0	0.17	NON-BASIC
Goat	953	0.46	5.00	0.09	NON-BASIC
Broiler Chicken	2,612	1.27	30.00	0.04	NON-BASIC

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Commodity	Production (kg)	Actual Proportion (%)	Ideal Proportion (%)	LQ	Category
TOTAL	205,005	100.00	100.00		

Source: Processed Results (2025)

Table 2. Results of Location Quotient Analysis for Egg Production

Commodity	Production (units)	Actual Proportion (%)	Ideal Proportion (%)	LQ	Category
Free-range chickens	44.639	38.93	30.00	1.30	BASIS
Duck	13,299	11.60	10.00	1.16	BASIS
Laying hens	56,737	49.48	60.00	0.82	NON-BASIC
TOTAL	114,675	100.00	100.00		

Source: Processed Results (2025

Table 3. Ranking of Leading Commodities Based on LQ Value

Rank	Commodity	Type	LQ	Status
1	Pork	Meat	3.79	MAIN PRODUCT
2	Free-range chicken	Meat	1.48	HIGHLIGHTS
3	Free-range chicken	Egg	1.30	HIGHLIGHTS
4	Duck	Eggs	1.16	HIGHLIGHTS
5	Laying Hen Breed	Eggs	0.82	Needs Development
6	Beef cattle	Meat	0.44	Needs Development
7	Duck	Meat	0.17	Needs Development
8	Goat	Meat	0.09	Needs Development
9	Broiler Chicken	Meat	0.04	Requires Development

Source: Processed Products (2025

Based on the results of the Location Quotient (LQ) analysis, livestock commodities in Sangihe Islands Regency can be mapped into three strategic zones, namely the primary leading zone, secondary leading zone, and development zone. In the primary priority zone, pig farming occupies the leading position with an LQ value of 3.79 and a production contribution of 116,456 kg or 56.81% of total meat production. The high LQ value indicates a very strong comparative advantage, meaning that this commodity not only meets local demand but also generates a significant surplus with great potential for regional export. Thus, pigs can be positioned as the main driver of the regional livestock economy.

Secondary priority zones include free-range chicken meat (LQ 1.48), free-range chicken eggs (LQ 1.30), and duck eggs (LQ 1.16). These three commodities have a strong production base with broad development opportunities. Free-range chicken meat is managed using traditional farming systems that are in line with local wisdom and have the potential for increased productivity. Free-range chicken eggs have high economic value due to consumer preference for natural products, while duck eggs occupy a stable niche market , such as the

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traditional culinary industry. Therefore, these three commodities have the potential to become secondary mainstays if their management and added value are strengthened.

Meanwhile, the development zone is occupied by commodities with an LQ value below 1.0, such as laying hens (0.82), beef cattle (0.44), broiler chickens (0.04), goats (0.09), and meat ducks (0.17). Commodities in this group are not yet a basis for production, but still have strategic potential. Laying hens can be improved through the intensification of modern technology given the high demand for egg consumption. Beef cattle, although currently in deficit, are an important commodity because the demand for beef continues to increase; their development can be carried out through breeding programmes and fattening patterns. As for minor commodities such as goats, broiler chickens, and meat ducks, they need to undergo a feasibility assessment before being prioritised, given their still very limited production scale.

When viewed from a per capita production perspective, there is an imbalance between surplus and deficit. Pork production reached 0.847 kg/person per year, indicating a high surplus, while native chicken production at 0.441 kg/person remained at a moderate level. In contrast, cattle only contributed 0.165 kg/person and broiler chickens 0.019 kg/person, both of which were in significant deficit. A similar pattern is also seen in egg production, where broiler chickens only produce 0.4 eggs per capita, free-range chickens 0.3 eggs per capita, and ducks 0.1 eggs per capita. Although low, duck eggs are specialised for certain market niches.

Overall, the results of this analysis show that the structure of livestock farming in Sangihe is still imbalanced, with pigs as the dominant commodity and most other commodities still in deficit. Therefore, development strategies need to be directed towards expanding the market for pigs as a leading export commodity, strengthening free-range chickens and duck eggs for niche markets, and revitalising beef cattle and broiler chickens through technological intensification. With these strategic steps, the Sangihe Islands Regency can balance local food security and commodity competitiveness in regional and global markets.

Table 4. Competitiveness Analysis Using the IFAS-EFAS Matrix

Internal Factors	Weight	Rating	Score
STRENGTHS			
Pig production advantage (116,456 kg)	0.15	4	0.60
Diversification of poultry farming	0.12	3	0.36
Adaptation to local conditions	0.10	3	0.3
Land resource potential	0.08	3	0.24
WEAKNESS			
Limited logistics infrastructure	0.14	2	0.28
Low human resource capacity	0.12	2	0.24
Poverty rate 10.46%	0.11	1	0.11
Dependence on imported feed	0.10	2	0.20
Limited processing technology	0.08	2	0.16
TOTAL	1.00		2.49

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External Factors	Weight	Rating	Score
OPPORTUNITIES			
High regional market demand	0.18	4	0.72
Agro-industrial development	0.15	3	0.45
Government policy support	0.12	3	0.36
Ecotourism potential	0.10	3	0.3
THREATS			
Climate change	0.15	2	0.30
Competition from imported products	0.12	2	0.24
Limited access to energy	0.10	2	0.2
Feed price fluctuations	0.08	2	0.16
TOTAL	1.00		2.73

Source: Processed Results (2025

Based on the results of competitiveness analysis using the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) matrices, it can be understood that the livestock sector in Sangihe Islands Regency has a combination of strengths and opportunities that are quite strategic for development. Internally, the total score obtained is 2.49, indicating that internal conditions are moderate. The main strength lies in the superiority of pig production, with a volume of 116,456 kg, which is the main basis for excellence, supported by diversification of poultry farming, adaptation to local conditions, and the availability of land resources. However, a number of weaknesses still limit the optimisation of competitiveness, particularly limitations in logistics infrastructure, low human resource capacity, high poverty rates (10.46%), and dependence on imported feed and a lack of processing technology.

Meanwhile, an analysis of external factors using EFAS produced a total score of 2.73, indicating that the external environment is relatively more supportive than internal conditions. The greatest opportunities arise from high regional market demand, prospects for agro-industrial development, government policy support, and the potential for ecotourism to strengthen the branding of local livestock products. However, there are a number of threats that need to be anticipated, such as climate change, competition from imported products, limited access to energy, and fluctuations in feed prices that can affect production stability.

Overall, the IFAS (2.49) and EFAS (2.73) scores place the Sangihe livestock sector in a "grow and build" situation, meaning it has great opportunities for growth but still needs to strengthen internal factors in order to compete sustainably. The strategy that needs to be pursued is to maximise production advantages and market opportunities, while gradually overcoming structural weaknesses such as logistics, human resources, and dependence on external inputs.

Table 5. SWOT Matrix

Factor	Opportunities (O) (Total Score = 1.83)	Threats (T) (Total Score = 0.90)

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Strengths (S) (Total Score = 1.50)	**SO Strategy (Aggressive/Growth Strategy)** 1. Developing downstream pig and poultry industries based on agro-industry with support from regional markets and government policies. 2. Promoting the integration of livestock farming with ecotourism to strengthen local branding. 3. Utilising poultry diversification to meet niche market demand (duck eggs, free-range chickens).	**ST Strategy (Diversification)** 1. Leveraging the production advantages of pork and poultry to anticipate competition from imported products. 2. Developing a cold chain logistics system to maintain price stability during feed price fluctuations. 3. Promoting the adoption of climate-friendly technologies to reduce the impact of climate change.
Weaknesses (W) (Total Score = 0.99)	**WO Strategy (Turnaround)** 1. Enhancing livestock human resource capacity through training and technology transfer with government policy support. 2. Strengthening logistics infrastructure based on regional development programmes. 3. Diversifying local feed sources to reduce dependence on imports.	**WT (Defensive) Strategy** 1. Minimising the risk of energy constraints through the use of biogas from livestock waste. 2. Developing simple technologies for processing products to extend their shelf life. 3. A livestock-based poverty alleviation programme to reduce social vulnerability to market fluctuations.

Source: Processed Results (2025

The results of quantitative SWOT analysis indicate that the livestock sector in Sangihe Islands Regency is in a relatively strong position to develop a growth strategy. This can be seen from the IFAS score of 2.49 and the EFAS score of 2.73, which place this sector in quadrant I, a condition in which internal strengths can be optimised to capture external opportunities. With its main advantages being high pig production, poultry farming diversification, and adaptability to local conditions, the livestock sector has great potential for further development.

The SO (Strength–Opportunity) strategy that can be adopted includes encouraging the development of agro-industry-based downstream industries for pork and poultry products with the support of a growing regional market and pro- ic government policies on food security. In addition, the potential for ecotourism can be integrated with livestock businesses

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to strengthen local branding, and poultry diversification, such as free-range chicken eggs and duck eggs, can be directed towards fulfilling high-value niche markets.

However, the development strategy should not stop at utilising strengths. There are still a number of weaknesses that need to be addressed through a WO (Weakness–Opportunity) strategy. Some relevant steps include increasing human resource capacity through training and technology transfer, strengthening logistics infrastructure with the support of regional development programmes, and diversifying local feed to reduce dependence on high-risk imports.

On the other hand, there are external threats that can hamper competitiveness, such as climate change, competition from imported products, limited access to energy, and fluctuations in feed prices. Therefore, an ST (Strength–Threat) strategy is needed, including utilising the advantages of pig and poultry production as a basis for protection against the entry of imported products, developing a cold chain logistics system to reduce the impact of price fluctuations, and applying climate-friendly technology to maintain stable production despite extreme weather changes.

Meanwhile, the WT (Weakness–Threat) strategy is defensive in nature to minimise risk. Efforts that can be made include utilising biogas from livestock waste as an alternative energy source, developing simple technologies to increase product storage capacity, and strengthening poverty alleviation programmes based on smallholder livestock farming to reduce socio-economic vulnerability to global market shocks.

Thus, the most appropriate strategic direction is to emphasise the SO (aggressive) strategy to drive growth, while continuing to integrate the WO, ST, and WT strategies so that the development of the livestock sector in Sangihe is not only oriented towards short-term expansion but also sustainable in the face of external challenges.

Collaborative Governance in the Competitiveness of Sangihe Food Commodities

Within the framework of Collaborative Governance, the effectiveness of strengthening the competitiveness of leading food commodities in the Sangihe Islands Regency lies in the ability to orchestrate actors with different interests and strengths in a sustainable collaborative governance system. Collaborative Governance (Ansell & Gash, 2008) emphasises the existence of a deliberative forum that brings together the government, the private sector, civil society, and academics in a participatory and consensus-based decision-making process.

Local Government As both regulator and facilitator, the local government has policy legitimacy, regulatory instruments, and access to public budgets. However, its main weaknesses are limited technical capacity and bureaucratic rigidity. In Collaborative Governance, the government must transform from a mere controller to an enabler, opening space for participation, providing adaptive regulations, and ensuring fairness in the distribution of benefits.

Farmer/Breeder Groups are key actors in production. Local experience, traditional wisdom, and trust-based social networks are distinctive socio-economic strengths. However, limited access to capital, technology, and markets makes their position vulnerable.

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Collaborative Governance requires the empowerment of these groups through financing access schemes, technical training, and partnership facilitation so that they can move from being mere implementers to co-producers in the value chain.

Private Sector Its role is as an investor and marketer, particularly in providing capital, technology transfer, and connections to regional and national markets. However, the tendency towards short-term profit orientation often creates an imbalance in relationships. Collaborative Governance requires incentive schemes (e.g. tax breaks, ease of licensing, or local branding) so that private involvement is more long-term oriented, enabling them to become strategic partners rather than mere profit takers.

Academics and Research Institutions As providers of technology, data, and research methodologies, academics play a vital role in strengthening innovation and sustainability. However, there is a gap between theory and practice in the field. Collaborative Governance can bridge this gap by building a knowledge co-creation platform, a forum where research, technological innovation, and field experience come together so that research results are truly relevant and applicable.

Analysis of Interests and Influence

Mapping of interests and influence shows that there are four main groups of actors. First, local governments and large livestock farmers are in a position of high interest–high power. This means that they have a high level of interest and considerable power in determining the direction of food commodity management. Therefore, both play a key role as the main drivers of collaboration.

Second, small farmers and local communities fall into the high interest–low power category. They have a strong interest because their daily lives are directly related to the food sector, but they do not have sufficient power to influence policy. This condition requires an empowerment strategy to increase their bargaining position.

Third, the private sector and the Central Government are in the low interest–high power position. Although their interests are not particularly high, their power is enormous, especially in terms of capital, regulation, and market access. Therefore, lobbying strategies, incentives, and long-term commitments are needed to increase their involvement.

Fourth, consumers and financial institutions are in the low interest–low power group. Nevertheless, both still influence the food ecosystem, either through consumption preferences that can shift market patterns, or through credit and financing policies that can open or close access to capital for farmers.

Collaboration Patterns and Gaps

The results of the study show that the current collaboration patterns still have two sides. On the formal side, collaboration is realised through regional development coordination forums, limited partnerships between the government and the private sector, and sporadic CSR programmes. Unfortunately, these forms of collaboration are still sectoral and unsustainable.

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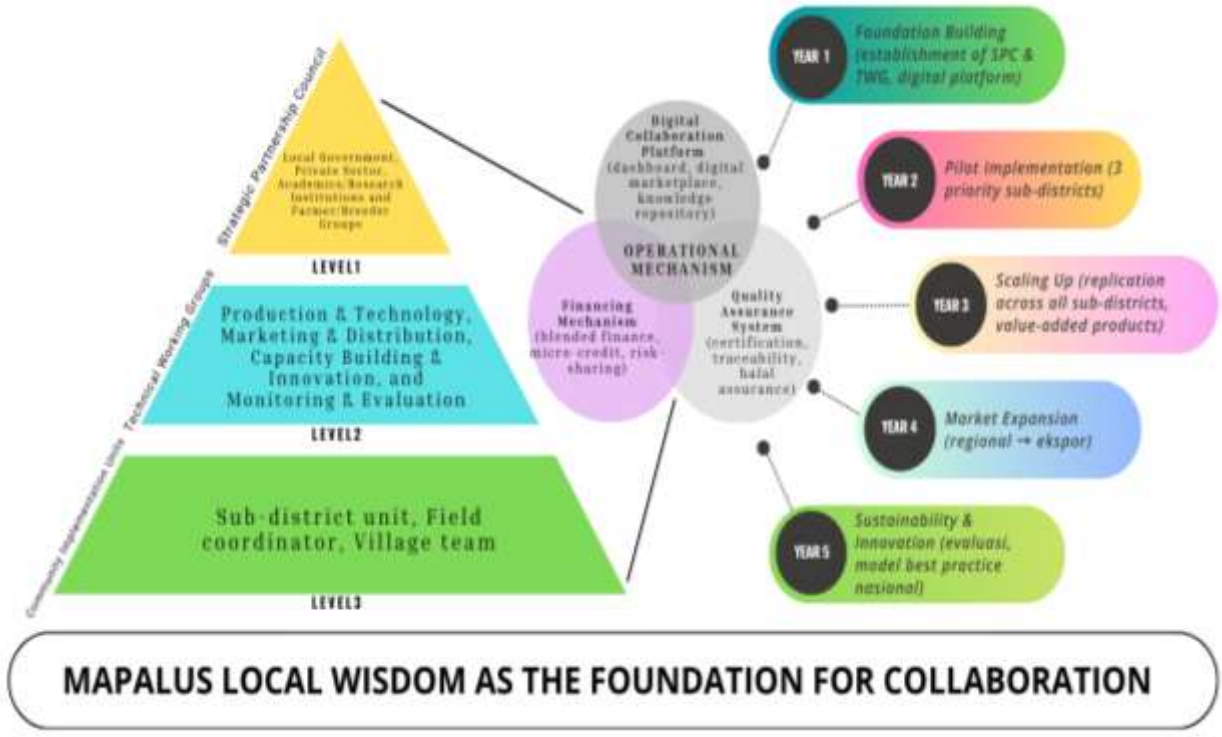
On the informal side, collaboration is actually stronger because it is rooted in local social values, such as mutual assistance between communities, traditional profit-sharing systems, and trust-based trading networks. However, this informal collaboration is not well connected to macro policies, so its benefits are not maximised. The most prominent gaps are weak cross-sectoral coordination, a lack of regular dialogue platforms, and the absence of a joint monitoring system. As a result, existing policies and programmes often run separately and do not support each other.

Designing a Collaborative Governance Model as a Policy Roadmap

The Collaborative Governance Model Design as a Policy Roadmap for strengthening the competitiveness of leading commodities in the Sangihe Islands Regency was developed using a layered governance model approach. This approach emphasises that effective governance must be based on a clear institutional structure, supportive operational mechanisms, and a measurable timeframe for achieving sustainable results. Thus, this model not only presents a governance architecture but also provides a medium-term implementation roadmap over a five-year horizon.



Source: Processed Results (2025

Figure 1. Design of the Collaborative Governance Model as a Policy Roadmap

The main governance structure is depicted in the form of a three-level pyramid that illustrates the synergy between strategic, technical and implementative actors. At the top- , the Strategic Partnership Council (SPC) consists of local government, the private sector, academics/research institutions and farmer/rancher groups. The SPC serves to establish a

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long-term vision and strategic direction, thereby becoming the main pillar of policy. Next, at the middle level, there are Technical Working Groups (TWGs) divided into four areas, namely production & technology, marketing & distribution, capacity building & innovation, and monitoring & evaluation. This division is intended so that every aspect of the development of leading commodities can be handled in a focused and integrated manner. At the grassroots level, Community Implementation Units consisting of sub-district units, field coordinators, and village teams serve as the driving force behind the programme's implementation at the grassroots level.

To ensure that this institutional structure runs effectively, a cross-sectoral and interconnected operational mechanism is required. This mechanism is visualised through three large overlapping circles: Digital Collaboration Platform, Financing Mechanism, and Quality Assurance System. The Digital Collaboration Platform provides a space for interaction in the form of a dashboard, digital marketplace, and knowledge repository that connects all stakeholders. The Financing Mechanism presents a blended finance scheme, microcredit, and risk-sharing mechanisms to support the sustainability of livestock businesses. Meanwhile, the Quality Assurance System serves to ensure quality standards through certification, traceability, and halal certification. These three instruments act as key governance support tools that strengthen the institutional pyramid.

The connection between the institutional structure and operational mechanisms is then outlined in a five-year implementation roadmap (2025–2030). In the first year, the focus is on foundation building, namely the formation of the SPC, TWG, and the initiation of a digital platform. The second year enters the pilot implementation stage, which focuses on three priority sub-districts as policy laboratories. The third year is directed at scaling up with model replication to all sub-districts and the development of value-added products. In the fourth year, the programme enters the market expansion phase, from regional markets to exports. Finally, the fifth year is targeted at sustainability and innovation through comprehensive evaluation and the development of a model as a national best practice.

This entire governance model is not only built on a technocratic approach, but also integrates the local wisdom of Mapalus as a social foundation. Mapalus, which is a tradition of mutual cooperation among the Sangihe community, is placed at the base of the pyramid, symbolising the social values that underpin the entire governance system. These local values are combined with digitalisation instruments and global market access, thereby strengthening local identity while enhancing global competitiveness. Thus, the proposed Collaborative Governance model becomes a comprehensive, adaptive policy rooted in local culture, while also being responsive to global dynamics.

CONCLUSION

This study successfully developed a Collaborative Governance Model to strengthen the competitiveness of leading commodities in the Sangihe Islands Regency. The livestock sector, particularly pigs and poultry, was identified as the main leading commodity with significant development potential. The model developed emphasises the importance of synergy between actors through a multi-stakeholder dialogue platform, an integrated information system, and

strategic partnership programmes. The implementation of this model is expected to increase the competitiveness of leading commodities, reduce poverty levels, and strengthen the region's contribution to supporting national food security. The successful implementation of this model requires long-term commitment from all stakeholders, conducive regulatory support, and sustainable investment in infrastructure and human resource development. Establishment of a permanent Multi-Stakeholder Coordination Agency to coordinate the implementation of the collaborative governance model Development of Digital Infrastructure to support integrated information systems Continuous Training Program for farmers and ranchers in the application of modern technology Strategic Partnerships with universities and research institutions for technological innovation development Development of Supporting Regulations that facilitate cross-sector collaboration.

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