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Actor dynamics in farmland protection: A MACTOR analysis in Tasikmalaya, Indonesia

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ABSTRACT
Agricultural land protection is vital for ensuring food security, especially in peri-urban areas of developing countries facing rapid urbanization and land conversion. This study analyzes actor interactions in implementing Sustainable Food Agriculture Land (SFAL) Protection in Tasikmalaya City, Indonesia, using the MACTOR (Matrix of Alliances and Conflicts: Tactics, Objectives, and Recommendations) method. The use of MACTOR in farmland protection in Indonesia is still limited. The study provides a novel approach to uncover alliances, conflicts, and power asymmetries among policy actors. Data were collected through focus group discussions and in-depth interviews with stakeholders from government institutions, farmer organizations, and the private sector. The analysis identified eleven key actors and six strategic objectives, including regional regulation, soil fertility, irrigation management, cost-efficient farming, and livelihood diversification. Results show that private developers exert the greatest influence, followed by the city government through the Regional Development Planning Agency, sub-district authorities, and the Mayor. In contrast, farmers and their groups remain marginalized with limited policy influence. Despite this, there is formal alignment among actors toward land protection goals. The study highlights the need to strengthen farmer institutions, enhance transparent land governance, and develop multi-actor collaboration to balance agricultural sustainability and urban growth pressures.

Contribution/Originality: This study introduces the MACTOR method for analyzing actor dynamics in farmland protection within Indonesia's peri-urban context. It reveals that farmers are marginalized despite being the primary land users and highlights the dominance of developers. Additionally, the study identifies convergence on regulatory and agronomic goals as a novel foundation for fostering collaborative governance.

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1. INTRODUCTION

Agricultural land plays a fundamental role in global food supply, carbon storage, and biodiversity (Faoziyah, Rosyaridho, & Panggabean, 2024). However, urbanization and industrialization are eroding fertile land, particularly in peri-urban areas, which are the spearhead of regional and global food security. Based on a dynamic systems study, Indonesia's food security is expected to become increasingly vulnerable by 2045, particularly on Java, which is a food belt and faces high urbanization pressures. If productivity is only developed without land protection, future food consumption will be disrupted, particularly for strategic commodities such as rice, corn, and cassava.

At the global level, a similar phenomenon is observed in urbanization studies, which show that urban expansion contributes to the reduction of agricultural land availability, although the effects vary across countries (Olivia, Boe - Gibson, Stitchbury, Brabyn, & Gibson, 2018). Controlling land conversion is an urgent global need to ensure future food production and prevent a broader food security crisis. Meanwhile, Indonesia has experienced a significant decline in rice paddy areas in recent decades. Agricultural census data shows that in the 2018–2023 period, the national rice paddy area shrank from approximately 7.7 million hectares to 7.1 million hectares, or an average loss of approximately 130,000 hectares per year. Projections from the Bogor Research and Development Center for Land Resources even suggest that by 2045, rice paddy areas will only remain at around 5.1 million hectares.

Reflecting on this trend, the World Resources Institute (WRI) Indonesia warns that Java experienced 91% of its total agricultural land conversion to residential and industrial land between 2011 and 2022. Similarly, in Sumatra and Kalimantan, the expansion of oil palm plantations has eroded agricultural land and threatened national food sustainability. The agricultural land conversion was driven by greater economic incentives in the non-agricultural sector and weak land protection regulations. Although Indonesia Law No. 41 of 2009 concerning the Protection of Sustainable Food Agricultural Land (SFAL) exists, it is often not effectively implemented at the regional level.

Tasikmalaya faces similar challenges, including rapid urban growth, pressure on agricultural land, and ineffective local SFAL policies. An economic valuation study of environmental services lost due to agricultural land conversion in Tasikmalaya recorded losses of approximately IDR 1.24 billion per year (based on Willingness to Accept/WTA) and a potential loss of Willingness to Pay/WTP of up to IDR 278 million per year in Purbaratu, Tasikmalaya (Erfrissadona, Sulistyowati, & Setiawan, 2020). The study concluded that land conversion is economically and ecologically detrimental and highlighted the need for a multi-actor approach to addressing land conversion.

Despite extensive studies on land conversion in Indonesia, most have emphasized economic valuation, spatial patterns, or regulatory shortcomings, with limited attention to the dynamics of multi-actor interactions that shape policy outcomes. Moreover, the application of systematic tools such as MACTOR in analyzing farmland protection remains scarce, particularly in peri-urban contexts where competing interests are most intense. This study addresses this gap by employing the MACTOR method to map actor influence, alliances, and conflicts in the implementation of PLP2B in Tasikmalaya City. The novelty lies in uncovering how asymmetric power relations between government, private developers, and farmers affect policy effectiveness, while also identifying opportunities for collaborative governance to strengthen sustainable farmland protection.

2. METHODS

This study uses a qualitative-descriptive approach supported by exploratory quantitative analysis through the MACTOR method (Matrix of Alliances and Conflicts: Tactics, Objectives, and Recommendations). This approach was chosen because the PLP2B problem is complex, involving many actors with different goals, interests, and levels of influence. Conceptually, the MACTOR method (Godet, 2000) is used to identify actors involved in the policy, determine the strategic objectives of each actor, analyze convergence and divergence (coalitions and conflicts) between actors, and measure the relative influence of actors in the policy system. This approach is expected to be relevant to answer the research objective, namely, to map important actors in the implementation of PLP2B in Tasikmalaya City. The study was conducted in Tasikmalaya City, West Java, which is an urban-peri-urban area with high land conversion pressure.

Data collection was carried out in three stages:

1. Document analysis of Law No. 41 of 2009 concerning the PLP2B; the Tasikmalaya City Regional Regulation (Perda) on PLP2B; the Mayor's Regulation on Spatial Planning (RTRW) of Tasikmalaya City; and agricultural and land statistics.
2. In-depth interviews were conducted with 15 key informants selected through purposive sampling. The informants included: local government officials (Agriculture Office, Spatial Planning Office, Bappelitbangda, Legal Section of the Regional Secretariat); representatives of farmer groups and Gapoktan (Farmer Groups); academics in the fields of agribusiness, spatial planning, and public policy; local NGO activists working in the environmental and agricultural sectors; and representatives of the private sector (housing developers).
3. Focus Group Discussions (FGDs) were conducted to validate the list of actors and strategic objectives and to assess the level of influence between actors and coalition/conflict relations.

The MACTOR analysis process followed the stages developed by Godet (2000), which can be summarized in the following flowchart.

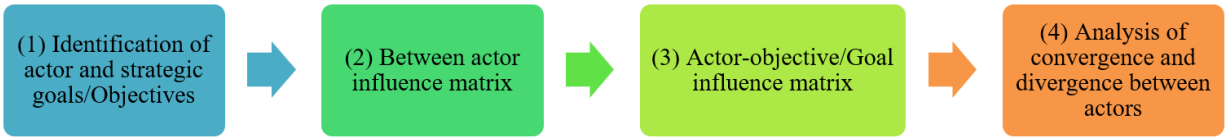

Figure 1. MACTOR analysis stages.

Figure 1 illustrates the MACTOR analysis process, which begins with data collection as mentioned above. The FGDs identify actors and strategic objectives within the SFAL policy, followed by measuring the influence between actors and strategic objectives. In the final stage, convergence and divergence analyses are conducted to map alliances, conflicts, and power asymmetries among policy actors.

To strengthen the validity and reliability of the findings, several triangulation techniques were employed. *First*, data triangulation was conducted by combining three sources of evidence: (1) official policy documents, (2) in-depth interviews, and (3) FGDs. *Second*, methodological triangulation was applied by cross-checking perceptions obtained through interviews with collective assessments in FGDs and by integrating them into the structured MACTOR matrices. *Third*, expert validation was carried out by discussing the preliminary results with academic experts and local practitioners familiar with land governance. Triangulation is widely recognized as an effective strategy to enhance credibility in qualitative and policy research (Denzin, 2009; Flick, 2018; Patton, 2015).

This study has several limitations, namely the subjectivity of the assessment (the score in MACTOR is strongly influenced by respondents' perceptions). The number of actors involved in this study was only 15 main actors, while there are still other actors who may be relevant. Although this study involved a relatively small number of informants, such a sample size is common in qualitative policy studies where the focus is on depth rather than breadth of analysis (Creswell, 2014; Guest, Bunce, & Johnson, 2006). The informants were selected purposively to ensure representation from key actor categories, namely local government institutions, farmer organizations, private developers, academics, and NGOs, thereby capturing the diversity of perspectives relevant to the implementation of SFAL in Tasikmalaya City.

3. RESULT AND DISCUSSION

3.1. SFAL Key Actor and Strategic Objective Identification

The SFAL is a cross-sectoral policy that inherently involves diverse actors with varying roles, interests, and levels of influence. Actor identification is a crucial initial step in multi-actor analysis using the MACTOR method, as the position and interactions of each actor will determine the direction of policy implementation (Godet & Durance, 2011).

Based on the results of FGDs and in-depth interviews, this study identified 11 key actors involved in the implementation of the SFAL in Tasikmalaya.

1) The Mayor of Tasikmalaya (WALI) – the highest executive authority at the city level, with significant authority in determining policy direction and development priorities.
2) The Tasikmalaya City Council (DPRD) – the local legislative body responsible for drafting regional regulations and overseeing policy implementation.
3) The Department of Food Security, Agriculture, and Fisheries (DISTAN) – the technical agency responsible for implementing agricultural programs, food security, and land conservation.
4) The Department of Public Works and Spatial Planning (DISPU) has authority over urban spatial planning, which is closely related to agricultural land protection.
5) The Department of Housing and Settlement Areas (DISPER) plays a role in housing development, with a potential conflict of interest with the objectives of the PLP2B.
6) The Regional Development Planning Agency (BAPEDA) – a development planning agency with a strategic role in formulating medium- and long-term policies, including land protection.
7) The Tasikmalaya City Land Office (BPN) – an agency that regulates the legal aspects of land, including certification and land conversion.
8) The Village (KEL) – the smallest government unit that directly interacts with the community and serves as a liaison between city government policies and their implementation on the ground.
9) Farmer Groups (POKTAN) – community organizations that represent the interests of farmers at the local level.
10) Farmers (TANI) – key actors in agricultural land use, but often marginalized in decision-making.
11) Housing Developers (DEV) – a private sector entity with a strong interest in land conversion into residential and commercial areas.

This identification shows the existence of three large groups of actors: (1) the government (the center of regulatory and administrative power), (2) the farmers' community (direct users of agricultural land), and (3) the private sector (housing developers). This configuration aligns with the finding that the implementation of land protection policies is determined by the trade-off between government authority, farmers' interests, and the push for property expansion (Mulyani & Jepson, 2015).

Meanwhile, regarding the strategic objectives of SFAL in Tasikmalaya City, according to the results of the FGD, they were identified as follows:

1) Drafting a Mayoral Regulation on the distribution and area of LP2B (PERWALI).
2) Maintaining rice field fertility (SUBUR).
3) Developing alternative non-rice business opportunities (ALTUT).
4) Efficient rice farming costs (BIAYAUT).
5) Maintaining irrigation channels (IRIG).
6) Increasing the cropping index (IP).

3.2. The Influence between Actors of SFAL

The Matrix of Direct Influence (MDI) is used to map the relationships between actors, namely the extent to which one actor influences another in the policy system. Based on MACTOR analysis criteria, the influence scores in this

matrix are categorized as 0 (No Influence), 1 (Influence on operating procedures), 2 (Influence on projects), 3 (Influence on missions), or 4 (Influence on existence).

Table 1. Direct Influence between Actors involved in SFAL.

MDI	*WALI*	*DPRD*	*DISTAN*	*DISPU*	*DISPER*	*BAPEDA*	*BPN*	*KEL*	*POKTAN*	*TANI*	*DEV*
WALI	0	3	**4**	**4**	**4**	**4**	1	**4**	3	3	3
DPRD	**4**	0	3	3	3	3	1	2	1	1	1
DISTAN	3	3	0	1	1	1	1	1	**4**	3	0
DISPU	3	3	1	0	1	1	1	2	0	0	2
DISPER	3	3	1	1	0	1	1	1	0	0	3
BAPEDA	3	3	3	3	3	0	2	3	2	2	3
BPN	1	2	1	1	1	3	0	2	2	2	3
KEL	3	2	2	2	2	2	2	0	**4**	3	3
POKTAN	2	1	3	1	0	1	2	2	0	**4**	0
TANI	2	2	2	0	0	2	2	2	**4**	0	0
DEV	2	2	2	2	3	3	1	2	3	2	0

Source: Primary Data (2025).

Table 1 shows that WALI has an influence on the existence (score 4) of DISTAN, DISPU, DISPER, BAPEDA, and KEL. This reflects the local political reality, where the regional head is the center of decision-making (Agrawal & Ribot, 1999). BAPEDA holds a crucial position, with influence on the missions (Score 3) of WALI, DPRD, DISTAN, DISPER, DISPU, BAPEDA, and KEL. This is consistent with the regional development planning agency (BAPEDA)'s role as the "conductor" of regional development planning (Healey, 2003). Interestingly, DEV has influence on the missions (score 3) of DISPER, BAPEDA, and POKTAN, highlighting the potential conflict between housing development interests and agricultural land conservation. Meanwhile, the Village (KEL) plays a significant role at the community level, influencing the existing (score 4) of farmer groups (POKTAN) and the mission (score 3) of farmers (TANI). However, farmers and farmer groups have relatively weak influence over other actors, generally scoring 1 or 2, indicating their position as policy-takers rather than policy-makers.

This configuration demonstrates a power asymmetry, with city governments and the private sector dominant, while farmer actors tend to be marginalized. A similar situation is found in many developing cities, for example, Addis Ababa (Ethiopia) and Hanoi (Vietnam), where peri-urban farmers are losing political power in the face of urban expansion (Bryceson, 2000; Hall, Hirsch, & Li, 2011).

The Matrix of Dependence and Indirect Influence (MDII) is a development of the MDI that not only considers the direct influence between actors but also the chain effect (indirect influence) that occurs through other actors. Methodologically, the MDII is calculated by adding the direct influence to the indirect influence obtained from the combination of relations across two or more levels of actors (Godet & Durance, 2011).

Table 2. Indirect influence and dependence between actors.

MDII	*WALI*	*DPRD*	*DISTAN*	*DISPU*	*DISPER*	*BAPEDA*	*BPN*	*KEL*	*POKTAN*	*TANI*	*DEV*	Ii
WALI	25	23	22	18	18	19	14	20	21	18	16	189
DPRD	22	21	18	17	16	16	12	17	14	14	15	161
DISTAN	15	14	16	12	11	14	11	14	14	14	9	128
DISPU	14	14	14	14	14	14	9	13	11	11	11	125
DISPER	13	13	13	13	14	14	8	12	11	10	11	118
BAPEDA	25	24	20	17	17	19	14	20	19	18	17	**191**
BPN	17	16	17	14	14	17	14	17	14	13	12	151
KEL	20	20	19	15	15	18	14	19	20	19	15	175
POKTAN	13	14	13	9	9	12	11	12	15	15	9	117
TANI	13	13	14	11	10	12	11	13	15	15	9	121
DEV	21	20	19	15	15	16	14	18	15	15	14	168
Di	**173**	171	169	141	139	152	118	156	154	147	124	1644

Table 2 presents the cumulative effects of indirect influence among actors. WALI and BAPEDA emerge as the most influential actors (Ii=189 and 191, respectively), reaffirming the central role of political leadership and planning

institutions in shaping land-use policies (Agrawal & Ribot, 1999; Healey, 2003). Meanwhile, KEL (village government) also scores relatively high (Ii=175), underscoring the importance of decentralized governance in mediating local agricultural interests. By contrast, POKTAN and TANI remain weak in terms of indirect influence, reflecting their dependence on higher-level actors for policy direction (Hall et al., 2011). The significant role of housing developers (DEV, Ii=168) illustrates the persistent tension between urban expansion and farmland protection, a pattern also reported in peri-urban China and Vietnam (Lichtenberg & Ding, 2008; McGee, 2009). These findings suggest that despite formal recognition of farmers in policy frameworks, power asymmetries structurally disadvantage them, consistent with broader critiques of agrarian governance in the Global South (Borras Jr & Franco, 2012).

3.3. The Influence of Actors on Objectives in SFAL

Matrix Actors–Objectives (MAO) analysis is used to assess actors' relationships to strategic policy objectives. The analysis is conducted in three stages: 1MAO (direct actor-objective influence), 2MAO (after considering inter-actor influences), and 3MAO (after considering both direct and indirect influences). This method allows us to understand how actors' support for policy objectives evolves from initial preferences to a more realistic final configuration (Godet, 1991; Godet & Durance, 2011).

3.3.1. Direct Influence

The 1MAO analysis in Table 3 indicates that most actors express positive alignment with strategic farmland protection objectives, particularly PERWALI (local regulation), SUBUR (soil fertility), and IRIG (irrigation). Strong agreement from technical agencies such as DISTAN, POKTAN, and TANI highlights that frontline actors recognize the urgency of sustaining agricultural productivity (Davis et al., 2012). However, weaker engagement from institutions like BPN and BAPEDA at this initial stage suggests that regulatory and planning bodies may prioritize broader development agendas over specific farmland protection goals (Hudalah & Firman, 2012). This divergence between technical-operational actors and policy–planning actors is consistent with prior research showing sectoral silos as a key challenge in land governance.

Table 3. 1MAO matrix.

1 MAO	*PERWALI*	*SUBUR*	*ALTUT*	*BIAYAUT*	*IRIG*	*IP*	Absolute sum
WALI	1	1	1	1	1	1	6
DPRD	1	0	0	0	0	0	1
DISTAN	1	1	1	1	1	1	6
DISPU	1	0	0	0	1	0	2
DISPER	1	0	0	0	1	0	2
BAPEDA	1	0	0	0	0	0	1
BPN	1	0	0	0	0	0	1
KEL	1	1	1	1	1	1	6
POKTAN	1	1	1	1	1	1	6
TANI	1	1	1	1	1	1	6
DEV	1	0	0	0	0	0	1
Number of agreements	11	5	5	5	7	5	
Number of disagreements	0	0	0	0	0	0	
Number of positions	11	5	5	5	7	5	

Note: -1: actor unlikely to achieve objective
0: Neutral position
1: actor likely to achieve the objective

3.3.2. After Considering the Influence of Inter-Actors

Table 4 presents inter-actor influences. POKTAN and TANI emerge as the strongest supporters of farmland protection objectives (absolute score 24 each), followed by DISTAN (21) and WALI (19). This indicates that farmer actors, though institutionally weak in direct influence, gain strength when considered in relational terms, as their interests converge with technical agencies (Adger, Arnell, & Tompkins, 2005). BAPEDA also records higher involvement (13), suggesting that interdependencies with political leaders and technical agencies increase its role in supporting farmland sustainability. Conversely, private developers (DEV) remain marginal (2), confirming their limited willingness to support farmland protection when it conflicts with urban expansion interests (Lefebvre, 2009). These findings illustrate how actor alliances can reshape policy priorities beyond initial formal positions, reinforcing the importance of network effects in policy processes (Klijn & Koppenjan, 2016).

Table 4. 2MAO Matrix.

2 MAO	*PERWALI*	*SUBUR*	*ALTUT*	*BIAYAUT*	*IRIG*	*IP*	Absolute sum
WALI	4	3	3	3	3	3	19
DPRD	1	0	0	0	0	0	1
DISTAN	3	4	4	4	2	4	21
DISPU	2	0	0	0	3	0	5
DISPER	2	0	0	0	3	0	5
BAPEDA	3	2	2	2	2	2	13
BPN	2	0	0	0	0	0	2
KEL	2	3	3	3	3	3	17
POKTAN	4	4	4	4	4	4	24
TANI	4	4	4	4	4	4	24
DEV	2	0	0	0	0	0	2
Number of agreements	29	20	20	20	24	20	
Number of disagreements	0	0	0	0	0	0	
Number of positions	29	20	20	20	24	20	

Note: 0 = Objective has a bleak outcome.
1 = The objective jeopardizes the actor's operating procedures (management, etc) / is vital for its operating procedures.
2 = Objective jeopardizes the success of the actor's projects / is vital for the success of its projects.
3 = Objective jeopardizes the accomplishment of the actor's mission / is indispensable for its missions.
4 = Objective jeopardizes the actor's existence / is indispensable for its existence.

3.3.3. After Considering Both Direct and Indirect Influences

The 3MAO results in Table 5 show a more consolidated pattern of actor mobilization, with WALI (24.3), KEL (20.9), and BAPEDA (18.6) as central supporters, alongside POKTAN (15.8) and TANI (17.1). This configuration reveals the critical role of vertical integration linking local government, planning institutions, and grassroots actors in advancing farmland protection (Ansell & Gash, 2008). Interestingly, while DISTAN's score decreases slightly (15.1), the relative rise of KEL underscores the importance of village-level governance as a bridging institution between farmers and city authorities (Meinzen-Dick, Knox, Place, & Swallow, 2002). These findings imply that sustainable farmland protection requires multi-level governance, where local institutions actively mediate farmer voices within city planning processes (Ostrom, 2010).

Table 5. 3MAO Matrix.

3 MAO	*PERWALI*	*SUBUR*	*ALTUT*	*BIAYAUT*	*IRIG*	*IP*	Mobilisation
WALI	5.1	3.8	3.8	3.8	3.8	3.8	24.3
DPRD	1	0	0	0	0	0	1
DISTAN	2.2	2.9	2.9	2.9	1.4	2.9	15.1
DISPU	1.6	0	0	0	2.3	0	3.9
DISPER	1.4	0	0	0	2.1	0	3.6
BAPEDA	4.3	2.9	2.9	2.9	2.9	2.9	18.6
BPN	2.3	0	0	0	0	0	2.3
KEL	2.5	3.7	3.7	3.7	3.7	3.7	20.9
POKTAN	2.6	2.6	2.6	2.6	2.6	2.6	15.8
TANI	2.9	2.9	2.9	2.9	2.9	2.9	17.1
DEV	2.6	0	0	0	0	0	2.6
Number of agreements	28.4	18.7	18.7	18.7	21.8	18.7	
Number of disagreements	0	0	0	0	0	0	
Degree of mobilisation	28.4	18.7	18.7	18.7	21.8	18.7	

3.4. Mapping of Convergence and Divergence Between Actors

The 1CAA matrix (Table 6) reveals the initial configuration of actor alignments without considering interdependencies. Farmer groups (POKTAN and TANI) show the strongest convergence with DISTAN and DISPU,

reflecting their common interest in protecting farmland and maintaining agricultural productivity. In contrast, private developers (DEV) appear as the most divergent actor, showing little support for farmland protection objectives. WALI and BAPEDA register moderate convergence values, signaling a cautious political stance at this stage. This initial picture confirms that frontline agricultural actors align more naturally with land protection, while planning institutions and political leaders hold more ambivalent positions (Davis et al., 2012; Healey, 2003).

Table 6. 1CAA matrix.

1 CAA	WALI	DPRD	DISTAN	DISPU	DISPER	BAPEDA	BPN	KEL	POKTAN	TANI	DEV
WALI	0	1	6	2	2	6	1	6	6	6	1
DPRD	1	0	1	1	1	1	1	1	1	1	1
DISTAN	6	1	0	2	2	6	1	6	6	6	1
DISPU	2	1	2	0	2	2	1	2	2	2	1
DISPER	2	1	2	2	0	2	1	2	2	2	1
BAPEDA	6	1	6	2	2	0	1	6	6	6	1
BPN	1	1	1	1	1	1	0	1	1	1	1
KEL	6	1	6	2	2	6	1	0	6	6	1
POKTAN	6	1	6	2	2	6	1	6	0	6	1
TANI	6	1	6	2	2	6	1	6	6	0	1
DEV	1	1	1	1	1	1	1	1	1	1	0
Number of convergences	37	10	37	17	17	37	10	37	37	37	10

The network visualization of 1CAA (Figure 2) clearly illustrates two clusters: (i) farmer organizations and technical agencies forming a dense pro-agriculture group, and (ii) developers positioned at the opposite pole. This confirms prior findings in Southeast Asia, where peri-urban expansion often generates structural tensions between urban development and agricultural protection (Hall et al., 2011; Lichtenberg & Ding, 2008).

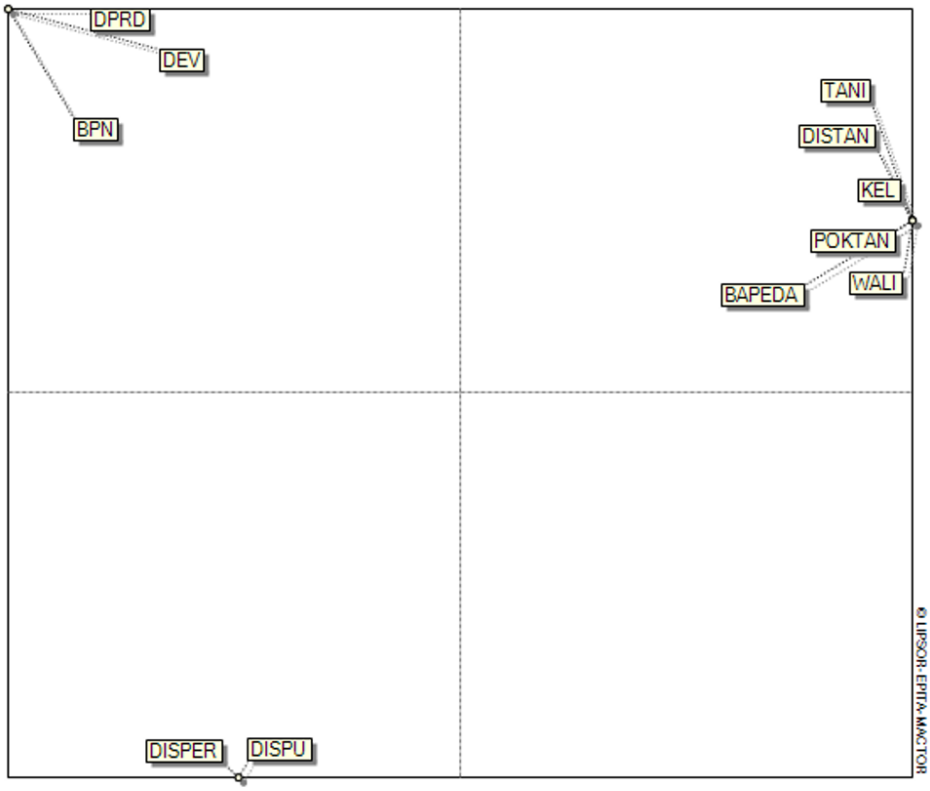

Figure 2. Map of order 1 convergence between the actor.

When interdependencies are incorporated, the 2CAA matrix (Table 7) shows significant strengthening of convergence between WALI, BAPEDA, and grassroots actors (POKTAN, TANI). This indicates that political leaders are more likely to align with agricultural objectives once their relationships with technical agencies and farmer groups are factored in. At the same time, divergence between DEV and the pro-agriculture coalition remains sharp, confirming

entrenched conflicts of interest. BPN and DPRD record weak convergence scores, pointing to institutional fragmentation in land governance (Hudalah & Firman, 2012).

Table 7. 2CAA.

2 CAA	WALI	DPRD	DISTAN	DISPU	DISPER	BAPEDA	BPN	KEL	POKTAN	TANI	DEV
WALI	0	2.5	20	6	6	16	3	18	21.5	21.5	3
DPRD	2.5	0	2	1.5	1.5	2	1.5	1.5	2.5	2.5	1.5
DISTAN	20	2	0	5	5	17	2.5	19	22.5	22.5	2.5
DISPU	6	1.5	5	0	5	5	2	5	6.5	6.5	2
DISPER	6	1.5	5	5	0	5	2	5	6.5	6.5	2
BAPEDA	16	2	17	5	5	0	2.5	15	18.5	18.5	2.5
BPN	3	1.5	2.5	2	2	2.5	0	2	3	3	2
KEL	18	1.5	19	5	5	15	2	0	20.5	20.5	2
POKTAN	21.5	2.5	22.5	6.5	6.5	18.5	3	20.5	0	24	3
TANI	21.5	2.5	22.5	6.5	6.5	18.5	3	20.5	24	0	3
DEV	3	1.5	2.5	2	2	2.5	2	2	3	3	0
Number of convergences	117.5	19	118	44.5	44.5	102	23.5	108.5	128.5	128.5	23.5

The visualization of 2CAA (Figure 3) highlights the shift of WALI and BAPEDA closer to the pro-agriculture cluster, showing their increasing alignment. The figure also demonstrates the isolation of developers (DEV), who remain at the periphery of the network. This suggests that actor interdependencies are crucial for building coalitions, echoing findings from collaborative governance literature where relational ties shift actor positions (Ansell & Gash, 2008; Klijn & Koppenjan, 2016).

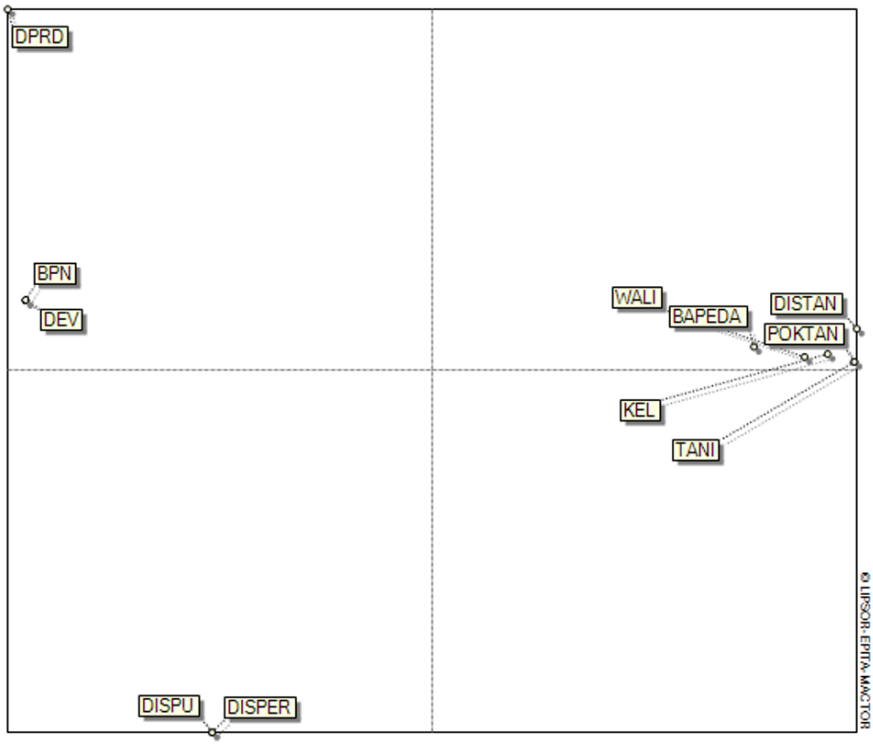

Figure 3. Map of order 2 convergence between the actor.

The 3CAA matrix (Table 8) presents a consolidated picture of actor alignments, where WALI and BAPEDA now record the strongest convergence with farmer groups (scores above 20). Village government (KEL) also emerges as a significant actor, bridging between farmers and higher-level authorities.

DISTAN and DISPU remain supportive, though their relative scores decline slightly as political leaders consolidate their positions. On the divergent side, developers (DEV) maintain strong opposition, showing persistent structural conflict. These results illustrate the consolidation of a multi-level governance coalition supporting farmland protection (Adger et al., 2005; Ostrom, 2010).

Table 8. 3CAA matrix.

3 CAA	WALI	DPRD	DISTAN	DISPU	DISPER	BAPEDA	BPN	KEL	POKTAN	TANI	DEV
WALI	0	3.1	19.7	6.4	6.3	21.4	3.7	22.6	20	20.7	3.9
DPRD	3.1	0	1.6	1.3	1.2	2.6	1.7	1.7	1.8	1.9	1.8
DISTAN	19.7	1.6	0	3.7	3.6	16.8	2.2	18	15.4	16.1	2.4
DISPU	6.4	1.3	3.7	0	3.7	5.5	1.9	5	4.6	4.8	2.1
DISPER	6.3	1.2	3.6	3.7	0	5.4	1.9	4.9	4.4	4.6	2
BAPEDA	21.4	2.6	16.8	5.5	5.4	0	3.3	19.7	17.2	17.9	3.5
BPN	3.7	1.7	2.2	1.9	1.9	3.3	0	2.4	2.5	2.6	2.5
KEL	22.6	1.7	18	5	4.9	19.7	2.4	0	18.3	19	2.6
POKTAN	20	1.8	15.4	4.6	4.4	17.2	2.5	18.3	0	16.5	2.6
TANI	20.7	1.9	16.1	4.8	4.6	17.9	2.6	19	16.5	0	2.7
DEV	3.9	1.8	2.4	2.1	2	3.5	2.5	2.6	2.6	2.7	0
Number of convergences	127.7	18.8	99.7	39.1	37.9	113.3	24.5	114.3	103.3	106.9	26.1

The 3CAA visualization (Figure 4) depicts a dominant cluster comprising WALI, BAPEDA, KEL, DISTAN, and farmer groups, visually confirming their strong convergence. DEV remains clearly detached, highlighting their continued divergence. The marginal positions of BPN and DPRD are also visible, emphasizing their weak role in coalition-building. This pattern mirrors global experiences where farmland protection hinges on bridging local farmer interests with political authority, while developers remain a counterforce (McGee, 2009; Meinzen-Dick et al., 2002).

Figure 4. Map of order 3 convergence between the actor.

The CAA analysis reveals that the pro-agriculture coalition comprising farmers, farmer groups, and technical agencies gains stronger support once inter-actor influences are considered, with WALI, BAPEDA, and KEL joining the main convergence cluster. In contrast, developers remain the most divergent actors, while BPN and DPRD appear marginal. These findings highlight significant opportunities for cross-level collaborative governance to strengthen farmland protection, although institutional fragmentation and the dominance of developer interests continue to pose major challenges for the effectiveness of PLP2B policy.

4. CONCLUSION

This study applies the MACTOR method as a novel approach to reveal alliances, conflicts, and power asymmetries among policy actors in farmland protection. The findings indicate that developers and certain government bodies

dominate decision-making, while farmers remain marginalized. Yet, convergence is evident between political leaders, village governments, and farmer organizations, offering opportunities for collaborative governance. To strengthen policy effectiveness, three directions are proposed: (i) empower farmer institutions through capacity-building, legal recognition, and active participation in policy forums; (ii) enhance enforcement of farmland protection regulations by embedding SFAL into spatial planning and applying transparent monitoring and sanctions; and (iii) establish multi-level coordination platforms to bridge community and city-level actors in balancing agriculture and urban growth. These measures are crucial not only to transform actor convergence into policy action but also to secure sustainable farmland protection and long-term food security in rapidly urbanizing regions.

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Institutional Review Board Statement: The study involved minimal risk and adhered to ethical guidelines for social science fieldwork. Formal approval from an Institutional Review Board was not required under the policies of Universitas Pembangunan Nasional Veteran Jawa Timur, Indonesia. Informed verbal consent was obtained from all participants, and all data were anonymized to ensure participant confidentiality.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
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