AGRISEP: Journal of Agricultural Socio-Economics and Agribusiness Studies

https://ejournal.unib.ac.id/agrisep

RESEARCH ARTICLE DOI: https://doi.org/10.31186/jagrisep.24.02.791-808

ANALYSIS OF THE IMPLEMENTATION OF SUSTAINABLE FOOD AGRICULTURAL LAND PROTECTION POLICY IN MUSI RAWAS DISTRICT USING THE INTERPRETIVE STRUCTURAL MODELING METHOD

Indarwanto[1,*]; Yuwana[2]; Atra Romeida[3]; Gunggung Senoaji[4]; Reflis[5]; Rahmi Yuristia[6]

[1)] Doctoral of Environmental Science, Faculty of Agriculture, University of Bengkulu, Bengkulu, Indonesia
[2)] Department of Agricultural Industry Technology, Faculty of Agriculture, University of Bengkulu, Bengkulu, Indonesia
[3)] Department of Agroecotechnology, Faculty of Agriculture, University of Bengkulu, Bengkulu, Indonesia
[4)] Department of Forestry, Faculty of Agriculture, University of Bengkulu, Bengkulu, Indonesia
[5)] Department of Agricultural Socio-Economic, Faculty of Agriculture, University of Bengkulu, Bengkulu, Indonesia
[6)] Department of Social Sciences, Wageningen School of Social Sciences, Business Economic Group University, Wageningen University and Research, Wageningen, Netherland
* Corresponding author: indarwantotomi003@gmail.com

ARTICLE INFO

Keywords:
Implementation
ISM
Land conversion

Submitted:
06 July 2024
Revised:
16 October 2024
Accepted:
08 December 2024

ABSTRACT

This study focuses on analyzing the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 concerning Sustainable Food Crop Land Protection (LP2B). In the study, interviews were conducted with informants related to the research aimed at developing a strategy for implementing Musi Rawas Regency Regional Regulation Number 3 of 2018, concerning the protection of sustainable food crop land in Musi Rawas Regency. The method used in this study is interpretive structural modelling (ISM). The ISM method is a modeling technique that can summarize expert opinions to provide specific opinions on the hierarchy of sub-elements according to each element contained in the system. The results obtained from this study indicate that the main obstacle is the lack of optimal socialization regarding sustainable food crop land protection policies to the community, and the need for increased farmer training to implement sustainable agricultural practices to protect food crop areas and land sustainably.

Cite as:
Indarwanto, Yuwana, Romeida, A., Senoaji, G., & Reflis. (2025). Analysis of The Implementation of Sustainable Food Agricultural Land Protection Policy in Musi Rawas District Using the Interpretive Structural Modeling Method. *Jurnal AGRISEP: Kajian Masalah Sosial Ekonomi Pertanian dan Agribisnis,* 24(02), 791-808. https://doi.org/10.31186/jagrisep.24.02.791-808

INTRODUCTION

Land has significant value in development in developing countries (Djelantik et al., 2022). In Indonesia, agricultural land plays a crucial role in food production,

helping to maintain price stability (Fahad et al., 2024). The need for land is expected to increase in line with the growing population (Mhawish & Saba, 2016; Appiah et al., 2019). Food agriculture is a crucial aspect of ensuring food security and environmental sustainability (Anggrainy & Isharyanto, 2021). However, due to rapid economic development and urbanization, many agricultural lands have been converted into residential, industrial, and commercial areas. According to studies by Oakleaf et al. (2024), conversion pressures affect roughly 23% of land across 200 countries.

Uncontrolled land conversion has been shown to harm local economies and reduce the availability of agricultural land (Dar et al., 2021). Gandharum et al. (2022) highlight that agricultural land has now become the main target for the expansion of built-up areas. Supporting this view, Djelantik et al. (2022) and Adriani et al. (2024) explain that the conversion of farmland—particularly rice fields—is largely driven by rising land demand, which often coincides with the expansion of residential and commercial areas.

This trend directly threatens national food security because it reduces the amount of productive agricultural land available (Widhiyastuti et al., 2023). If it continues unchecked, the reduction of farmland could endanger future food supplies (Yang et al., 2022). In this context, sustainable agriculture plays a vital role, not only in ensuring food security but also in promoting social justice, economic development, and shared prosperity (Barchia et al., 2023). As emphasized by Yuan et al. (2024), sustainable agriculture is essentially a development framework designed to fulfill humanity's fundamental need for food.

To address this challenge, the concept of sustainable food farmland protection was introduced with the aim of managing the shift from agricultural to non-agricultural land uses (Satria & Beik, 2018). This protection framework includes planning, allocation, utilization, maintenance, and monitoring mechanisms for agricultural areas (Sumarja et al., 2021). However, Pitaloka (2020) notes that Indonesia's spatial planning policies related to farmland protection have not been fully enforced, largely due to weak political commitment at the regional level. Prasada et al. (2019) further argue that the success of these policies depends on the effective use of technology, strong public awareness, and consistent policy support.

The effective implementation of farmland protection policies is therefore crucial, not only for maintaining the resilience of agricultural systems but also for strengthening food security and safeguarding the environment. One promising approach for supporting this effort is Interpretive Structural Modelling (ISM). According to Haryono and Handayani (2018), ISM can be applied to design strategies for implementing the LP2B Regional Regulation. Bani and Silfiana (2019) add that ISM helps identify the most influential factors in implementation, while Rifaldi et al. (2021) describe it as a structured method for consolidating expert opinions and creating a clear hierarchy of elements within a system. With ISM, stakeholders can map relationships between policies, community support, and available resources, leading to more effective strategies.

Recent studies reinforce the usefulness of ISM in addressing complex policy challenges and supporting decision-making. Kashyap et al. (2023), for example, used ISM to identify key factors in sustainable agricultural policy implementation, highlighting the importance of institutional capacity and stakeholder collaboration.

Similarly, Shashank et al. (2022) applied ISM to identify structural barriers in environmental policy, showing how the method can reveal hidden obstacles that hinder results.

Prasada et al. (2020) argue that ISM provides a systematic framework for overcoming challenges in LP2B implementation while fostering cross-sector collaboration. This view is echoed by Abellana (2020), who notes that ISM helps in organizing and classifying the various elements that influence policy outcomes. Djelantik et al. (2022), in their study on rice field conversion in Tabanan Regency, demonstrate how ISM can deepen our understanding of agricultural land protection policies and their practical applications. Similarly, Fu et al. (2021) emphasize the relevance of analyzing land conversion in China's urbanization process, where ISM proves useful in balancing urban development with food security concerns.

Beyond agriculture, ISM has also been applied in other contexts. Kundu (2021) used the approach to model factors influencing project-based learning, while Shekhar et al. (2023) employed it to identify obstacles in reducing agricultural product waste through logistics optimization in India. In Indonesia, Martanto (2021) examined land conversion patterns and their impact on food security in Karanganyar Regency, underlining the importance of sustainability considerations in farmland management. It is expected that by applying ISM, regions such as Musi Rawas Regency can achieve more integrated and sustainable farmland protection.

Finally, Attri et al. (2013) affirm that ISM remains a relevant tool for analyzing relationships among elements of land protection policy. This research, therefore, aims to further explore how different land protection policies intersect with one another, offering insights into potential synergies as well as conflicts.

RESEARCH METHOD

This study examines the implementation of Musi Rawas Regency's Regional Regulation Number 3 of 2018 concerning the Protection of Sustainable Food Agricultural Land (LP2B). Empirical evidence for this research was derived from primary as well as secondary datasets.Primary data were collected through expert questionnaires, with participants selected based on their expertise in policy implementation and their institutional roles. Many of these experts also possess direct experience in dealing with practical challenges that arise in the field. Complementing this, in-depth interviews with key informants were conducted to develop strategies for implementing the regulation. Secondary data, meanwhile, were obtained from relevant government agencies and supporting documents.

The methodological framework applied in this study is Interpretive Structural Modelling (ISM). ISM is a structured modelling technique designed to identify and organize the most influential elements within a system. By integrating expert perspectives, ISM facilitates the construction of a clear hierarchical model that highlights the relationships between policy components, thereby offering valuable support for strategic policy formulation (Rifaldi et al., 2021). According to Darmawan (2017), ISM consists of two main stages: arranging the elements and developing their hierarchical structure. The process involves identifying elements, establishing contextual relationships, constructing the Structural Self-Interaction Matrix (SSIM), generating the Reachability Matrix (RM), determining hierarchical levels, and finally producing graphical representations of the structural model.

Because of its adaptability, ISM has been widely applied across disciplines and is particularly effective in policy analysis and evaluation (Attri et al., 2013). In this study, ISM is employed to guide the formulation of collaborative management strategies for LP2B implementation in Musi Rawas Regency. The analysis produces a Driver-Dependence Matrix and a hierarchical structure for each element under consideration. Input for the modelling is derived from expert interviews with stakeholders representing different sectors and agencies, ensuring that the proposed strategies reflect a comprehensive and multi-perspective approach.

This study uses the following elements: (1) Objective elements, (2) Need elements, (3) Constraint elements, and (4) Institutional elements. (Darmawan 2017) said that the ISM method is divided into three parts, namely: (1) Identifying the most important sub-elements of the elements, (2) Arranging a hierarchy, and (3) Categorizing sub-elements.

Table 1. Elements and Sub-Elements of the Implementation of Regional Regulation of Musi Rawas Regency Number 3 of 2018 Concerning Sustainable Food Agricultural Land Protection

Element	Sub Elements
Purpose	Protecting food farming areas and land in a sustainable manner Ensuring the availability of sustainable farmland Realizing food independence, security, and sovereignty Protecting farmers' ownership of food farmland Increasing the prosperity and welfare of farmers and communities Improving farmer protection and empowerment Improving the provision of jobs for a decent life Maintaining ecological balance Realizing agricultural revitalization
Necessity	Training of farmers to implement sustainable farming practices Recruitment and development of sustainable agriculture experts Special budget allocation for the implementation of the regional regulations Application of modern technology in environmentally friendly sustainable agriculture Evaluation and improvement of regulations related to agriculture and the environment Education and counseling programs to increase public awareness Monitoring system to measure the impact and success of regional Regulations implementation Periodic evaluation mechanism to assess the effectiveness of the strategy Building partnerships with government, private, and NGO agencies
Constraints	The community does not understand land conversion Limited budget allocation for the implementation of the regional regulations implementation strategy Lack of community participation and support in the implementation of the strategy Socialization regarding sustainable food and agricultural land protection policies to the community has not been optimal

	Barriers to implementing policies that support sustainable farmland protection
Institution	Food Crops, Horticulture and Livestock Service Regional Development Planning Agency One-Stop Investment and Integrated Services Office Pamong Praja Police Unit UNMURA College Agricultural Extension Association (Perhiptani) KJF Agricultural Extension District Government Village/sub-district government Gapoktan/Farmer Group

The elements of the institution in policy implementation are the actors involved in policy implementation efforts. Each sub-element of the institutional element has its role in policy implementation, namely, the Food Crops, Horticulture and Livestock Service as a policy implementer, Regional Development Planning Agency as a budget planner, One-Stop Investment and Integrated Services Office as a permit issuer, Pamong Praja Police Unit as security and enforcement of policy implementation, UNMURA College as a research institution, Perhiptani as an agricultural extension association institution, Agricultural Extension Association (Perhiptani) as an agricultural extension worker, District Government as a sub-district government, Village/sub-district government as a village government, Gapoktan/Farmer Group as an agricultural actor.

RESULT AND DISCUSSION

The results of data processing using the Interpretive Structural Modeling (ISM) application are as follows.

Purpose Element

Figure 1. illustrates that the sub-element (E1), which focuses on protecting areas and agricultural land for sustainable food production, operates independently and plays a pivotal role in driving other sub-elements within the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land. The second highest priority is given to (E2) ensuring the sustainable availability of agricultural land for food production and (E3) achieving food independence, security, and sovereignty. This highlights that sustainably protecting agricultural land for food production is essential to maintaining its long-term availability (Anggrainy & Isharyanto, 2021) and realizing food independence, security, and sovereignty (Martanto, 2021; Widhiyastuti et al., 2023). With significant momentum and minimal reliance on external systems, the integration of these two sub-elements can drive broader participation in implementing Musi Rawas Regency Regional Regulation Number 3 of 2018, which focuses on the protection of sustainable food agricultural land.

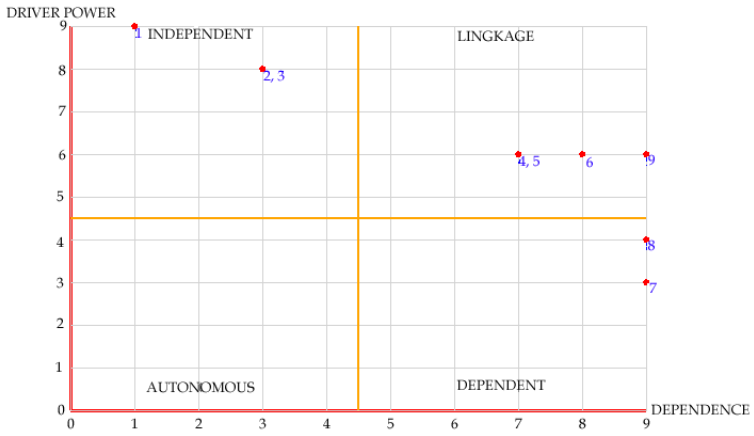

Figure 1.
Micmac Graphics Destination Elements

Sub-element (E4) safeguards the ownership of agricultural food land held by farmers, (E5) enhances the prosperity and well-being of farmers and the community, (E6) strengthens the protection and empowerment of farmers, and (E9) ensures agricultural revitalization in the environmental sector, having a significant impact and dependence on the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 concerning the Protection of Sustainable Food Agricultural Land.

The sub-elements (7) enhance job opportunities for a decent life, and (8) preserve ecological balance in the dependent sector, but have limited influence. This indicates that these two sub-elements have minimal motivation to inspire other sub-elements to implement Musi Rawas Regency Regional Regulation Number 3 of 2018, which focuses on the protection of sustainable food agricultural land. This sub-element relies on the participation of other sub-elements.

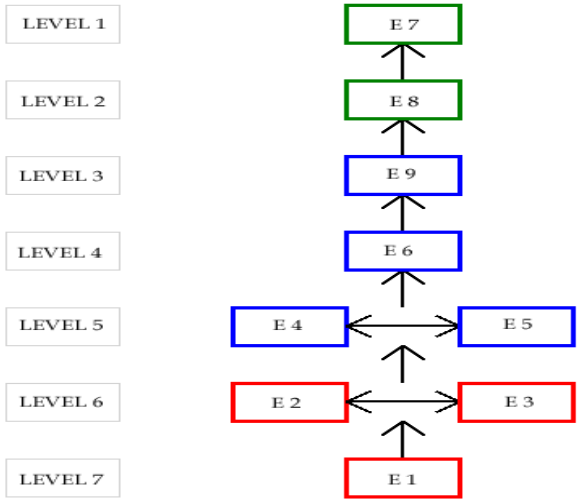

Figure 2.
Hierarchy Structure of Purpose Elements

Figure 2. illustrates that the sub-element (E1), focused on protecting food agricultural areas and land sustainably, ranks at the highest level, level 7. This indicates that the primary goal of implementing Musi Rawas Regency Regional Regulation Number 3 of 2018, concerning the protection of sustainable food agricultural land, is to ensure the long-term protection of these areas. Sub-elements (E2) ensuring the availability of sustainable food agricultural land and (E3) achieving food independence, security, and sovereignty are positioned at level 6. This reflects the idea that the ongoing availability of sustainable food agricultural land will contribute to the realization of food independence, security, and sovereignty.

At level 5, the focus is (E4) on safeguarding the ownership of agricultural land used for food production by farmers and (E5) on improving the prosperity and welfare of both farmers and the community. At level 4, the aim shifts to (E6) enhancing the protection and empowerment of farmers, as well as (E9) achieving agricultural revitalization. This indicates that protecting farmers' ownership of food agricultural land contributes significantly to increasing their prosperity and welfare, while also supporting agricultural revitalization. These four sub-elements belong to the environmental sector, highlighting their substantial influence and strong interdependence in implementing Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land.

The sub-elements (7) enhancing job opportunities for a decent living and (8) preserving ecological balance are positioned at levels 2 and 1, respectively, and heavily rely on the engagement of other sub-elements. This indicates that if other sub-elements actively contribute to supporting the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land, there will be improvements in both job availability for a decent living and the maintenance of ecological balance.

One of the main elements in this study is the purpose of the land protection policy. These goals include protecting agricultural areas (Hambali et al., 2021), ensuring the availability of land (Anggrainy & Isharyanto, 2021), and realizing food independence (Satria et al., 2018). By understanding these objectives, we can identify the steps needed to achieve successful policy implementation.

Element of Needs

Figure 3. illustrates that the sub-element (E1) of farmer training for implementing sustainable agricultural practices belongs to the independent sector and plays the most significant role in driving other sub-elements related to the Implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land. This indicates that training farmers in sustainable farming practices enhances their knowledge (Cahyaningrum, 2019), contributing to the sustainable availability of agricultural and food land, which is essential for achieving food independence, security, and sovereignty (Prasada et al., 2019).

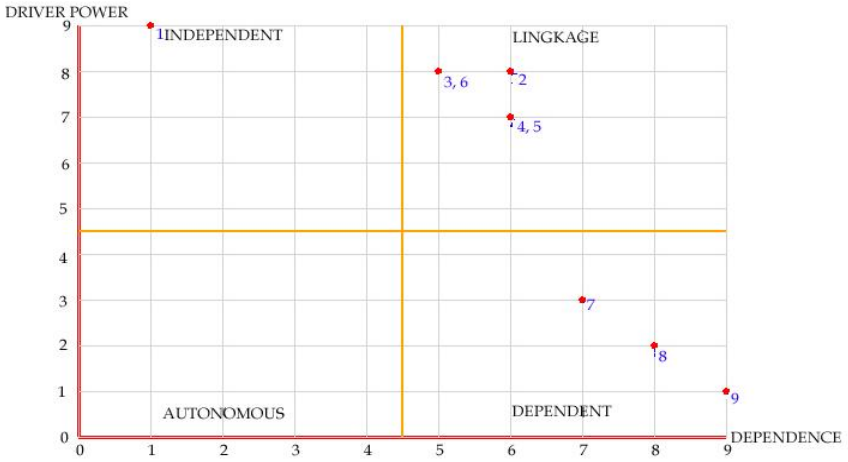

Figure 3.
Micmac Graphics Elements Requirement

Sub-elements (E2) recruitment and development of sustainable agriculture experts, (E3) special budget allocation for the implementation of the PERDA, (E4) application of modern technology in environmentally friendly sustainable agriculture, (E5) evaluation and improvement of regulations related to agriculture and the environment and Education and extension programs aimed at raising public awareness play a crucial role in driving the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land. Then the third highest impetus ranking is (E4) the application of modern technology in environmentally friendly sustainable agriculture, and (E8) a periodic evaluation mechanism to assess the effectiveness of the strategy. This suggests that promoting farmer training for sustainable agricultural practices, with the collaboration of other sub-elements, can foster the participation of these sub-elements in implementing Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land.

Sub-elements (E7) monitoring system to measure the impact and success of PERDA implementation, (E8) periodic evaluation mechanism to assess the effectiveness of strategies, and (E9) building partnerships with government institutions, the private sector, and NGOs, which are in the dependent sector and have low influence power. This indicates that these two sub-elements have minimal motivation to urge other sub-elements to implement Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land, and they even rely on the participation of other sub-elements.

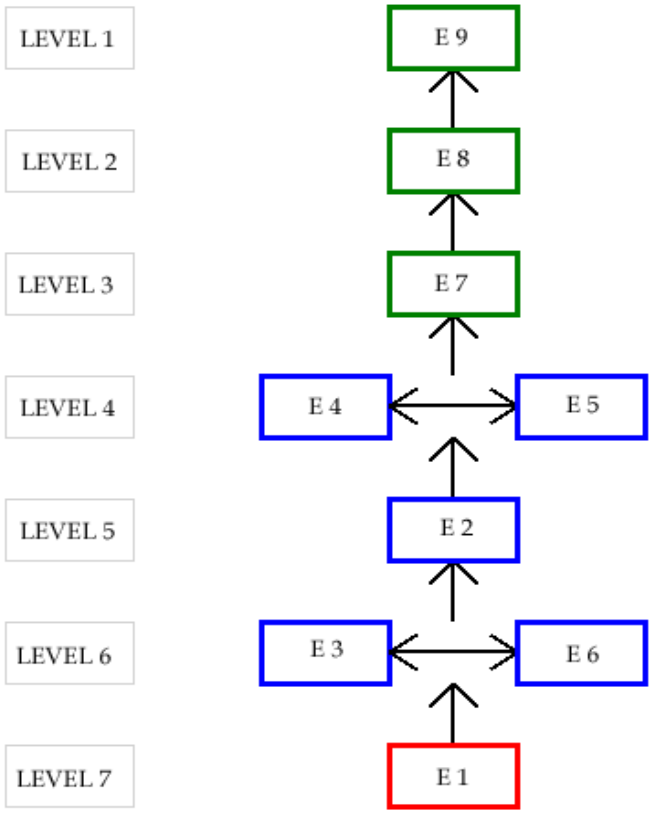

Figure 4.
Hierarchy Structure of Requirement Elements

Figure 4. illustrates that the sub-element (E1) of farmer training for implementing sustainable agricultural practices is at its peak, reaching level 7, which aligns with the findings of the study by Cahyaningrum (2019), emphasizing the importance of protecting and empowering farmers. The main objective of implementing Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land is to ensure the sustainable protection of agricultural land and food production areas.

At level 6 is the sub-element (E3) of the special budget allocation for the implementation of the PERDA, which is in accordance with the research results of Adiarsa & Nur (2020), and (E6) education and counselling programs to increase public awareness. Then, at level 5 is (E2) recruitment and development of sustainable agriculture experts. Furthermore, at level 4 is (E4) the application of modern technology in environmentally friendly sustainable agriculture and (E5) the evaluation and improvement of regulations related to agriculture and the environment.

Sub-element (E7) of the monitoring system to measure the impact and success of the implementation of PERDA is at level 3, (E8) the periodic evaluation mechanism

to assess the effectiveness of the strategy is at level 2, and (E9) building partnerships with government agencies, the private sector, and NGOs is at level 1 and is highly dependent on the involvement of other sub-elements.

In policy implementation, there are several needs that must be met. Among them are training for farmers so that they can implement sustainable agricultural practices, adequate budget allocation to support implementation, and the application of modern, environmentally friendly technology. Meeting these needs will significantly affect the success of land protection policy.

The causes of budget constraints in policy implementation are the lack of coordination between stakeholder institutions and the lack of commitment of local governments to policy implementation. Then, the lack of community participation is caused by the lack of community knowledge about policy implementation.

Element of Constraints

Figure 5. illustrates that sub-element (E4) has been less effective in socializing the sustainable food agricultural land protection policy to the community within the independent sector, despite being the most influential in motivating other sub-elements in the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on Sustainable Food Agricultural Land Protection. The second most influential factor is (E1), which highlights that the community lacks understanding of land conversion. This suggests that the insufficient socialization of the sustainable food agricultural land protection policy has led to a lack of awareness regarding land conversion. With high mobility and low system dependence, the involvement of these two sub-elements is expected to drive greater participation from other sub-elements in the implementation of the regulation.

The environmental sector, as a sub-element (E2) of the restricted budget allocation for executing the Regional Regulation Implementation strategy, plays a significant role with both a strong influence and a high dependency on the enforcement of Musi Rawas Regency Regional Regulation Number 3 of 2018, which focuses on the Protection of Sustainable Food Agricultural Land.

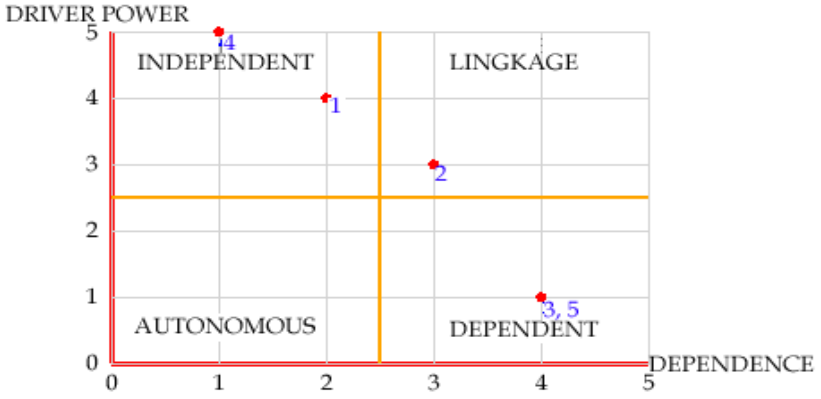

Figure 5.
Micmac Graph of Constraint Elements

Sub-element (E3) refers to the lack of community participation and support in executing the strategy, while (E5) highlights the challenges in implementing policies

that back sustainable agricultural land protection. he two sub-elements identified are categorized as part of the dependent sector, meaning their influence is relatively weak. Rather than acting as drivers of policy implementation, they rely significantly on the involvement of other sub-elements to support the enforcement of Musi Rawas Regency Regional Regulation Number 3 of 2018 regarding the Protection of other sub-elements to supports the enforcement of Musi Rawas Regency Regional Regulation Number 3 of 2018 regarding the Protection of Sustainable Food Agricultural Land.

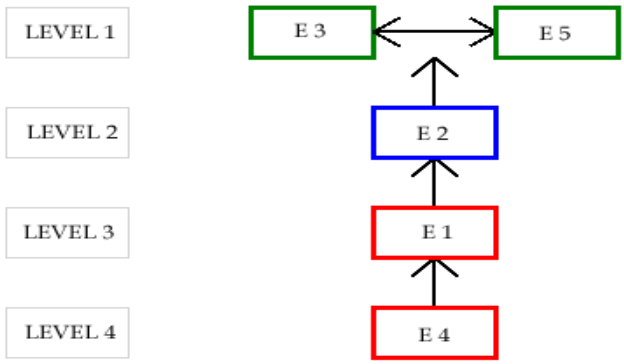

Figure 6.
Hierarchical Structure of Constraint Elements

As illustrated in Figure 6, sub-element (E4) is positioned at level 4, the highest degree in the hierarchy. This reflects that the strategy for protecting sustainable food agricultural land has not been adequately disseminated to the community. Consequently, the low level of public awareness regarding Musi Rawas Regency Regional Regulation Number 3 of 2018 on Sustainable Food Agricultural Land Protection emerges as a major barrier to its effective implementation. Similarly, sub-element (E1), which is placed at level 3, indicates that the community remains uninformed about issues related to land-use conversion, despite the regulation's existence.

At level 2, sub-element (E2) highlights the limited budget allocated for the implementation of this regional regulation. The insufficiency of funding constrains the ability to properly socialize and educate the community about the importance of protecting agricultural land for sustainable food production. This element falls within the environmental sector, underscoring both its strong influence and dependence on the success of the regulation's implementation.

Meanwhile, sub-element (E3), which concerns the lack of community participation and support, and sub-element (E5), which relates to obstacles in enforcing land protection policies, are both located at level 1. Their placement shows that these factors are highly dependent on the performance of other sub-elements. This implies that if higher-level sub-elements are effectively addressed particularly awareness-raising and budget allocation, then community involvement and policy enforcement are likely to improve, thereby strengthening the overall implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land.

A limited understanding among communities, including farmers, often leads to the conversion of agricultural land into uses that are perceived as more economically profitable, despite the negative consequences for land sustainability and food production. Strengthening public awareness and comprehension of the importance of protecting agricultural land is therefore essential. This can be achieved through more structured socialization efforts, such as community meetings, the use of media platforms, and field-based educational programs. Alongside these efforts, the government should play an active role by not only facilitating continuous and well-organized socialization initiatives but also by providing incentives for regions that successfully maintain agricultural land.

Nevertheless, implementing this strategy faces several challenges. One of the most significant is the inadequate dissemination of information to the community regarding land preservation measures (Prasada et al., 2019). Equally problematic is the limited participation of the community in supporting this initiative, coupled with financial constraints that hinder its effectiveness. Given that many households depend directly on agriculture for their livelihoods, the protection of agricultural land holds both economic and social significance (Satria et al., 2018). Addressing these obstacles is thus a critical step in ensuring the successful implementation of policies for sustainable agricultural land management.

Institutional Elements

Figure 7. illustrates that the sub-element (E1) of the Food Crops, Horticulture, and Livestock Service operates in the independent sector and plays a leading role in encouraging the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018, which protects sustainable food agricultural land, by other sub-elements. The second highest level of influence is held by (E10) Gapoktan/Farmer Group, followed by (E3) the Investment and One-Stop Integrated Services Office, which also belongs to the independent sector. This indicates that the Food Crops, Horticulture, and Livestock Service (E1), Gapoktan/Farmer Group (E10), and the Investment and One-Stop Integrated Services Office (E3) exert a significant influence on encouraging other institutions to participate in the implementation of this regional regulation. With substantial momentum and minimal reliance on the system, the engagement of these three sub-elements is likely to inspire the involvement of additional institutions in the regulation's execution.

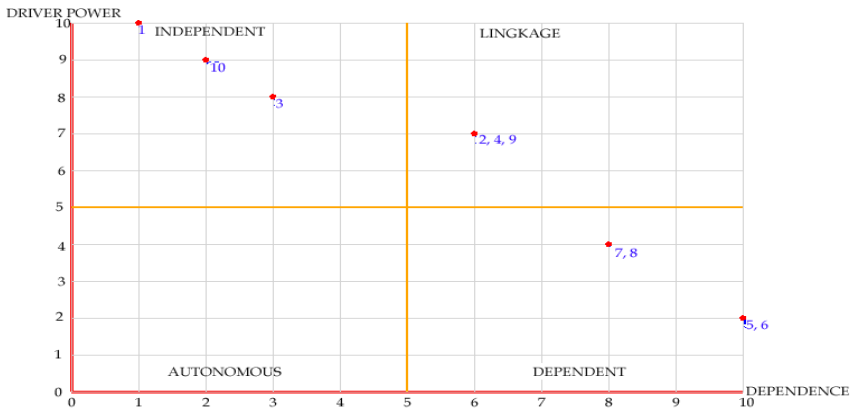

Figure 7.
Micmac Chart of Institutional Elements

Sub-elements (E2) of the Regional Development Planning Agency, (E4) of the Pamong Praja Police Unit, and (E9) of the Village/sub-district Government are in the environmental sector and have a high influence as well as a high dependence on the Implementation of Regional Regulation of Musi Rawas Regency Number 3 of 2018 concerning the Protection of Sustainable Food Agricultural Land. Sub-elements (5) UNMURA University, (6) Agricultural Extension Association (Perhiptani), (7) KJF Agricultural Extension, and (8) District Government are in the dependent sector and have low influence power. This suggests that these two sub-elements have minimal motivation to urge other sub-elements to implement Musi Rawas Regency Regional Regulation Number 3 of 2018 regarding the Protection of Sustainable Food Agricultural Land. These sub-elements rely on the participation of other sub-elements.

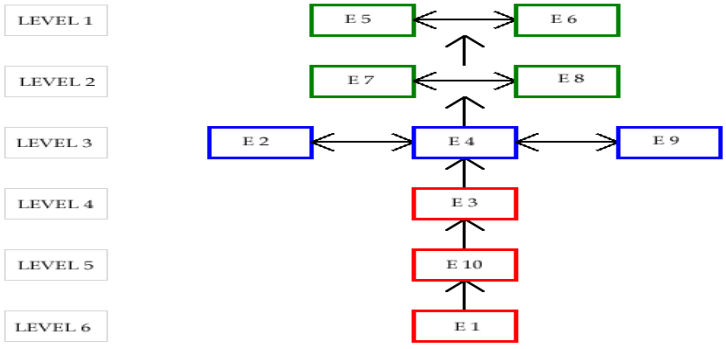

Figure 8.
Hierarchical Structure of Institutional Elements

Figure 8. illustrates that the sub-element (E1) of the Food Crops, Horticulture, and Livestock Service occupies the highest position at level 6. This indicates that the Food Crops, Horticulture, and Livestock Service is the priority institution in implementing Musi Rawas Regency Regional Regulation Number 3 of 2018 regarding the Protection of Sustainable Food Agricultural Land. At level 5, the sub-

element (E10) representing Gapoktan/Farmer Groups follows, while at level 4, the sub-element (E3) of the Investment and One-Stop Integrated Services Office is positioned. This hierarchy highlights the necessity for collaborative support from these institutions/agencies to implement the regulation effectively.

At level 3 are (E2) Regional Development Planning Agency, (E4) Pamong Praja Police Unit, and (E9) Village Government/sub-district government, this sub-element is in the environmental sector which means that its existence has a high influence as well as high dependence in The enforcement of Musi Rawas Regency Regional Regulation No. 3 of 2018 on the Protection of Sustainable Agricultural Land.

Sub-elements (5) UNMURA University, (6) Agricultural Extension Association (Perhiptani), (7) KJF Agricultural Extension, and (8) District governments at levels 1 and 2 rely heavily on the participation of other sub-elements. This implies that when these sub-elements actively support the implementation of Musi Rawas Regency Regional Regulation Number 3 of 2018 on the Protection of Sustainable Food Agricultural Land, entities such as UNMURA University, the Agricultural Extension Association (Perhiptani), KJF Agricultural Extension, and the district government will also become involved.

The enforcement of land protection policies largely depends on the active role of institutions. To ensure the success of these programs, government agencies—such as the Food Crops, Horticulture, and Livestock Service—must work collaboratively with both the private sector and local communities (Kashyap et al., 2023). Engaging the community is particularly important to guarantee that policies are implemented effectively and achieve their intended outcomes.

Institutions, whether governmental or part of civil society, play a pivotal role in the formulation, execution, and monitoring of land preservation policies. They also facilitate community involvement, help resolve challenges such as conflicting interests or resistance to change, and provide education and outreach regarding the importance of protecting agricultural land.

Overcoming these challenges requires a comprehensive and coordinated approach. The government should strengthen and enforce land protection regulations while offering incentives to encourage local communities to preserve agricultural land. Involving communities in planning and decision-making fosters a sense of ownership and responsibility for land sustainability. Additionally, ongoing socialization and educational initiatives are essential to help the public understand both the benefits of land preservation and the potential consequences of land conversion.

CONCLUSION

The study on the strategy for implementing Musi Rawas Regency Regional Regulation Number 3 of 2018, which concerns the protection of sustainable food agricultural land, concluded that the use of the ISM method in selecting a strategy can be assessed through its components. These components include the objective, need, obstacle, and institutional elements. The strategy for implementing the regulation involves local government agencies, universities, extension workers, and farmer or farmer group organizations (gapoktan). The implementation strategy is based on the importance level of each issue. The findings highlight that the main challenges are the insufficient socialization of sustainable agricultural land

protection policies to the community and the need for more farmer training to adopt sustainable agricultural practices, which will help preserve food agricultural areas and land over the long term.

The enforcement of Musi Rawas Regency Regional Regulation Number 3 of 2018, which focuses on the protection of sustainable food agricultural land, must be upheld as it plays a crucial role in safeguarding farmers' land rights, preserving fertile agricultural land, and maintaining environmental balance.

AUTHOR CONTRIBUTION STATEMENT

Indarwanto was responsible for conceptualization, research design, and overall supervision of the study. Yuwana contributed to methodology development, data collection, and formal analysis. Atra Romeida was involved in data curation, visualization, and preparation of the original manuscript draft. Gunggung Senoaji and Reflish contributed to writing (review and editing) and provided critical revisions to strengthen the intellectual content of the manuscript, and Rahmi Yuristia contributed to proofreading. All authors have read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ETHIC STATEMENT

Ethical approval was obtained from the Ethics Committee of the University of Bengkulu, Indonesia. In addition, all participants provided informed consent prior to their participation in this study.

REFERENCES

Abellana, D. P. (2020). An Interpretative Structural Modelling Approach to Analysing Root Causes of Defective Jobs: A Case Study in An Automobile Service Industry. *International Journal of Productivity and Quality Management*, 31(1), 1–27. doi: 10.1504/IJPQM.2020.109327

Adriani, D., et al. (2024). *Resources Availability and Income Achievement: A Driving Force for Competitiveness of Rice Farming*, 23(2), 327–350. doi: 10.31186/jagrisep.23.02.327-350

Adiarsa, S. R., & Nur, A. M. (2020). Kunci Sukses Proses Penyusunan Kebijakan Perlindungan Lahan Pertanian Pangan Berkelanjutan di Kabupaten Karawang. *Jurnal Politikom Indonesiana: Kajian Ilmu Pemerintahan, Ilmu Politik dan Ilmu Komunikasi*, 5(1), 132-154. doi: 10.35706/jpi.v5i1.3738

Anggrainy, Y. I., & Isharyanto, J. E. (2021). Implementasi UU Nomor 41 Tahun 2009 Tentang Perlindungan Lahan Pertanian Pangan Berkelanjutan sebagai Upaya untuk Pengendalian Laju Alih Fungsi Lahan Pertanian di Kota Semarang. *Notary Law Research*, 3(1), 28–40. doi: 10.56444/nlr.v3i1.3397

Appiah, D. O., Asante, F., & Nketiah, B. (2019). Perspectives on Agricultural Land Use Conversion and Food Security in Rural Ghana. *Sci*, 1(1), 1-13. doi: 10.3390/sci1010014.v1

Attri, A., Dev, N., & Sharma, V. (2013). Interpretive Structural Modelling (ISM) Approach: An Overview**.** *Research Journal of Management* Sciences, 2(2), 1-8. Retrieved from https://www.researchgate.net/

Bani, A. D., & Silfiana, S. (2019). Policy Evaluation of Peraturan Daerah No. 5 Tahun 2014 on Land Protection of Sustainable Food Farming in Banten Province. *Jurnal Kebijakan Pembangunan Daerah,* 3(1), 33–48. doi: 10.56945/jkpd.v3i1.53

Barchia, M. F., Mareja, H., Susatya, A., & Putri, E. (2023). Sustainability of Rice Cultivation in Irrigated Paddy Fields in the Highlands of Bengkulu, Indonesia. *European Alliance for Innovation*. doi: 10.4108/eai.5-10-2022.2328294

Dar, M. H., et al. (2021). Abiotic Stress Tolerance-Progress and Pathways of Sustainable Rice Production. *Sustainability*, 13(4), 1–19. doi: 10.3390/su13042078

Darmawan, D. P. (2017). *Pengambilan Keputusan Terstruktur dengan Interpretative Structural Modelling*. Elmatera

Djelantik,A. A. A. W. S., Sudarma, I. M., & Setiawan, I. G. B. D. (2022). Alih Fungsi Lahan Sawah dan Dampaknya di Kecamatan Kediri Kabupaten Tabanan. *Jurnal Manajemen Agribisnis (Journal of Agribusiness Management),* 10(2), 1-20. doi: 10.24843/jma.2022.v10.i02.p14

Fahad, S., et al. (2024). Reasons of Agriculture Land Conversion into Non-Agriculture Activities: A Case of Rural Area of District Peshawar. *Journal of Asian Development Studies*, 13(2), 1410–1421. doi: 10.62345/jads.2024.13.2.112

Fu, S., Xu, X., & Zhang, J. (2021). Land Conversion Across Cities in China. *Regional Science and Urban Economics*, 87, 1–19. doi: 10.1016/j.regsciurbeco.2021.103643

Gandharum, L., Hartono, D. M., Karsidi, A., & Ahmad, M. (2022). Monitoring Urban Expansion and Loss of Agriculture on the North Coast of West Java Province, Indonesia, Using Google Earth Engine and Intensity Analysis. *The Scientific World Journal*, 2022(1), 1-16. doi: 10.1155/2022/3123788

Hambali et.al., 2021**.** Kesesuaian Kawasan Lahan Pertanian Pangan Berkelanjutan Dengan Rencana Tata Ruang Wilayah Di Kabupaten Sumenep**.** *Jurnal Tunas Agraria*, 4(3), 276-292. doi: 10.31292/jta.v4i3.164

Haryono & Handayani, D. I. (2018). Pemodelan Sistem Traceability Halal Supply Chain dalam Menjaga Integritas Produk Makanan Halal dengan Pendekatan Interpretive Structural Modeling (ISM). *PROZIMA (Productivity, Optimization and Manufacturing System Engineering)*, 2(2), 70–79. doi: 10.21070/prozima.v2i2.2196

Kashyap, A., Yadav, Kumar, A., Vatsa, O. N., Chandaka, T. N., & Shukla, O., J. (2023). Investigation of the Critical Success Factors in the Implementation of the Lean Industry 4.0 in Manufacturing Supply Chain: An ISM Approach.

Management of Environmental Quality: An International Journal, 34(4), 981-996. doi: 10.1108/MEQ-04-2022-0109

Kundu, G. K. (2021). Modeling The Enablers of Project-Based Learning: An ISM-Fuzzy MICMAC Approach. *International Journal of Quality And Reliability Management,* 38(9), 1923–1946. doi: 10.1108/IJQRM-08-2020-0273

Martanto (2021). Land Use Conversion Pattern And Food Security For Sustainable Food Land Direction In Karanganyar Regency, Indonesia. *AgBioForum,* 23(2), 143-152. Retrieved from https://agbioforum.org/menuscript/index.php/agb/article/view/7

Mhawish, Y. M, & Saba, M. (2016). Impact Of Population Growth on Land Use Changes in Wadi Ziqlab of Jordan Between 1952 and 2008. *International Journal of Applied Sociology*, 6(1), 7–14. doi: 10.5923/j.ijas.20160601.02

Oakleaf, J., Kennedy, C., Wolff, N. H., Hart, D. E. T., Ellis, P., Theobald, D. M., Fariss, B., Burkart, K., & Kiesecker, J. (2024). Mapping Global Land Conversion Pressure to Support Conservation Planning. *Scientific Data*, 11(1), 1–10. doi: 10.1038/s41597-024-03639-9

Pitaloka, E. D. A. (2020). Policy for the Protection of Sustainable Agricultural Land in the Political Dimensions of Spatial Planning Law. *Jurnal IUS Kajian Hukum Dan Keadilan*, 8(1), 49–78. doi: 10.29303/ius.v8i1.718

Prasada, I. M. Y., & Priyanto, M. W. (2019). Dampak Implementasi Perda PLP2B di Provinsi Jawa Barat. *Agritech: Jurnal Fakultas Pertanian Universitas Muhammadiyah Purwokerto*, 21(2), 1411–1063. doi: 10.30595/agritech.v21i2.4252

Rifaldi, M., Sumargo, B., & Zid, M. (2021). Penerapan Metode Interpretative Structural Modeling (ISM) dalam Menyusun Strategi Pengelolaan Sampah (Studi Kasus di Kabupaten Bekasi). *Jurnal Teknik Lingkungan, Universitas Pembangunan Nasional "Veteran" Jawa Timu*r, 2(1), 1-7. Retrieved from esec.upnvjt.com

Satria, J., Falatehan, F., & Beik. I. S. (2018). Strategy to Protect Agricultural Land for Sustainable Food Security in Bogor Regency. *Jurnal Manajemen Pembangunan Daerah,* 10(2), 48-59. doi: 10.29244/jurnal_mpd.v10i2.27786

Shashank, K., Raut, R. D., Narwane, V. S., Narkhede, B. E., & Muduli, K. (2022). Implementation Barriers of Smart Technology in Indian Sustainable Warehouse by Using A Delphi-ISM-ANP Approach. *International Journal of Productivity and Performance Management*, 71(3), 696–721. doi: 10.1108/IJPPM-10-2020-0511

Shekhar, S., Singh, R., & Khan, S. (2023). Barriers to Minimisation of Agri-Products Wastage through Optimizing Logistics in India: An ISM Modelling Approach. *Heliyon*, 9(11), 1-18. doi: 10.1016/j.heliyon.2023.e21551

Sumarja, Rifai, E., Tisnanta & Saputra, R. A. (2021). Problematika Perlindungan Lahan Pertanian Berkelanjutan Pasca Undang-Undang Cipta Kerja. *SASI*, 27(4), 492-503. doi: 10.47268/sasi.v27i4.562

Wang, B., Tian, J., & Wang, S. (2022). Process and Mechanism of Transition in Regional Land Use Function Guided by Policy: A Case Study from

Northeast China. *Ecological Indicators*, 144, 1-19. doi: 10.1016/j.ecolind.2022.109527

Widhiyastuti, A. N., Adjie, E. M. A., Fauzan, A. A., & Supriyadi. (2023). Sustainable Food Agricultural Land Preservation at Sleman Regency, Indonesia: An Attempt to Preserve Food Security. *Agrihealth: Journal of Agri-Food, Nutrition and Public Health*, 4(1), 41-52. doi: 10.20961/agrihealth.v4i1.67471

Yang, Y., Tian, Y., Zhang, Q., Tao, J., Huang, J., Gao, C., Lin, J., & Wang, D. (2022). Impact of Current and Future Land Use Change on Biodiversity in Nanliu River Basin, Beibu Gulf of South China. *Ecological Indicators*, 141, 1-17. doi:10.1016/J.Ecolind.2022.109093

Yuan, S., Saito, K., Oort, P. A. J. V., Ittersum, M. K., V., Peng, S., & Grassini, P. (2024). Intensifying Rice Production to Reduce Imports and Land Conversion in Africa. *Nature Communications*, 15(1), 1-12. doi: 10.1038/s41467-024-44950-8