

A System Dynamics Analysis of Policy Interventions for Enhancing Village Government Self-Sufficiency in Indonesia

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ABSTRACT

One of the mandates of Law No. 6 of 2014, concerning villages, is to realise village self-sufficiency as a foundation for achieving rural community welfare. However, to date, village governments have not been able to achieve village self-sufficiency because policies from central and regional governments are often partial in nature and have not yet had an impact on improving village self-sufficiency. This study explores and analyses the structure and determines the leverage points of the village's self-sufficiency system using a system dynamics approach, which is an appropriate method for addressing problems characterised by dynamic complexity. Data collection was conducted through interviews, observations, and focus group discussions. The findings of this research identify leverage points in the village self-sufficiency system through interventions in the public service subsystem, village-generated revenue, and the economic dimension. The strategy for implementing the policies involves collaboration among related stakeholders, as village governments have limited authority in terms of regulation, human resources, and financial aspects.

Keywords: Village self-sufficiency; system dynamics, village government

INTRODUCTION

Village self-sufficiency has become a central issue in Indonesia's national development (Bustamin et al., 2025; Eko, 2015; Suharto, 2019) particularly following the enactment of Law No. 6 of 2014, which was subsequently revised as Law No. 3 of 2024 concerning Villages. This phenomenon demonstrates dynamic complexity, involving various stakeholders, ranging from village governments (Suharto, 2019; Wanusmawatie and Ulum, 2021) and local organisations (Darwin et al., 2016; Widodo and Suradi, 2011) to central and regional governments (Eko, 2015; Muluk et al., 2022; Wanusmawatie et al., 2017), as well as private sector entities, academics, and the media (Aritenang, 2021; Kusmulyono et al., 2023; Siskawati et al., 2022; Suyanto et al., 2024). Field reality demonstrates that achieving village self-sufficiency is not a linear process but rather a complex system with multi-dimensional interactions among governance aspects (Setyowati, 2019; Zaitul et al., 2023) and social, economic, and environmental dimensions (IDM, 2024). This complexity becomes increasingly evident when various village development programmes that have been implemented have not been able to optimally realise village self-sufficiency as mandated by regulations (Hartojo et al., 2022; Phoek et al., 2024; Suyanto et al., 2024). Despite this, the central government has provided support through village fund allocations totalling 609.9 trillion rupiah from 2015 to 2024 (Rahayu & Ika, 2024; Sadya, 2023; Sumarto, 2022). Likewise, the regional government of Indragiri

Hilir Regency has implemented a flagship programme called "One Village, One Village Facilitator" over the past decade to support capacity building for village officials and village institutions.

Previous studies have tended to analyse village self-sufficiency factors in a partial and linear manner. Several studies have focused on human resource aspects of village apparatus and Village Consultative Body (BPD) (Yenrizal and Bajari, 2019), while other research has examined the governance dimensions of village administration (Setyowati, 2019; Zaitul et al., 2023). Studies on the role of village funds in village self-sufficiency have been explored by various researchers (Karim et al., 2024; Phoek et al., 2024; Yudaruddin et al., 2023). Additionally, numerous studies have analysed the opportunities and challenges of village-owned enterprise (BUMDesa) management (Azhari and Bustamin, 2022; Dahana et al., 2023; Kania et al., 2021; Kasmawati et al., 2024), village public service performance and complaints (Wanusmawatie, 2018a); and performance measures of a balanced scorecard (Zaitul et al., 2025). Consequently, these approaches have not been able to capture the complex dynamics occurring within village governance systems (Jiang et al., 2024; Li et al., 2023; Wang et al., 2024). This condition results in policies that are often ineffective because they fail to consider the interacting cause-and-effect relationships within the system.

Furthermore, the scarcity of research employing system dynamics approaches to analyse village self-sufficiency in Indonesia represents a research gap that needs to be addressed, particularly in identifying leverage points that can accelerate the achievement of village self-sufficiency. This study aims to identify and analyse the structure of village self-sufficiency systems through a system dynamics approach as well as formulate policy scenarios that can accelerate village self-sufficiency. The use of System Dynamics methodology in this research was chosen due to its superior capability in accommodating the complexity of social systems that are difficult to quantify through conventional methods (Coyle, 1996; Muhammadi et al., 2001).

This research provides theoretical contributions by strengthening the application of the subsidiarity principle in the context of village governance as the closest level of government to the community. Practically, this study generates leverage points as policy scenarios that can be adopted by villages with similar characteristics to accelerate the achievement of self-sufficiency. The methodological contribution of this research is the development of a comprehensive village self-sufficiency system dynamics model, encompassing ten interconnected subsystems within a unified system framework. Thus, this research contributes to the development of public policy at the national level, particularly in designing more effective and efficient village empowerment strategies based on a profound understanding of village self-sufficiency system dynamics.

LITERATURE OVERVIEW

Local Government and Subsidiarity Principle

Local government was originally governance administered by the people, referred to as self-government (Norton, 1994). The essence of local government is self-governance that involves administration, executive selection, and legislative elections, either directly or indirectly (Norton, 1994). In line with Chandler, (2008) perspective, local government entails the authority to regulate and manage matters within its jurisdictional scope to facilitate service delivery to the community. Each country has various forms of regional government; for instance, Indonesia has two levels of regional government: provincial government and district/municipal government. In contrast, the United States exhibits significant variation and diversity, including counties, townships, municipalities, and special districts. Therefore, according to Alderfer, (1964); Muttalib & Khan, (1982) villages are part of the local government pattern, particularly those of a traditional nature.

Village governance in Indonesia is factually positioned as the lowest level of government, although this is not regulated formally since the constitutional system only recognises two levels, as previously mentioned. Consequently, debates have emerged among village experts, including Nurcholis, (2014), who refers to villages as pseudo local self-government because villages lack autonomy since the requirements for autonomous regions are not fulfilled. Similarly, Wasistiono terms it 'quasi-local self-government'. Meanwhile, Wanasmawatie, (2018) views villages as a mixture of traditional and modern organisations, albeit predominantly traditional in nature and possessing limited autonomy. Conversely Muluk,(2023) agrees that villages have autonomy, but their autonomy pattern differs from districts/municipalities because it derives from autonomous regions. Furthermore, the degree of village autonomy certainly differs from that of districts/municipalities, as it does in other countries. These differing perspectives on villages from various viewpoints are legitimate contributions to academic discourse; however, empirical reality demonstrates that villages require practical concepts for achieving self-sufficiency. Therefore, villages should not be viewed merely as communities capable of meeting their own needs; they must also be regarded as organisations that require good governance.

Therefore, we must strengthen the implementation of the subsidiarity principle as stipulated in Law No. 6 of 2014 concerning Villages. The subsidiarity principle's systemic predilection for locating authority at the most local

level feasible has long been admired for its ability to protect localised, diverse interests from the tyranny of a national majority (Bednar, 2014). Similarly, Muluk, (2023) interprets subsidiarity as existing within the context of plurality and its protection. It is clearly evident that such protection is achieved by placing authority in the lowest possible government unit within the hierarchical government structure. Subsidiarity ultimately proves more capable of achieving social welfare because it establishes the foundation for efficient governance in managing diverse public interests. Rather than merely producing ordinary efficiency, subsidiarity tends to generate what is termed "adaptive efficiency" (Bednar, 2014). The implementation of the subsidiarity principle has become particularly intriguing in contemporary times, as current developments toward governance have added complexity to governmental administration alongside increasing intersectoral administration and horizontal subsidiarity (Henry, 2018). Therefore, strengthening the application of subsidiarity in village governance would certainly reinforce the path toward village self-sufficiency. However, the question remains: is the central government willing to strengthen subsidiarity in village governance, or will it remain merely a formality as prescribed in village legislation?

Self-Sufficiency from a System Dynamics Perspective

Self-sufficiency is defined as "the ability to do or produce everything that you need without the help of other people" (Oxford, 2024). The term 'self-sufficiency' can be traced back to Aristotle's work titled *Nicomachean Ethics*, which states that an ideal condition exists where individuals can fulfil their needs independently without relying on others. Furthermore, self-sufficiency constitutes an essential element in achieving true happiness or *eudaimonia* (Aristotle, 2009; Dineen, 2010). Therefore, the concept of self-sufficiency has generated tremendous appeal among social scientists, policymakers, and local communities across various historical and contemporary contexts (Gudeman and Hann, 2015).

Referring to the literature, the term 'independence' is often equated with autonomy, resilience, independence, self-reliance, and self-sufficiency. However, the appropriate term in the village context is 'village self-sufficiency'. This aligns with the self-sufficiency concept pioneered by King Bhumibol Adulyadej of Thailand in the 1970s, who introduced the Sufficiency Economy Philosophy (SEP) through three practical principles: moderation, reasonableness, and self-immunity. These principles prioritise sufficiency over efficiency and maximisation. The output of SEP aims to enhance social, economic, and environmental dimensions (sustainability). This concept is actually consistent with village self-sufficiency in Indonesia, known as the Village Development Index (VDI), which encompasses three principles: entrepreneurial community networks, village economic granaries, and village cultural circles, as regulated in Village Minister Regulation PD/T No. 2 of 2016 concerning the VDI with social, economic, and environmental dimensions. This aligns with the concept of sustainability.

In reality, village self-sufficiency cannot be adequately captured through these three dimensions alone, as villages function not only as self-governing communities but also as local self-government (Eko, 2015). Therefore, System Dynamics (SD), as part of systems thinking, offers a new way of thinking based on the primacy of wholeness and relationships (Maani and Cavana, 2002). The essence of systems thinking discipline lies in a shift in thinking patterns, namely viewing interconnectedness rather than linear cause-and-effect chains and observing change processes rather than merely static representations (Senge, 1996). Village governance experiences complex, dynamic problems in realising village self-sufficiency. However, the reality is that villages are always approached partially by related stakeholders, resulting in policy patterns that have not been able to make village governments independent but instead have made villages increasingly dependent on higher-level governments.

METHOD

This research employs a systems thinking approach through the SD method. This method is considered appropriate because it enables the identification of dynamic behaviours within a system and provides an analytical framework for implementing situational changes in the desired directions (Coyle, 1996). The case study was conducted in SIV, Indragiri Hilir Regency, Riau Province, Indonesia, which experiences dynamic complexity in efforts to achieve village self-sufficiency. The selection of the SD approach refers to Coyle, (1996) perspective, considering its advantages in accommodating qualitative data that represents social realities difficult to quantify. According to Coyle (1996), the SD method comprises five stages as illustrated in Figure 1.

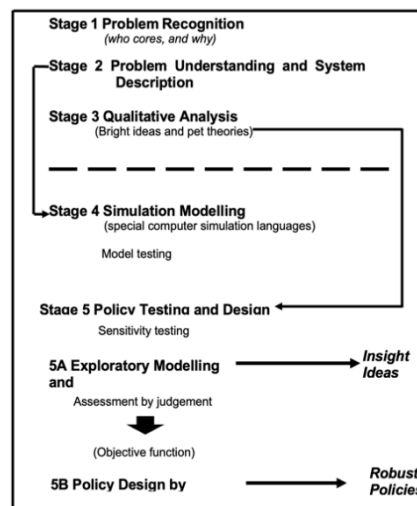


Figure 1: Framework of the System Dynamics Approach

Sources: R.G. Coyle. *System Dynamics Modelling: A Practical Approach*. (London: Chapman & Hall, 1996), page. 11.

The first stage is problem recognition. SIV demonstrably experiences dynamic complexity problems in achieving village self-sufficiency, indicated by VDI measurement results conducted by the Ministry of Village Affairs (MOVA) showing no significant improvement from 2016 to 2024, remaining at developing status. Additionally, various internal and external actors are involved. These actors include village governments, supravillage governments, private parties, academics, the media, and local village organisations.

Second, regarding problem understanding and system description, the objective of this research is to achieve village self-sufficiency. At this stage, researchers conducted literature studies, observations, and intensive discussions with village experts to deeply identify variables related to village self-sufficiency. After obtaining adequate understanding, researchers developed concepts of inter-variable relationships in the form of CLDs. This process involves system understanding through mapping elements and actors, then creating CLDs (Aguilar et al., 2025; Bahati et al., 2024; Coste and Prah, 2025; Frerichs et al., 2025; Issac et al., 2025). This diagram illustrates various forces operating within the system related to village self-sufficiency phenomena. Inter-subsystem interactions provide structure to objects, distinguishing them from other objects, and influencing object behaviour (Muhammadi et al., 2021). Behaviour in the diagram is indicated by positive (+) and negative (-) symbols so that all subsystems interact in cause-and-effect relationships. This diagram is called a CLD, which provides a framework for viewing interconnections among elements and patterns of change, not merely momentary snapshots (Senge, 1996b). The analysis results are shown in Figure 2.

Third, qualitative analysis: The qualitative analysis stage represents a crucial phase for achieving accurate and comprehensive results. Researchers employed the pet theories method, which is beneficial because it explores the perspectives of experienced practitioners in village governance. Data collection was conducted through three main procedures. The first step involved conducting in-depth interviews with key informants, including the village government, village facilitators, and personnel from the Village and Community Empowerment Office. Second, direct observation was conducted by researchers to examine village public service conditions and infrastructure at the research location. Third, researchers implemented Focus Group Discussion (FGD) to confirm data accuracy with related stakeholders.

Fourth, simulation modelling: Simulation was conducted by constructing simulation models based on CLDs generated in the second stage. CLDs were then converted into SFDs using the PowerSim Studio 10 Expert application, as shown in Figure 3. The conversion process aims to transform causal structures into quantitative models that can be simulated to analyse village self-sufficiency systems' dynamics. Finally, policy testing and design: This stage was implemented after model validation demonstrated adequate results. Sensitivity analysis was conducted as the initial step in the village self-sufficiency policy testing and design process. Sensitivity analysis aims to identify parameters most sensitive to overall village self-sufficiency system performance. The results of this analysis serve as the foundation for formulating effective policy recommendations to enhance village self-sufficiency.

RESULTS

Formulation of Village Self-Sufficiency System through CLD and SFD

Based on literature and empirical studies, findings reveal that Indonesia's village governance system experiences dynamic complexity in achieving village self-sufficiency (Antlöv et al., 2016; Nas et al., 2019; Noor et al., 2024; Sidik and Habibi, 2023; Suyanto et al., 2024; Syukri, 2022; Vel et al., 2017; Zaitul et al., 2025). Numerous actors are involved, including the role of village government (Suharto, 2019; Wanusmawatie, 2018), local organisations (Widodo and Suradi, 2011), central and regional government support (Eko, 2015; Muluk et al., 2022; Wanusmawatie and Ulum, 2021), the private sector, academics and media (Suharto, 2019; Wanusmawatie et al., 2019), as well as the village community itself. These stakeholders have roles in either strengthening or weakening village self-sufficiency. Research findings from a case study of SIV, Indragiri Hilir Regency, Riau Province, reveal that several system variables, both internal and external to the system environment, can influence village self-sufficiency. Subsequently, the system structure was constructed in the form of a CLD to identify patterns and behaviours in the village's self-sufficiency system. To facilitate reading the CLD of the village self-sufficiency system as a complex system, the village self-sufficiency subsystems are explained separately, although they actually constitute an integrated whole as a unified system.

First, the self-sufficiency performance enhancement subsystem: Self-sufficiency is conceptualised as encompassing social, economic, and ecological dimensions. This aligns with the concept promoted by the Village Development Index (VDI). The systemic thinking framework of this self-sufficiency enhancement subsystem begins with improving village governance. The better the village governance, the higher the self-sufficiency performance of SIV governance. This self-sufficiency also receives support from the performance of social, economic, and environmental dimensions. The better the performance in these three dimensions, the better the village's self-sufficiency. Self-sufficiency performance influences village self-sufficiency. The higher the self-sufficiency performance, the higher the village self-sufficiency. Furthermore, village governance has a reciprocal influence on the level of village self-sufficiency. Improved self-sufficiency performance will follow better village governance. This system structure generates a reinforcing pattern and produces village self-sufficiency behaviours characterised by exponential growth, as shown in Figure 2.

Second, community participation provides input to the village governance subsystem. The better the community participation, the stronger the village governance becomes, which will enhance governance performance and information. Subsequently, performance and information receive support from village government, meaning that increasing the quality of human resources village heads, village apparatus, and BPD will also improve village governance performance. Strengthening performance and information will enhance transparency and accountability in village governance management. The district government supports transparency and accountability through the Village Community Empowerment Office (PMD), which serves as the leading sector for capacity building and village financial management. Furthermore, transparency and accountability provide input to participation, implying that well-managed governance transparency and accountability lead to increased community participation in the village. This system structure generates a reinforcement pattern that produces exponential growth behaviours toward village self-sufficiency, as shown in Figure 3.

Third, the degree of control subsystem begins with village self-sufficiency status influencing the degree of control. When the village status becomes increasingly non-self-sufficient, the degree of control exercised by supra-village government increases, which means that autonomy or self-sufficiency decreases. This condition originates from low village financial autonomy, which impacts the high dependency of village government on transfer funds from supra-village levels. However, when village financial autonomy strengthens, the degree of control will decrease. Conversely, when the degree of control strengthens, it will impact the reduction of village authority. This system structure generates a balancing pattern that produces exponential decay behaviours toward village self-sufficiency, as shown in Figure 4.

Fourth, the village financial availability subsystem begins with transfer revenue. The greater the financial transfers from supra-village levels and assistance from private parties or other sources, the stronger the village financial availability becomes. Village financial availability also receives input from village original income, meaning that the greater the village original income, the stronger the village finances become. Financial availability influences village self-sufficiency, meaning that the stronger the village's finances are, the more capital it has to implement development programs, empowerment initiatives, and community services. Furthermore, transfer revenue is reciprocally influenced by village self-sufficiency. According to the VDI, if the village status is self-sufficient, the more transfer funds they receive according to the village fund allocation calculation scheme. This system structure generates a reinforcing pattern and produces exponential growth behaviours toward village self-sufficiency, as shown in Figure 5.

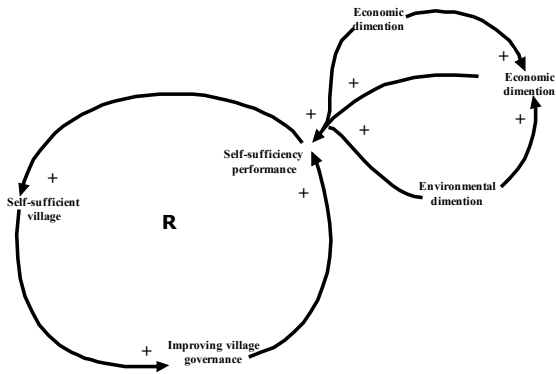


Figure 2. CLD of self-sufficiency performance subsystem

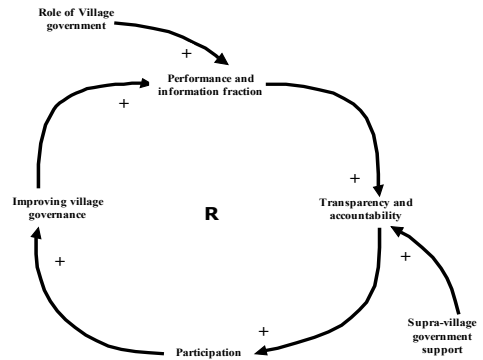


Figure 3. CLD of Village Governance Subsystem

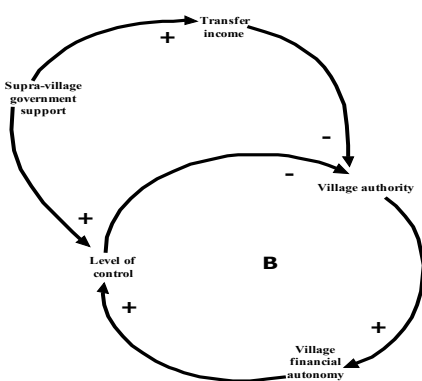


Figure 4. CLD of degree of control subsystem

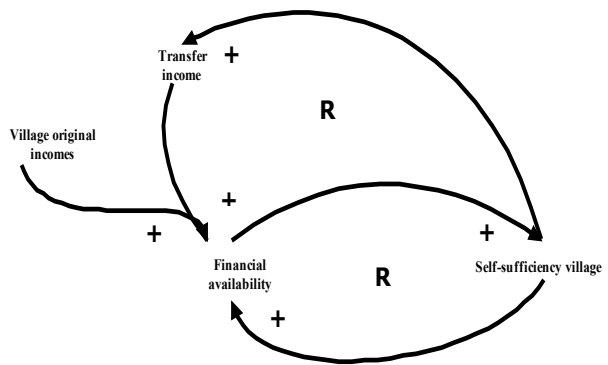


Figure 5. CLD of financial availability subsystem

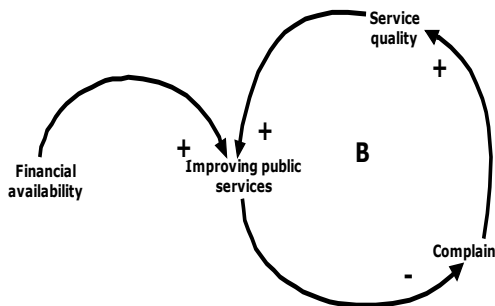


Figure 6. CLD of public service enhancement subsystem

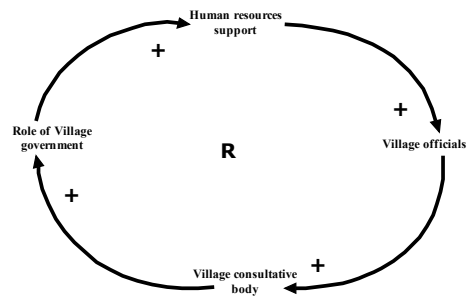


Figure 7. CLD of village government support subsystem

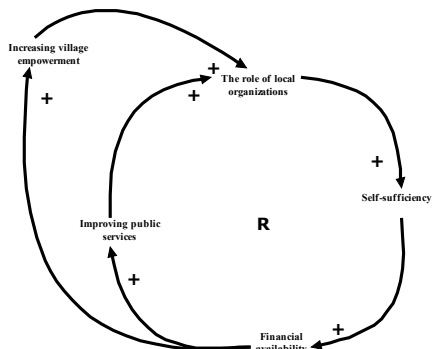


Figure 8. CLD of local organization role subsystem

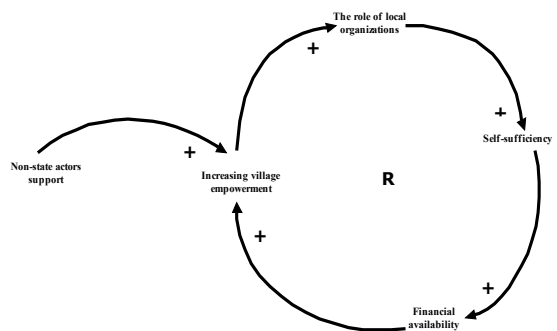


Figure 9. CLD of village empowerment enhancement subsystem

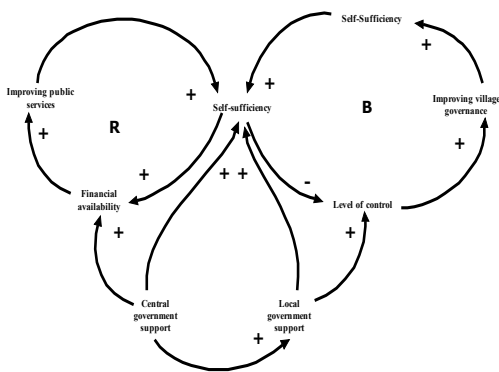


Figure 10. CLD of central and regional government support subsystem

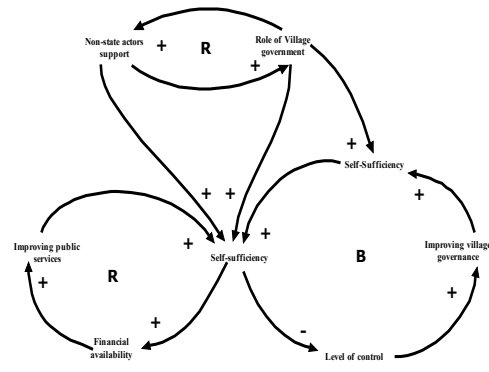


Figure 11. CLD of Third-Party Support Subsystem

The fifth subsystem is the public service enhancement subsystem. The systemic thinking of the public service enhancement subsystem receives input from service quality. The more diverse the quantity and quality of services provided by village government, the stronger the village public services become, resulting in better levels of community satisfaction with village governance. Nevertheless, village public service enhancement influences community complaints, meaning that the better the village public services, the fewer the complaints. However, service quality receives feedback from complaints, whereby when complaints increase, efforts to improve quality also increase. This system structure generates a balancing pattern that produces exponential decay behaviours toward village self-sufficiency, as shown in Figure 6.

Sixth, the village government support subsystem: The systemic thinking framework of the village government support subsystem receives input from the BPD. The stronger the role of BPD, the better the village government support becomes. When village government support strengthens, it will influence human resource quality and affect the quality of village apparatus and BPD human resources. This cycle illustrates a reinforcing pattern that produces exponential growth behaviours, as shown in Figure 7. The Seventh, the local organisation role subsystem: the systemic structure of village local organisation roles receives input from public services and village empowerment. The stronger these two dimensions become, the stronger the role of village local organisations also becomes. When local organisations assume effective roles, they will help accelerate village self-sufficiency. Furthermore, the level of village self-sufficiency has a reciprocal relationship with village financial availability. This cycle of roles within local organisations illustrates a reinforcing pattern that produces exponential growth behaviours, as shown in Figure 8.

Eighth, the subsystem for enhancing village empowerment: The systemic structure of village empowerment enhancement receives direct support from village financial availability, meaning that the stronger the financial availability, the more village empowerment activities will increase. This is certainly due to adequate budget allocation to finance village empowerment programmes, strengthened by support from third parties such as assistance from academics from various universities conducting community service in villages, media presence that helps publicise village activities, and collaboration with private parties as a solution to financial limitations. Subsequently, village empowerment will have a positive impact on enhancing the role of local organisations. Reality demonstrates that local organisations become active when the village government provides attention or assistance through village empowerment, as shown in Figure 9.

Ninth, the central and regional government support subsystem: This systemic structure illustrates that village self-sufficiency receives direct support from the central government, and in accordance with the mandate of Law No. 6 of 2014, which was revised as Law No. 3 of 2024 concerning Villages, mandates that villages receive village fund budgets from the State Budget (APBN). This means that the larger the village funds transferred to villages through district calculations, the greater the support for village self-sufficiency. Furthermore, central support is not limited to village funds alone; the central government, through the MOVA as the leading sector managing villages, has village facilitators known as Local Village Facilitators (PLD) whose task is to oversee village funds to ensure their use according to designated purposes or accountability. Not only does MOVA have village-related programmes, but almost all ministries are involved in bringing projects to villages. Additionally, the regional government of Indragiri-Hilir Regency has a flagship program called "Desa Maju Inhil Jaya Plus Terintegrasi" which is integrated with the provision of one facilitator per village. This dynamic structure tends to demonstrate an exponential growth pattern, as shown in Figure 10.

Tenth, the third-party support subsystem: Third parties illustrate that third-party support receives reinforcement from private sector support. This means that the greater the private sector support for villages, the greater the role of third parties toward villages. Additionally, academic support strengthens the role of third parties. When academic support strengthens, the role of third parties toward villages increases because academics can

validation. Structural validation was performed by ensuring validity in CLD construction, and performance validation represents the process of achieving SFD validity, as shown in Figure 13.

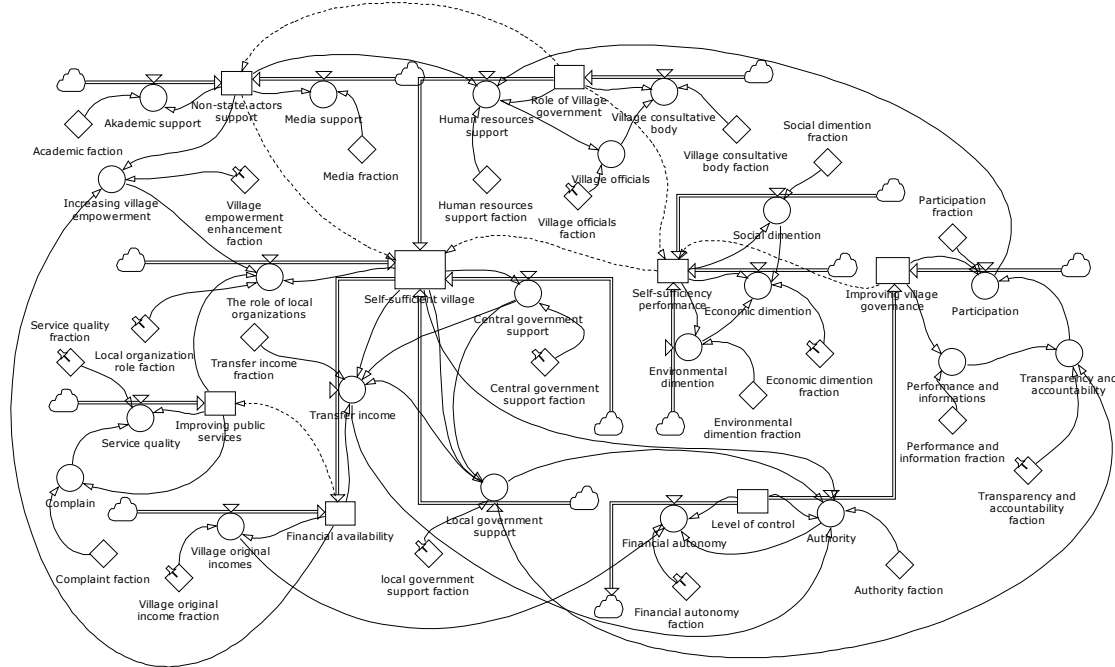


Figure 13. SFD of village self-sufficiency system

Alternative Policy Scenario Recommendations for Village Self-Sufficiency

After the SFD stabilises, the next step is determining the system's leverage through sensitivity testing. Sensitivity testing aims to measure a model's response to parameter changes or relationships between variables in the system. To identify leverage variables, value changes are made to each variable to determine their influence on other variables and the system as a whole. Sensitivity testing assumes conditions and changes that may occur in the real world, whether due to specific policies or other unknown factors. Each variable is given a stimulus of 0.5% to observe the greatest response to small changes. This aligns with Firmansyah, (2019) statement that small changes can produce big results. Results show that three variables have the highest sensitivity as leverage points for the SIV village self-sufficiency system, as shown in Table 1.

Table 1. Sensitivity test of village self-sufficiency scenarios

Scenario	Value	Difference
Business as Usual (BAU)	2.284545455	-
Service quality	2.278085455	0.434545455
Village original income	2.06354	0.231818182
Economic dimension	2.059903636	0.218181818

Source: Powersim studio 10 expert simulation results

Table 1 explains the sensitivity test results for SIV self-sufficiency scenarios, identifying three variables with the highest leverage: the service quality subsystem, the village original income subsystem, and the economic dimension subsystem. Scenarios represent structured simulations of systems under different conditions to evaluate system responses to policy changes, parameters, or model structure (Sterman, 2000). In village self-sufficiency scenarios, "the emphasis is heavy on exploring the behaviour of the system rather than predicting precise details" (Coyle, 1996). Scenarios are simulated over a 10-year timeframe to observe village self-sufficiency system behaviour during that period. According to Firmansyah, (2019), the minimum duration for time intervals is two periods, which equals ten years; however, having more time intervals is preferable.

First, the scenario policy involving service quality intervention demonstrates the highest leverage for enhancing the self-reliance of SIV. The scenario simulation results exhibit exponential growth behaviour as illustrated in Figure 13. Second, the scenario policy implementing village original revenue intervention shows the second-highest leverage for improving village self-reliance. The scenario simulation results demonstrate exponential growth system behaviour as presented in Figure 14. Finally, the scenario policy involving intervention in the economic dimension exhibits the third-highest leverage for enhancing village self-reliance. The scenario simulation results show exponential growth system behaviour, as depicted in Figure 15.

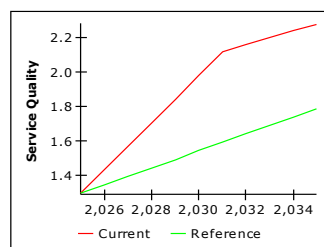


Figure 13. Service quality intervention

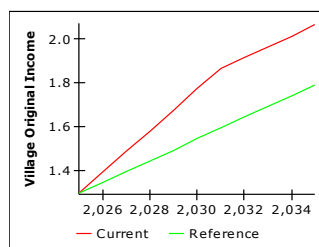


Figure 14. Village original income intervention

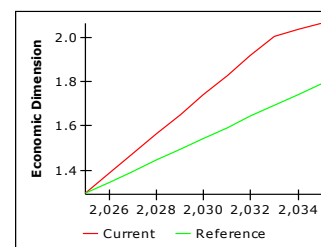


Figure 15. Economic dimension intervention

DISCUSSION

Policy Scenario for Improving Public Service Quality

The primary scenario for accelerating village self-sufficiency involves improving service quality. Based on the evidence that community satisfaction with SIV government services remains low, particularly regarding village road infrastructure development, healthcare service availability, poor educational service quality, telecommunications services, and limited and inequitably distributed social assistance, these deficiencies consequently result in high levels of community complaints regarding service delivery.

To implement this scenario, village government authority is regulated and limited by Law No. 6 of 2014 concerning Villages, where village authority encompasses (1) traditional rights, such as customary territory management and cultural preservation; (2) village-scale local authority, such as natural resource management, basic social services, and simple infrastructure development; (3) assignments from government, such as development programme implementation and population data collection; and (4) other authorities regulated by legislation, for instance, Village-Owned Enterprise (VOE) management or disaster management.

Furthermore, there are limitations in the authority to use village budgets derived from supra-village government transfers, as usage proportions have been predetermined through implementation guidelines and technical guidelines. Consequently, village governments find it difficult to realise priority programs based on community aspirations; instead, they must consistently follow supravillage government instructions, even though these programs and activities are often ineffective in terms of outcomes because they do not align with community needs. This phenomenon occurs because the concept used by supravillage governments always standardises villages across Indonesia based on efficiency considerations.

(Musgrave A. Richard and Musgrave B. Peggy, 1989) introduce the concepts of block grants and specific grants in their 1989 book "Public Finance in Theory and Practice." Therefore, policies should be categorised rather than standardised, taking into account the geographical conditions and the unique characteristics and problems of each village. For instance, villages that are considered to have efficient, effective, accountable, and transparent village governance should implement block grants. However, villages with poor governance should implement specific grants.

The implementation of this concept can function when supra-village governments, particularly the central government, place trust in village governments' ability to provide the best services to communities. This aligns with the concept of subsidiarity in village governance, which emphasises that the lowest and closest levels of government should serve the community. Maldonado, (2004) defines the "subsidiary principle" as an approach where organisational actions, responsibilities, and decision-making can be delegated to smaller organisational units, especially when larger organisations or states cannot manage them more rationally and efficiently. In this context, lower-level organisations take on the responsibilities of larger organisations to manage affairs and achieve more satisfactory results. This concept becomes increasingly relevant, considering (Gussen, 2019) perspective that the subsidiarity principle is now shifting from government organisations towards governance.

Policy Scenario for Increasing Village Original Revenue

The primary problem afflicting the majority of villages in Indonesia is the absence of capacity to generate village original revenue, resulting in continuous dependence on supra-village government entities. Despite the existence of institutions established as vehicles to drive village economic development, namely Village-Owned Enterprises (BUMDesa), these entities were formed through a top-down approach via Government Regulation No. 11 of 2021 concerning BUMDesa. The Ministry of Village Affairs (MOVA) serves as the leading sector, supported through village fund budgets and receiving special financial assistance from the Riau Provincial Government. Nevertheless, the BUMDesa of Sungai Intan Village has yet to contribute to village finances due to inadequate human resources among both directors and members, as well as the absence of entrepreneurial spirit,

consequently resulting in poor governance and an inability to determine its core business activities. In addition to BUMDesa, the Ministry of Village Affairs (MOVA) has established the "Red and White Cooperative" institution as another vehicle for stimulating village economic development. However, as this initiative was recently launched by Indonesia's new President, Prabowo Subianto, it cannot yet be analysed in depth. Therefore, it is expected that enhancing village economic development and increasing village original revenue can be achieved by implementing interventions that maximise the role of BUMDesa.

Studies indicate that VOE serves as the driving force for village economics, capacity strengthening, cross-sector collaboration, broader financial access and sustainability, and most importantly, increasing village original income (Adhinata et al., 2020; Mulyani et al., 2023; Pawitan et al., 2025; Wijaya and Purnawan, 2023; Zulkarnaini and Mashur, 2019). Several examples of villages successfully increasing village original income through VOE intervention include VOE Tirta Mandiri in Ponggok Village, which generated revenue of IDR 10.3 billion from tourism business. Second, VOE in Tirtonirmolo Village, with savings and loan business units generating revenue of IDR 8.7 billion. Third, VOE Karang Kandri Sejahtera in Karang Kandri Village successfully obtained revenue worth IDR 3 billion from the power plant supplier business. Fourth, VOE Bangun Jaya recorded revenue of IDR 3 billion from plantation and savings and loan businesses. Furthermore, VOE Bulan Purnama in Landiri Village earned revenue of IDR 1.6 billion from the livestock business, among many others that can serve as best practices (Nukilan, 2024).

Therefore, practical VOE development strategies are needed: Firstly, we must recognise the local potential as a village's advantage. The core business of VOE must be determined based on local potential and community needs to generate comparative and competitive advantages, not merely imitating other VOE businesses (Marlina, 2024). Secondly, we must improve our human resources. The key to VOE success is having a director with entrepreneurial spirit. In fact, the majority of VOE failures are caused by directors being selected due to their proximity to village heads rather than based on capacity principles.

Policy Scenario for Enhancing the Economic Dimension

The factual evidence reveals that the economic condition of SIV lacks production diversification. The community relies predominantly on coconut plantations with minimal contribution from other agricultural products. The village currently lacks essential economic infrastructure, including a village market, economic institutions such as banks, logistical distribution systems, and other supporting economic facilities. Furthermore, the primary constraint is the limited market accessibility for community agricultural products due to severely inadequate village road infrastructure, consequently hindering farmers' access to markets for their agricultural output. Therefore, implementing interventions in the economic dimension represents an appropriate strategy to accelerate village self-sufficiency.

To enhance the economy of SIV, essential strategies include agricultural production diversification through the introduction of alternative crops and integrated farming systems, alongside road infrastructure development to facilitate market access. The establishment of village markets and local financial institutions such as village banks can support marketing activities and provide financial access for farmers. Additionally, the implementation of modern agricultural technology and empowerment of local enterprises through village product processing, such as coconut oil production or handicrafts, will increase added value and create employment opportunities. Government policy support and subsidy programs for village development are also crucial for accelerating village self-sufficiency.

The three policy scenarios outlined above do not emphasise partial implementation but rather require holistic execution according to priority scales and available resource capacities. When relevant stakeholders possess sufficient resources, a combination of policies would be more effective due to the greater leverage generated. Furthermore, these proposed scenarios are not solely the responsibility of village government, whose authority is highly limited, but must be implemented collaboratively by village government and supra-village government entities in partnership with relevant stakeholders to achieve village self-sufficiency in governance, social, economic, and environmental dimensions.

CONCLUSION

Researchers have extensively developed policy scenarios in the public sector using system dynamics approaches. However, no studies have yet aimed to achieve village self-sufficiency, particularly in the Indonesian context. This research identifies village self-sufficiency variables and then constructs CLD structures based on village self-sufficiency subsystems. Subsequently, this research discovers system patterns and behaviours and conducts scenario simulations to identify leverage points for accelerating village self-sufficiency through interventions in public service subsystems, village original income subsystems, and economic dimension

subsystems. The findings of village self-sufficiency leverage points cannot be implemented solely by village governments but require intensive collaboration with supra-village governments and stakeholders such as private parties, academics, media, and others. This is necessary because village governments have limited authority in regulatory, human resource, and financial aspects.

Theoretically, the findings of this study reinforce the subsidiarity principle approach for implementation in village governments, which are the closest level of government to communities and are responsible for providing effective and efficient public services. Villages with characteristics similar to this research can practically adopt the offered scenarios. This case study represents the typical conditions found in most villages across Indonesia. This study's limitation lies in its focus on a single village, despite its representation of the majority of villages nationwide. Future studies need to expand the number and characteristics of villages, such as modern and traditional ones, to differentiate their structures, patterns, and system behaviours. Additionally, subsequent research also needs to compare village self-sufficiency structures and patterns in other countries to discover lessons as success stories that can be adopted for villages in Indonesia.

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