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The Hexahelix Collaboration Model for Stunting Prevention: A Case Study of Collaborative Governance in Rancakalong, Sumedang

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Abstract

Background: Child stunting remains a critical global health and development issue with profound long-term consequences.

Aims: This study aims to analyze the application of the hexahelix collaboration model in the stunting prevention program in Rancakalong District, Sumedang Regency, Indonesia.

Methods: A qualitative case study approach was used to identify and analyze six key helices: Government, Community, Private Sector, Academics, Media, and Policy. The research examines the roles, contributions, and interactions of these six actors within a single, integrated framework to address the multi-causal nature of stunting.

Result: The analysis reveals a novel conceptualization of Policy as a distinct, foundational helix that acts as the primary governance structure. Findings show that a layered, synchronized policy framework from the national to the village level facilitates the integration of diverse stakeholder efforts. The collaboration leverages technological innovation (e.g., the SIMPATI application), community-based action rooted in local wisdom, strategic private-sector partnerships and evidence-based input from academia. The media's role in public education and social accountability further strengthens the model's effectiveness. Data indicates a significant decrease in stunting prevalence in Rancakalong from 27.61% in 2017 to 7.59% in 2025.

Conclusion: These findings demonstrate that a well-defined policy helix can mitigate common challenges in multi-actor interventions. The hexahelix model provides a replicable empirical framework for tackling complex public health issues in developing contexts.

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INTRODUCTION

Child stunting, defined as low height for age, is a persistent and pervasive indicator of chronic undernutrition, primarily caused by inadequate nutrition and recurrent infections during the critical first 1,000 days of life (Abi Khalil et al., 2022). The World Health Organization (WHO) identifies stunting as a condition of growth failure in children under two years of age that can lead to irreversible physical and cognitive impairment (Affairs, 2024; Mertens et al., 2023). Globally, stunting affects more than one in five children under five years of age (United Nations, 2018). Recent reports from UNICEF and the World Health Organization continue to identify child malnutrition and stunting as major global public health concerns, particularly in developing countries where inequalities in health access, sanitation, and nutrition remain significant (UNICEF,

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2023; World Health Organization, 2023). This issue is not merely a public health concern but also a significant impediment to long-term socio-economic development. Previous studies have demonstrated that **stunting** is associated with reduced educational attainment, lower productivity, diminished earning **capacity, and increased** susceptibility to **non-communicable diseases later in life**, thereby perpetuating intergenerational cycles of poverty (McGovern et al., 2017). In the Indonesian context, similar findings have highlighted that stunting not only affects child growth and health outcomes but also poses long-term challenges for human resource development, emphasizing the importance of integrated and multisectoral prevention strategies (Elni & Julianti, 2021; Masthalina et al., 2025).

Given the multifaceted nature of stunting, which is influenced by food security, sanitation, healthcare access, parenting practices, **education**, and economic conditions, a multisectoral and multi-stakeholder approach is essential (Mulyani et al., 2025; Sharn et al., 2025). This perspective is consistent with the Sustainable Development Goals (SDGs), particularly **Target 2.2**, which aims to end all forms of malnutrition and achieve internationally agreed targets on stunting reduction (United Nations, 2018; World Bank, 2020). The complexity of stunting necessitates governance approaches that move beyond traditional sectoral interventions (Mulyadi & Muchtar, 2026). Furthermore, stunting can be categorized as a "wicked problem" because it involves interconnected social, economic, cultural, and institutional dimensions that cannot be resolved through single-sector interventions alone (Head, 2008). Consequently, collaborative governance has emerged as an increasingly important framework for addressing complex public policy challenges.

Collaborative governance is widely understood as a process through which public institutions directly engage non-state stakeholders in collective decision-making and policy implementation processes (Ansell & Gash, 2008). Effective collaborative governance requires trust-building, shared understanding, interdependence among actors, and sustained institutional commitment (Emerson et al., 2012). In public health interventions, cross-sector collaboration is particularly important because health outcomes are influenced by multiple social determinants that extend beyond the healthcare sector itself (Bryson et al., 2015). The literature on multi-actor collaboration further emphasizes the importance of involving government agencies, civil society organizations, private sector actors, academic institutions, and media organizations in developing sustainable solutions to complex societal problems (Lemke & Harris-Wai, 2015; Yuan et al., 2022). Such collaboration can improve stakeholder engagement, strengthen social capital, increase public trust, and enhance policy effectiveness (World Bank, 2020).

The theoretical foundation for understanding such collaboration can be traced to the evolution of helix models. Initially developed through the Triple Helix framework, the model highlighted interactions among universities, industry, and government in promoting innovation and knowledge-based development (Etzkowitz & Leydesdorff, 1995). The framework subsequently evolved into the Quadruple Helix model by incorporating civil society and the public as important actors in innovation systems (Cai & Lattu, 2022). The Quintuple Helix further expanded the framework by integrating environmental considerations and sustainable development objectives (Carayannis et al., 2012). Recent studies have further expanded helix-based approaches by incorporating additional stakeholder dimensions to address increasingly complex governance and development challenges. The Hexahelix model emphasizes broader stakeholder integration and collaborative problem-solving involving multiple sectors and governance actors (Rachim et al., 2020). These developments reflect an increasing recognition that complex societal challenges require broader stakeholder involvement and more comprehensive governance arrangements.

In Indonesia, stunting remains a major national challenge despite various government interventions. The national target is to reduce stunting prevalence to 14% (Pemerintah Republik Indonesia, 2021). Although national prevalence declined from 37.3% in 2013 to 21.6% in 2022, significant regional disparities persist (Widyaningsih et al., 2022). In West Java Province, stunting prevalence reached 20.2% in 2022, while Sumedang Regency recorded the highest prevalence in the province at 27.6%, exceeding both provincial and national averages (Gustini, 2022). This condition positioned Sumedang as a priority area for stunting intervention programs. However, monitoring data from the Rancakalong Health Center revealed a substantially lower prevalence of 10.14% in 2022. This apparent discrepancy reflects differences between regency-level survey data and localized intervention outcomes. While the 27.6% figure represents the overall prevalence of

Sumedang Regency based on the Indonesian Nutritional Status Survey (SSGI), the Rancakalong data reflect localized monitoring results following intensive intervention efforts. Therefore, the lower prevalence in Rancakalong does not contradict the regency-level data, but instead demonstrates how localized collaborative interventions can produce significant improvements within regions still categorized as high-prevalence areas. This remarkable contrast between the high prevalence recorded at the regency level and the substantial reduction achieved at the sub-district level represents a positive anomaly that warrants further investigation. Understanding the factors that enabled Rancakalong to outperform the broader regional trend provides an important opportunity to identify effective collaborative governance practices that may be replicated in other high-prevalence settings.

Rancakalong District was therefore selected as the focus of this study because it represents one of the most active areas in implementing collaborative and community-based stunting prevention initiatives in Sumedang Regency. The district has implemented integrated interventions involving village governments, Posyandu cadres, PKK groups, academic institutions, private sector organizations, media actors, and policy-based coordination mechanisms established through Regent Regulation No. 82 of 2019 (Pemerintah Kabupaten Sumedang, 2019). More importantly, Rancakalong demonstrated a substantial decline in stunting prevalence from 27.61% in 2017 to 7.59% in 2025. This achievement distinguishes the district from many other localities that continue to face fragmented intervention efforts and fluctuating prevalence rates.

Although the importance of collaborative governance in public health has been widely documented, limited empirical studies have examined the interactions of six key actors within a single integrated framework for stunting prevention. Furthermore, existing helix-based studies generally conceptualize policy as an output of government action rather than as a distinct and foundational element shaping the interactions of all stakeholders. This study argues that policy functions not merely as a governmental product but as an enabling institutional structure that coordinates, legitimizes, and sustains collaborative action across sectors. This perspective is consistent with structuration theory, which emphasizes the reciprocal relationship between social actors and institutional structures in shaping collective action and governance processes (Giddens, 1984). By positioning Policy as a distinct helix alongside Government, Community, Private Sector, Academics, and Media, this study offers a novel analytical perspective for understanding collaborative governance in public health interventions.

Therefore, this study aims to analyze the implementation of the Hexahelix collaboration model in the stunting prevention program in Rancakalong District, Sumedang Regency. Specifically, the study examines the roles, contributions, and interactions of Government, Community, Private Sector, Academics, Media, and Policy actors in supporting collaborative governance for stunting prevention.

18 METHOD

This study employed a qualitative case study approach to analyze the implementation of the Hexahelix collaboration model in stunting prevention programs in Rancakalong District, Sumedang Regency, West Java, Indonesia. A qualitative approach was selected because the study sought to explore the dynamics of collaboration, stakeholder interactions, institutional arrangements, and community participation in addressing complex public health challenges. The case study design enabled an in-depth examination of how multiple actors interact within a specific social, political, and cultural context. Rancakalong District was purposively selected as the research site because it has demonstrated a significant reduction in stunting prevalence and serves as one of the most active areas implementing collaborative and community-based stunting prevention initiatives in Sumedang Regency. The district therefore provides a relevant empirical setting for examining the operation of the Hexahelix collaboration model in a localized governance context.

Data were collected through in-depth interviews, field observations, and document analysis. Semi-structured interviews were conducted with key informants representing the six helices involved in the stunting prevention program, including government officials, village heads, Posyandu cadres, PKK (Family Welfare Movement) members, health workers, academics involved in community service activities, and community leaders. The interviews focused on stakeholder

roles, collaboration mechanisms, implementation challenges, and perceptions regarding the effectiveness of the Hexahelix model. Field observations were carried out during Posyandu activities, supplementary feeding programs (PMT), community nutrition initiatives, and coordination meetings among stakeholders to capture actual interaction patterns and implementation practices at the grassroots level. In addition, relevant policy documents, government reports, village regulations, stunting prevalence records, and institutional publications were analyzed. Key documents included Presidential Regulation Number 72 of 2021, Regent Regulation Number 82 of 2019, and monitoring reports issued by the Rancakalong Health Center.

The collected data were analyzed using thematic analysis techniques. The analytical process involved data reduction, coding, categorization, interpretation, and conclusion drawing to identify recurring themes related to collaborative governance and stakeholder engagement. The thematic categories were developed based on the six dimensions of the Hexahelix model, namely Government, Community, Private Sector, Academics, Media, and Policy. The analysis focused on identifying patterns of collaboration, stakeholder contributions, coordination mechanisms, and factors influencing the effectiveness of program implementation. To ensure the credibility and trustworthiness of the findings, source triangulation was employed by comparing information obtained from interviews, field observations, and documentary evidence. This process enabled the verification of findings across multiple sources and strengthened the validity and reliability of the study.

RESULTS AND DISCUSSION

Results

Based on the Indonesian Nutritional Status Survey (SSGI), the prevalence of stunting among children under five in West Java Province reached 20.2% in 2022. Although this figure represented an improvement compared to previous years, disparities among regencies and cities remained substantial. Sumedang Regency was recorded as having the highest stunting prevalence in West Java, reaching 27.6% in 2022, indicating that stunting remained a major public health challenge requiring comprehensive and integrated intervention strategies (Gustini, 2022). Historical data also show that stunting has long been a critical issue in Sumedang Regency, with prevalence levels reaching 32% in 2018. These conditions underline the importance of strengthening collaborative and sustainable prevention efforts involving multiple stakeholders.

To provide a more detailed understanding of stunting dynamics at the local level, Table 1 presents stunting prevalence data recorded by the Rancakalong Health Center from 2017 to 2025 across ten villages in Rancakalong District.

Table 1. Stunting recapitulation data from the rancakalong health center

No	Village	2017 (P/S)	2018 (P/S)	2019 (P/S)	2020 (P/S)	2021 (P/S)	2022 (P/S)	2023 (P/S)	2024 (P/S)	2025 (P/S)
1	Nagarawang	371 / 28.84	377 / 32.10	333 / 25.83	321 / 16.82	323 / 19.81	323 / 9.29	332 / 8.73	318 / 9.75	317 / 10.41
2	Cibunar	200 / 19.50	188 / 23.40	175 / 20.00	184 / 13.59	182 / 19.23	180 / 10.00	176 / 8.52	185 / 10.27	189 / 7.41
3	Pangadegan	371 / 26.95	371 / 26.68	341 / 21.41	318 / 14.47	341 / 16.72	328 / 11.89	341 / 8.80	318 / 7.86	306 / 8.50
4	Sukahayu	340 / 20.59	332 / 16.27	313 / 14.38	308 / 9.74	306 / 9.80	310 / 6.45	295 / 5.08	276 / 3.99	289 / 5.88
5	Sukamaju	389 / 25.71	385 / 26.49	347 / 16.14	344 / 13.95	338 / 13.91	320 / 9.38	305 / 6.56	301 / 7.64	302 / 7.28
6	Pamekaran	237 / 35.02	232 / 31.47	215 / 20.47	237 / 15.61	237 / 15.19	220 / 10.00	217 / 8.76	211 / 5.69	195 / 6.15
7	Rancakalong	254 / 29.53	246 / 23.17	238 / 24.37	237 / 13.50	244 / 20.08	247 / 11.74	249 / 10.84	256 / 8.20	252 / 6.35

No	Village	2017 (P/S)	2018 (P/S)	2019 (P/S)	2020 (P/S)	2021 (P/S)	2022 (P/S)	2023 (P/S)	2024 (P/S)	2025 (P/S)
8	Sukasirnaras a	253 / 37.94	264 / 32.58	247 / 23.48	260 / 16.54	278 / 11.87	254 / 9.84	251 / 7.97	245 / 7.76	242 / 7.44
		243 /	253 /	235 /	230 /	234 /	236 /	227 /	216 /	229 /
9	Cibungur	25.51	33.99	12.77	14.35	23.50	14.41	7.93	6.02	6.99
		330 /	324 /	300 /	310 /	317 /	304 /	311 /	309 /	314 /
10	Pasir Biru	28.18	20.99	18.67	16.13	14.83	9.54	8.36	8.09	8.28
		2988 /	2972 /	2744 /	2749 /	2800 /	2722 /	2704 /	2635 /	2635 /
		Total	27.61	26.58	19.72	14.48	16.18	10.14	8.10	7.55

The data demonstrate a substantial decline in stunting prevalence throughout the study period. Overall prevalence decreased from 27.61% in 2017 to 10.14% in 2022 and further declined to 7.59% in 2025. This consistent downward trend indicates significant improvements in child nutritional outcomes and suggests that intervention programs implemented in Rancakalong have been increasingly effective over time. The reduction occurred across nearly all villages, reflecting the broad reach of prevention initiatives and the strengthening of local health and nutrition programs. These findings are particularly noteworthy given that Rancakalong is located within a regency that continues to experience relatively high stunting prevalence, highlighting the potential effectiveness of localized collaborative interventions.

Field findings further reveal that the reduction in stunting prevalence cannot be attributed solely to health-sector interventions. Instead, the observed improvements reflect the operation of a collaborative governance system involving multiple actors working across institutional and community levels. Observations and interviews conducted during the study indicate that collaborative practices were embedded in nutrition programs, health monitoring activities, community empowerment initiatives, and village development planning processes.

A Posyandu cadre from Cibunar Village explained:

"We routinely visit households with children categorized as undernourished or at risk of stunting. During the visits, we monitor children's growth, educate mothers about nutrition, and encourage families to utilize local food resources." (Interview with Posyandu Cadre, Cibunar Village, 2025)

This statement demonstrates how community-based health volunteers function not only as service providers but also as agents of behavioral change at the household level. Their continuous interaction with families enables early identification of nutritional risks while strengthening parents' awareness regarding child nutrition and health.

The findings also indicate that community participation plays a central role in sustaining intervention programs. In Rancakalong Village, youth organizations and community members collaboratively manage fish ponds to provide affordable sources of animal protein for local households. Similarly, PKK groups organize supplementary feeding programs (PMT) using locally available agricultural products, thereby strengthening food security while promoting nutrition-sensitive interventions. These activities illustrate how local resources and social capital are mobilized to support public health objectives.

A village official from Pangadegan Village stated:

"The success of stunting prevention programs cannot rely solely on the health sector. Collaboration between village governments, health workers, community organizations, and residents is essential because stunting is closely related to sanitation, food security, education, and parenting practices." (Interview with Village Official, Pangadegan Village, 2025)

This finding reflects a shared understanding among local stakeholders that stunting is a multidimensional problem requiring integrated responses across sectors. The recognition of interconnected determinants has encouraged stronger coordination among government institutions, community organizations, health workers, and local residents in designing and implementing intervention programs.

Field observations further revealed that coordination meetings involving village governments, health workers, community representatives, and local organizations were conducted regularly to evaluate program implementation and identify households requiring priority

assistance. In several villages, stunting prevention activities were integrated into village development planning forums and supported through Village Fund allocations. Furthermore, the implementation of the SIMPATI application enabled more systematic monitoring of child nutrition data and facilitated coordination among stakeholders. Health workers reported that the system improved reporting efficiency, accelerated the identification of vulnerable households, and strengthened communication between village and district-level institutions. Collectively, these findings demonstrate that the reduction of stunting in Rancakalong has been supported by an integrated governance approach that combines community participation, institutional coordination, evidence-based monitoring, technological innovation, and policy support.

Discussion

The findings demonstrate that the success of stunting prevention in Rancakalong District is supported by the active involvement of multiple stakeholders operating within an integrated Hexahelix collaboration framework. Government institutions play a central role as regulators, facilitators, and coordinators of collaborative action. At the national level, [Presidential Regulation Number 72 of 2021](#) provides the legal framework and strategic direction for accelerating stunting reduction across Indonesia (Pemerintah Republik Indonesia, 2021). At the provincial and regency levels, government agencies translate national priorities into local intervention programs, while district and village governments ensure implementation at the community level. One of the most significant innovations introduced by the Sumedang Regency Government is the development of the SIMPATI (Integrated Stunting Prevention Information System) application, which enables real-time monitoring of child nutritional status and facilitates evidence-based decision-making (Gunawan, 2022). This technological innovation illustrates the government's capacity to create an enabling environment for collaborative governance and public service innovation (Etzkowitz & Leydesdorff, 1995). Furthermore, the integration of digital technology through the SIMPATI application reflects the broader role of innovation capacity in improving public sector performance and strengthening collaborative governance effectiveness (Pradana et al., 2020).

Beyond governmental institutions, community participation emerges as one of the most important drivers of program sustainability. Community members are not merely beneficiaries of intervention programs but actively contribute to their design and implementation. Posyandu cadres, PKK groups, Dasawisma members, community leaders, and youth organizations serve as frontline actors responsible for monitoring child growth, providing nutrition education, conducting household visits, and mobilizing local resources. In several villages, community initiatives have generated innovative responses to local nutritional challenges. For example, community-managed fish ponds in Rancakalong Village provide affordable sources of animal protein, while household nutrition gardens and supplementary feeding initiatives utilize locally available agricultural products. These activities demonstrate how local wisdom, social capital, and collective action can strengthen public health interventions and promote long-term community ownership of development programs.

The contribution of the private sector also plays a strategic role within the collaboration framework. Rather than limiting participation to conventional corporate social responsibility activities, private sector actors contribute through competency-based partnerships that support program effectiveness. A notable example is the involvement of PT Telkom in supporting the development and management of the SIMPATI application (Gunawan, 2022). This partnership demonstrates how technological expertise and organizational resources from the private sector can enhance the efficiency and sustainability of public health interventions. By contributing specialized knowledge and digital infrastructure, the private sector becomes an important partner in improving service delivery and strengthening data-driven governance.

Academic institutions further contribute by providing scientific knowledge, technical expertise, and capacity-building support. Universities such as Universitas Padjadjaran and IPB University have participated through community service programs, research activities, and training initiatives aimed at strengthening local capacities. Academics have provided education and training on nutrition, sanitation, child growth monitoring, and data management for Posyandu cadres and community volunteers. In addition, innovations such as the utilization of modified cassava flour (mocaf) for supplementary feeding programs have been introduced through academic-community

collaboration. These contributions ensure that intervention strategies are grounded in scientific evidence and aligned with established public health standards.

The media also performs a critical function within the Hexahelix framework by facilitating information dissemination, behavioral change, and public accountability. Local media outlets, including Radar Sumedang and PRFM News Bandung, as well as village-level social media platforms, have been utilized to disseminate information regarding stunting prevention programs, promote healthy lifestyles, and share successful intervention experiences. Beyond their educational role, media institutions contribute to transparency by highlighting both achievements and ongoing challenges. Through this process, the media not only supports public awareness but also encourages accountability among stakeholders responsible for implementing stunting prevention policies and programs.

The findings further reveal that the effectiveness of the Hexahelix model is strongly supported by the existence of a coherent and synchronized policy framework. Unlike many collaborative governance studies that treat policy merely as an outcome of governmental action, this study identifies policy as a distinct and foundational element that shapes the interactions of all participating actors. The collaborative system in Rancakalong operates within a layered policy structure that extends from Presidential Regulation Number 72 of 2021 at the national level to Regent Regulation Number 82 of 2019 and village-level regulations that institutionalize stunting prevention efforts (Pemerintah Kabupaten Sumedang, 2019). These policies define stakeholder responsibilities, establish coordination mechanisms, allocate resources, and provide legal certainty for collaborative action. As a result, **policy functions not only as a regulatory instrument but also as an institutional foundation that** enables the long-term sustainability of collaborative governance.

Taken together, the interaction among government institutions, community organizations, private sector actors, academic institutions, media organizations, and policy mechanisms demonstrates the practical operation of the Hexahelix collaboration model in Rancakalong District. Rather than functioning independently, these actors form an interconnected governance ecosystem in which resources, knowledge, authority, and social capital are continuously exchanged to support the collective goal of reducing stunting prevalence. This integrated arrangement provides important insights into how collaborative governance can be operationalized in addressing complex public health challenges (Arianny & Adisasmito, 2024; Ryan, 2024).

The findings of this study demonstrate that the Hexahelix collaboration model provides an effective governance framework for addressing complex public health challenges such as stunting. This finding supports previous studies suggesting that collaborative governance arrangements can facilitate innovation, enhance institutional adaptability, and improve collective problem-solving capacity in complex policy environments (Huber, 2022). The strength of the model lies in its ability to facilitate integrated and context-sensitive interventions by combining institutional support, community participation, technological innovation, and policy coordination within a single collaborative system. The implementation experience in Rancakalong shows that stunting prevention efforts become more effective when national policy objectives are translated into locally relevant programs supported by community resources and cross-sector collaboration. The integration of technology through the SIMPATI application, formal coordination mechanisms through the Stunting Reduction Acceleration Team (TPPS), and active grassroots participation through Posyandu cadres and community organizations demonstrates a high degree of synergy among stakeholders involved in the intervention process.

Another important finding is the ability of the Hexahelix model to reduce bureaucratic fragmentation and sectoral ego among institutions involved in stunting prevention. In many public health programs, collaboration is often constrained by overlapping authority, fragmented responsibilities, and limited intersectoral communication. However, evidence from Rancakalong indicates that integrated coordination mechanisms and periodic cross-sector meetings have enabled stakeholders to develop shared objectives and collective responsibility for addressing stunting. The synchronization of policies from the regency level to village-level implementation has contributed to minimizing administrative barriers while strengthening institutional commitment among participating actors. Effective collaboration also requires continuous evaluation of stakeholder relationships, governance processes, and collective outcomes to ensure that collaborative arrangements remain adaptive and sustainable over time (Taplin, 2013). The

availability of integrated monitoring data through the SIMPATI application has further improved transparency, reduced duplication of interventions, and facilitated more responsive decision-making for vulnerable households.

Despite these achievements, several challenges remain. The sustainability of volunteer-based community initiatives, particularly those relying heavily on Posyandu cadres and community organizations, requires continuous support through capacity-building programs, institutional recognition, and adequate resources (Putri et al., 2025; Sinaga et al., 2025). In addition, differences in organizational capacity and access to resources among actors may create imbalances that affect long-term collaboration. As noted in the collaborative governance literature, maintaining effective partnerships among multiple stakeholders requires continuous negotiation, trust-building, and adaptive institutional arrangements to preserve collective commitment and prevent inter-organizational conflict (Huxham & Vangen, 2005). Therefore, the sustainability of the Hexahelix model depends not only on stakeholder participation but also on the capacity of institutions to maintain coordination mechanisms and collaborative relationships over time.

From a theoretical perspective, this study contributes to the growing literature on collaborative governance by providing empirical evidence that policy can be conceptualized as a distinct and foundational helix rather than merely an outcome of governmental action. The findings suggest that policy functions as an institutional structure that shapes stakeholder interactions, allocates resources, establishes coordination mechanisms, and provides legitimacy for collective action. This perspective extends existing helix-based approaches by emphasizing the role of policy as an enabling framework that influences the operation of all other actors within the collaboration system. The findings are also consistent with previous studies demonstrating that collaborative governance can strengthen the effectiveness of stunting prevention policies through intersectoral coordination, community participation, and shared institutional commitment (Zaenuri et al., 2023).

From a practical standpoint, the experience of Rancakalong offers important lessons for policymakers and practitioners seeking to strengthen stunting prevention programs in other regions. The findings highlight the importance of establishing a synchronized policy environment across different levels of government, leveraging technology to improve program management and monitoring, strengthening community participation through locally based initiatives, and fostering long-term partnerships among government institutions, private sector actors, academics, media organizations, and civil society groups. These elements collectively contribute to the development of a collaborative governance ecosystem capable of addressing complex public health problems in a sustainable and contextually appropriate manner.

CONCLUSION

This study analyzed the implementation of the Hexahelix collaboration model in stunting prevention efforts in Rancakalong District, Sumedang Regency. The findings demonstrate that the substantial reduction in stunting prevalence from 27.61% in 2017 to 7.59% in 2025 was supported by the synergistic interaction of six key actors: Government, Community, Private Sector, Academics, Media, and Policy. The study highlights the importance of collaborative governance in addressing complex public health challenges through the integration of institutional coordination, community participation, technological innovation, evidence-based interventions, and multi-level policy support. A key theoretical contribution of this research lies in the conceptualization of Policy as a distinct and foundational helix that not only regulates but also enables, coordinates, and sustains collaborative action among stakeholders. This finding extends existing helix-based approaches by demonstrating that policy functions as an institutional framework shaping stakeholder interactions, resource allocation, accountability mechanisms, and the long-term sustainability of collaborative governance. The findings further suggest that the Hexahelix model provides a practical and replicable framework for strengthening stunting prevention programs and addressing other complex development challenges in similar contexts.

In addition to its theoretical contribution, this study offers several practical implications for strengthening stunting prevention programs. The findings suggest that the government should further institutionalize the role of Posyandu cadres, PKK members, and other community leaders through continuous capacity-building programs, formal recognition, and sustainable incentive

mechanisms to ensure the long-term sustainability of grassroots interventions. The coordination function of the Stunting Reduction Acceleration Team (TPPS) should also be strengthened through periodic performance evaluations that identify resource gaps and enhance collaboration among stakeholders. Furthermore, private sector participation should be encouraged to move beyond conventional corporate social responsibility activities toward long-term, competency-based partnerships that contribute technological expertise, innovation, and organizational resources. Media organizations can play a greater role by promoting participatory communication strategies, including community dialogues, educational campaigns, and public awareness initiatives related to nutrition and child health. Academic institutions are also encouraged to expand applied research and policy evaluation activities that support evidence-based decision-making at village and district levels. Finally, village governments should institutionalize stunting prevention efforts through Village Regulations (Perdes) and ensure the consistent allocation of Village Funds to support sustainable nutrition and health programs as part of long-term village development priorities. Future studies may examine the long-term sustainability of the Hexahelix model, compare its implementation across different regions, and explore how variations in institutional capacity, trust, and resource distribution influence collaborative governance outcomes.

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AUTHOR CONTRIBUTION STATEMENT

CM conceived and designed the study. CM, BS, and DK developed the methodology, collected the data, conducted the analysis, and interpreted the results. CM prepared the original draft of the manuscript. BS, DK, and AR reviewed, edited, and approved the final version of the manuscript. All authors declare no conflict of interest.

AI DISCLOSURE STATEMENT

The authors declare that this research was prepared, researched, written, and edited without the aid of artificial intelligence (AI) techniques.

CONFLICTS OF INTEREST

The authors confirm the presence or absence of any potential conflicts of interest—financial, institutional, or personal that could influence the conduct of this study, the analysis of data, the preparation of the manuscript, or its publication.

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