Prospective analysis of the role of actors in governing mangrove ecosystem area in Tangerang District, Indonesia

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Abstract. *Mahardika SMAH, Yulianda F, Adrianto L, Sulistiono. 2022. Prospective analysis of the role of actors in governing mangrove ecosystem area in Tangerang District, Indonesia. Biodiversitas 23: 4940-4947.* The role of actors in the governance of mangrove ecosystems is one of the main factors in determining the sustainability of mangrove ecosystem management in the Tangerang District, Banten, Indonesia. The research aims to analyze actors' prospective role in the strategy of governance of mangrove ecosystems areas in Tangerang using the MACTOR method. This research is a descriptive case study with an expert judgment approach. The study results show that the central and local governments have an important role in the governance strategy of mangrove ecosystem areas in the Tangerang. The two actors can collaborate with the local community, the private sector, universities, NGOs, research institutions, and high schools. The strategy for the governance of mangrove ecosystems in Tangerang can be done by increasing the role of each actor by encouraging the central government and local governments to implement programs to achieve the most supportive strategic goals, namely the management of mangrove ecosystems based on collaborative management (co-management). The strategy can be easily implemented and get more optimal results by involving the role of the user community, NGOs, universities, local governments, and research institutions where the level of collaboration (convergence) is high to support the strategy.

Keywords: Actor, area ecosystem, governance, mangrove, prospective analysis, Tangerang District

INTRODUCTION

The potential of the mangrove ecosystem is an invaluable gift and luck of an area, so the potential and existence of the mangrove ecosystem resources must be maintained and preserved so that the sustainability of resources occurs to meet the needs and welfare of the community today without reducing the needs of the community in the future (Friess et al. 2019; Arifanti et al. 2022). Today, the community has begun to utilize the mangrove ecosystem by converting mangrove forests into ponds and exploiting mangrove forests for firewood, charcoal, fishing gear, cultivation media, and building materials. It is due to the social conditions and economic pressures of the people who want to get the maximum results regardless of the sustainability of the ecosystem (Abunge et al. 2013; Amir et al. 2019; Fent et al. 2019; Agudelo et al. 2020).

Therefore, before the mangrove ecosystem suffers severe damage, it is necessary to approach the community, government, and other groups involved in managing and utilizing the mangrove ecosystem to preserve and maintain the ecosystem in an ecological order. This achieves a commitment or a form of policy for the sustainable use of mangrove ecosystems is needed with the involvement of all sectors, both the private sector and the government, so that they can run synergistically in implementing planned utilization programs or activities.

An important issue in managing mangrove ecosystems is the overlapping management conflicts in planning and organizing various sectoral activities, local governments, local communities, and the private sector with multiple interests (Carrasquilla-Henao et al. 2019; Nijamdeen et al. 2022). The formulation of policies for the governance of mangrove ecosystems is a means to be used as a direction for an activity for an actor or group of actors to achieve a common goal. The role of the governance of mangrove ecosystem policy is as a frame of reference that explains in more detail the sustainable management of mangrove ecosystems (Goldberg 2020; Fu et al. 2021).

Coglan and Pascoe (2015) stated that the various actors involved with different interests in managing mangrove ecosystem areas would have consequences for the increasingly complex governance. Related sectors with interest in mangrove ecosystem management include forestry, marine and fishery sectors, the environment, region governments, provincial governments, and other private industries (Suharti 2017; Marlianingrum et al. 2021).

Integrated planning is needed to coordinate and direct the various activities of two or more development planning sectors utilizing coastal and marine areas (Martin et al. 2018). Integrated planning is more of a programmed effort to achieve goals by harmonizing and optimizing various interests for environmental preservation, community involvement, and economic development. Integrated management by involving actors means that there is a need

for coordination of duties and authorities and responsibilities between government agencies at certain government levels (horizontal integration) and between levels of government starting from village, sub-district, district, and provincial levels to the central station (vertical integration) (Roy and Alam 2012).

The participation of interested actors in planning and implementing management of mangrove ecosystem areas, both individually and collectively, is very important to be one of the main factors in determining the sustainability of mangrove ecosystem area management in Tangerang District. The integrated use of mangrove ecosystem areas needs to be carried out to combine various forms of utilization interests from different perspectives based on the interests of each actor in the mangrove ecosystem. Actors have other influences and attractions in each management of the mangrove ecosystem area.

An actor is a person, group, or organization capable of making decisions and acting more or less coordinately (Keseru et al. 2020; Pelyukh et al. 2021). Actors are also defined as groups or individuals who influence and are influenced by the achievement of certain goals (Yu et al. 2021). Actors are subjects with the power to control the use of resources or play a role in managing mangrove ecosystem areas (Ellison et al. 2020). Least four actors in ecosystem management interact with each other and have different rights and goals, namely the community, government, private sector, and buffer institutions (Rani et al. 2022).

The actor analysis in this research will provide information on actors with each actor's interests, influence, role, and level of participation so that policies can be taken to ensure the sustainability of mangrove ecosystem resources in the Tangerang. Actor analysis is a systematic process of collecting and analyzing information qualitatively to determine the interests of actors that must be taken into account when taking or implementing a policy (Ress and MacDonell 2017; Fetoui et al. 2021).

The level of influence indicates the ability of the actor to influence the success or failure of an activity, while the level of involvement is related to the impact that will be received by the actor (Godet 1991; Godet 2006). Each actor needs to be identified regarding the level of relationship strength, goals, desires, motivations, internal means of action, past strategic attitudes, boundaries, potential strategic moves, behaviors, personal history, associations, strengths and weaknesses, and others (Keseru et al. 2020; Pelyukh et al. 2021).

The multi-actor analysis in this research uses the MACTOR (Matrix of Alliance, Conflict, Tactics, Objective and Recommendation) method based on the influence between one actor and another and the effect of actors on the governance strategy of the mangrove ecosystem areas in Tangerang. This research aims to prospective analyze the role of actors in the governance strategy of mangrove ecosystem areas in Tangerang District, Banten, Indonesia.

MATERIALS AND METHODS

Study area

This study was conducted in Tangerang District, Banten Province, Indonesia, from December 2021 to February 2022. Geographically, Tangerang District is located at 6º00' - 6º20' South Latitude and between 106º20' - 106º43' East Longitude (Figure 1). Tangerang District consists of 29 sub-districts (8 coastal districts and 21 non-coastal sub-districts) with 274 villages. Tangerang District is a lowland area with an area of 959.61 km^2 with an altitude of 0 - 85 meters above sea level. The northern part is a coastal area of ± 51.2 km directly adjacent to the Java Sea and Jakarta Bay.
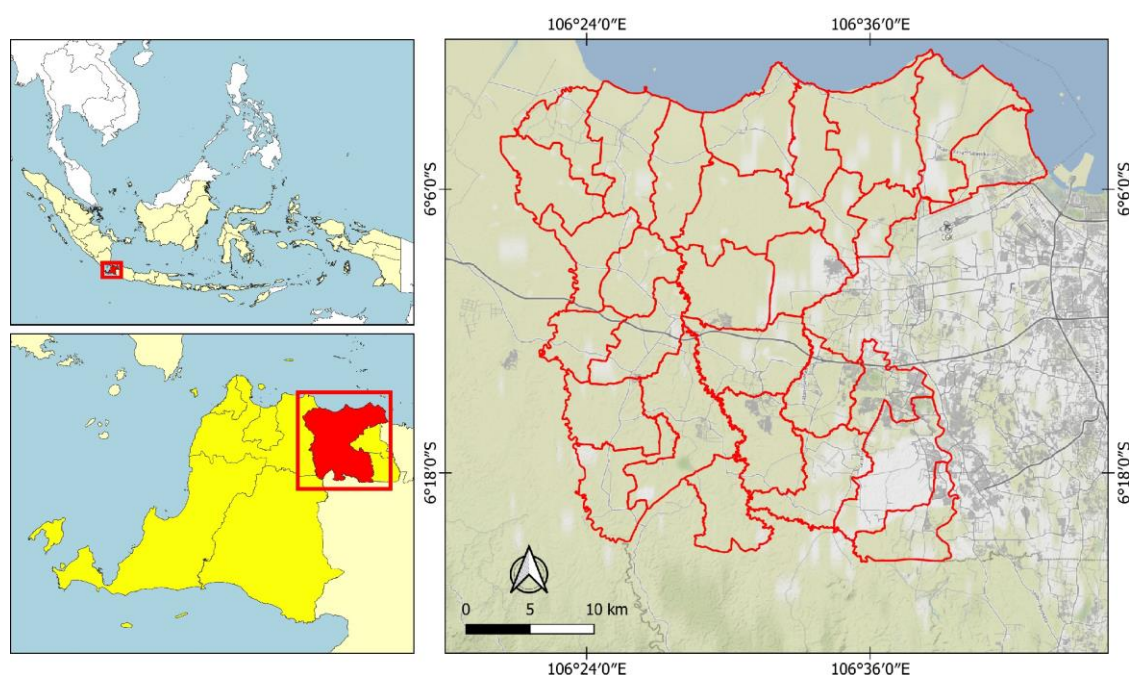

Figure 1. Research location in Tangerang District, Banten Province, Indonesia

Procedures

Actor analysis is a methodology to assist in identifying actors who have the most effective role in the governance strategy of mangrove ecosystem areas in the Tangerang. The MACTOR method is used to identify actors who play a role in managing mangrove ecosystem areas. This method evaluates the relationship between actors by analyzing the convergence (potential for cooperation) and divergence (potential for conflict) of the relationship between actors related to positions and objectives or strategies that have been formulated.

The MACTOR method is an analytical method based on an alliance and conflict matrix by better utilizing the added value of the information contained in the actor strategy table (Godet 1991; Godet 2006; Godet et al. 2007). MACTOR was used to look at the preferences of each stakeholder and the level of support for the identified goals. This method is applied to various issues, such as supporting decision-making to identify and choose between strategic options (Ress and MacDonell 2017).

This research is a descriptive case study with an expert judgment approach, namely the opinion of experienced people or experts in identifying actors involved in managing mangrove ecosystems in the Tangerang. They are collecting data for actor analysis with MACTOR obtained through expert opinion through interviews using a structured questionnaire. The actors are identified through field observations and interviews with expert resource persons from coastal communities, local governments, central government, private sector, universities, non-governmental organizations, research institutions, and high schools. Other supporting information is also needed in the research, sourced from the relevant agencies and reports or previous research.

The steps in the MACTOR method refer to Godet (1991; 2006) and Godet et al. 2007. After the actors are identified, build a Matrix of Direct Influence (MDI) to describe the influence between actors on other actors and a Matrix of Actor Objective (MAO) to show the attitude of actors towards the strategy that has been formulated. Expert resource persons fill out MDI and MAO. The filled matrix is then determined based on the score that appears the most (mode) and input into the MACTOR application.

Expert resource persons fill out MDI and MAO. The filled matrix is then determined based on the score that appears the most (mode) and input into the MACTOR application. Filling in the MDI is done using Godet (1991; 2006) and Godet et al. (2007), where the influence of actor i on actor j is calculated based on a score from 0-4 with the following conditions: (i) No influence of the mangrove ecosystem area management by actor i on actor j; (ii) The influence of the management of the mangrove ecosystem by actor i on actor j is very small (affecting operational procedures); (iii) The influence of the management of the mangrove ecosystem area by actor i on actor j is moderate (affecting work); (iv) The influence of the mangrove ecosystem management by actor i on actor j is strong (affecting the actor's mission); (v) The influence of mangrove ecosystem area management by actor i on actor j is very strong (affecting the actor's existence).

The next step is to fill in 2MAO, refer to Godet (1991; 2006) and Godet et al. (2007), to describe the relationship between actors and governance strategy of mangrove ecosystem areas in Tangerang. A positive value and the larger it indicates the actor agrees with the formulated objectives. The statement after the "/" sign indicates a negative question from the previous question where the difference with the MDI table, namely the 2MAO table, results in a positive (+) and negative (-) score. Filling the score on 2MAO has the following meanings:

Actors have no interest in strategy. (i) The strategy supports the actor's operational procedures/ disruptive operating procedures; (ii) The Strategy supports the actor's job success/ disrupts job success; (iii) The strategy supports the achievement of the actor's mission/ disrupts the actor's mission; (iv) The strategy supports the existence of actors / threatens the existence of actors.

Data analysis

The actor analysis using the MACTOR method in this research uses the new MACTOR software developed by the French Computer Innovation Institute 3IE (*Institut d'innovation Informatique pour l'Entreprise*) under the supervision of the conceptual creator by the LIPSOR Prospective (foresight) Strategy and Organizational Research Laboratory. MACTOR software provides a variety of graphical representations and aggregated coefficients that help interpret the data calculated by the model (Godet et al. 2007).

RESULTS AND DISCUSSION

Description of actors and strategies in the governance of mangrove ecosystem areas in Tangerang

Actors in managing mangrove ecosystem areas in Tangerang are people or groups (including institutions or institutions) who have a position in the management system of mangrove ecosystems in Tangerang and play a role in mobilizing their resources to influence outcomes directly or indirectly through influence on other actors. The actors identified in managing mangrove ecosystem areas in Tangerang consist of 8 main actors (Table 1), and 7 management strategies (Table 2).

Furthermore, the initial stage in the actor analysis with MACTOR is to build a direct influence matrix or Matrix of Direct Influence (MDI) to describe the influence between actors on other actors (Table 3) and the Matrix of Actor Objective (MAO) (Table 4) showing the attitudes of actors towards destination. MDI and MAO are matrices resulting from interviews with experts where in reading the numbers in the matrix, the readings are done row to column.

MDI aims to determine the level of influence and dependence between actors on the mangrove ecosystem area in the District. Each actor can influence the other or not affect the other. The assessment criteria are based on Godet (1991; 2006) and Godet et al. (2007) measured on a scale ranging from 0 (no effect) to 4 (affects existence). MAO is used to determine the position of actors in the management strategy of mangrove ecosystem areas in the Tangerang.

Table 1. Identification of actors in the governance of mangrove ecosystem areas in Tangerang District, Indonesia

Actors	Code	Desciption
Local community	User	Groups of people use the mangrove ecosystem area to support their lives or as a source of the economy (livelihood).
Local government	Localgov	Institutions or agencies are administering regional government affairs to prepare management plans for mangrove ecosystem areas.
Central government	Centralgov	Institutions or agencies administering central government affairs formulate national policies for managing mangrove ecosystem areas.
Private sector	Private	Private-owned enterprises utilize or carry out their business activities (economic sector) in the mangrove ecosystem area.
University	Univ	Educational institutions function as education, teaching, research, and community service.
Non-governmental organization (NGO)	NGO	Non-governmental institutions, both domestic and international, assist and encourage changes in community behavior in managing mangrove ecosystem areas.
Research institutions	Research	A specialized institution in developing science, technology, and scientifically accountable research.
High school	School	Institutions that have a formal education system in the teaching of students.

Table 2. Strategy for the governance of mangrove ecosystems in Tangerang District, Indonesia

Strategy	Code	Description
Rehabilitation and restoration of mangrove ecosystems	Rehab	Activities to restore or restore the damaged mangrove ecosystem's condition so it can carry out its functions properly.
Mangrove ecosystem ecotourism development	Ecotourism	Environmentally responsible recreational activities to enjoy and appreciate the mangrove ecosystem area.
Silvofishery pond development	Silvo	The approach between conservation and utilization of mangrove ecosystem areas is to maintain the existence of mangroves that ecologically have relatively high productivity and economic benefits from aquaculture activities.
Coastal border conservation	Coastbord	Protecting the coastline of at least 100 meters from the highest tide point towards the land is carried out to protect coastal areas from activities that interfere with the preservation of coastal functions.
Coastal community development movement program	Community	Coastal community economic empowerment program to improve the quality of community welfare and build quality coastal areas.
Increasing knowledge of mangrove ecosystem management for the community	Knowledge	Activities to foster a sense of responsibility and increase public awareness of the protection and preservation of mangrove ecosystems.
Management of mangrove ecosystem areas based on co-management (collaborative management)	Comanage	The management approach of mangrove ecosystems is based on togetherness and partnership between the government, communities, and other stakeholders to realize sustainable management through cooperation to achieve their respective interests.

Table 3. MDI: the relationship between actors in the governance of mangrove ecosystem areas in Tangerang District, Indonesia

MDI	User	Localgov	Centralgov	Private	Univ	NGO	Research	School
User	0	4	2	2	1	2	1	1
Localgov	3	0	1	1	2	2	2	1
Centralgov	3	3	0	2	2	2	1	0
Private	3	2	2	0	1	0	1	0
Univ	2	2	1	1	0	1	1	1
NGO	3	2	1	1	1	0	2	1
Research	1	1	1	1	1	1	0	1
School	1	0	0	0	1	1	1	0

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Table 4. MAO: the relationship between actors and strategies in the governance of mangrove ecosystem areas in Tangerang District, Indonesia

2MAO	Rehab	Ecotourism	Silvo	Coastbord	Community	Knowledge	Comanage
User	3	1	2	2	4	4	3
Localgov	2	2	3	3	3	2	3
Centralgov	3	2	2	1	2	1	3
Private	1	2	0	0	0	0	3
Univ	1	0	0	0	0	3	2
NGO	4	0	3	3	3	3	3
Research	2	2	2	2	3	3	2
School	0	0	0	0	0	3	2

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The level of influence and dependence of actors in the management of mangrove ecosystems areas in Tangerang

The level of influence and dependence between actors on the MACTOR method is shown in the Matrix of Direct and Indirect Influences (MDII), where there are two values, namely, the value of influence is denoted by Ii (Influence), and the importance of dependence is denoted by Di (Dependence). The value of Ii shows the net direct and indirect influence (net direct and indirect influence); the importance of Ii describes the actor's power to influence the actions of other actors. Meanwhile, the Di value indicates the degree of net direct and indirect dependence (Godet 1991; Godet 2006; Godet et al. 2007).

The influence and dependence of actors in the governance of mangrove ecosystems in Tangerang are interpreted in the Matrix of Direct and Indirect Influences (MDII), where the actor who has the most influence on other actors is the central government (Ii = 63), while the actor who has the most effect on other actors is the central government (Ii = 63), having the greatest dependence on other actors is the user community (Di = 63) (Table 5).

An actor's influence and dependency map is a graphical representation of an actor's position concerning influence and dependence (Di and Ii) between each other, where the situation is calculated automatically by MACTOR software. Godet (1991; 2006) and Godet et al. (2007) explained that the strong influence and level of dependence of actors in MDII are described according to their location in the quadrant where the higher up the actor has, the stronger the influence, while the more to the right the actor has the higher dependence.

Figure 2 shows that the central government and the private sector have high influence but low dependence on other actors (quadrant I/upper left), while the actors located in quadrant II (top right) are local community, NGOs, universities, and local governments, which means that the actor has a high level of influence and dependence on other actors. Actors in quadrant III (bottom right) are research institutions, meaning these actors have a low level of power but a high level of dependence on other actors. The actor located in quadrant IV is a high school where this actor has low influence, and the level of dependency is also common.

Competitive actor in mangrove ecosystem management in Tangerang

The Convergences Actor and Actor (CAA) matrix identifies the convergence of one actor with another actor towards the goals that have been formulated so that it can be described how a strong relationship occurs between actors who are in line to achieve a common goal. Godet (1982; 1991; 2006) explains that CAA identifies the number of possible alliances where the values represent the level of convergence where the higher the convergence value, the more likely there is to cooperate (alliance) between actors who are directly or indirectly involved in achieving the same goal. Local community, local governments, central government, and research institutions have the same level of convergence (number of convergences = 35) so that the four actors have the

opportunity to collaborate or form alliances to achieve goals in the management of mangrove ecosystem areas in Tangerang (Table 6).

The role and participation of the community are very important in the formulation of policies by the government in management, starting from planning, implementation, and evaluation to create sustainable management (Dewi 2016). The role of the central and local governments is very much needed, especially for communities using ecosystems through counseling, disseminating information, and holding dialogues to obtain feedback on thoughts and common perceptions regarding managing mangrove ecosystems so that control becomes a common need.

Management of multi-actor-based mangrove ecosystem areas in Tangerang requires that the region and its resource content can be utilized for the benefit of many parties in a balanced manner to avoid a single, narrow, and short-term orientation. According to Zaldivar-Jimenez et al. 2017, multipurpose and multi-actor management will bring a wide range of activities to open wider options for local communities to be involved in mangrove ecosystem management. Preserving mangrove ecosystems is complex because these activities require the accommodative nature of related parties both around and outside the mangrove area.

Table 5. MDII: level of influence and interdependence between actors in the governance of mangrove ecosystem areas in Tangerang District, Indonesia

MDII	User	Localgov	Centralgov	Private	Univ	NGO	Research	School	Ii
User	12	12	8	8	9	9	9	5	60
Localgov	11	10	7	7	8	8	9	5	55
Centralgov	13	13	8	8	8	8	8	5	63
Private	9	9	7	7	7	8	6	4	50
Univ	9	8	7	7	8	8	8	5	52
NGO	10	9	7	7	8	8	9	5	55
Research	7	6	6	6	7	6	7	5	43
School	4	4	4	4	4	4	4	4	28
Di	63	61	46	47	51	51	53	34	406

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Table 6. CAA Matrix: level of convergence between actors in the management of mangrove ecosystem areas in Tangerang District, Indonesia

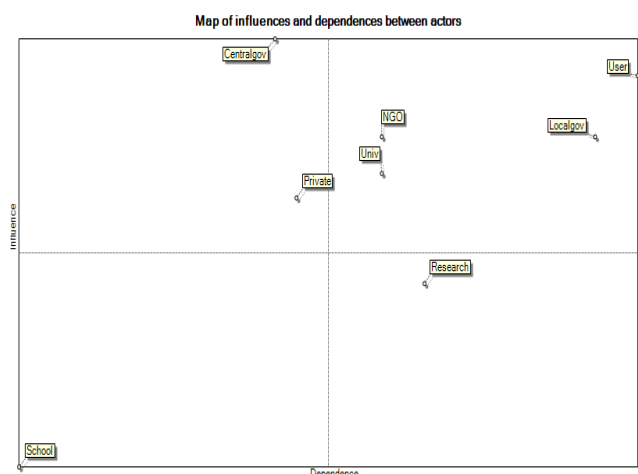| 1CAA	User	Localgov	Centralgov	Private	Univ	NGO	Research	School
User	0	7	7	3	3	6	7	2
Localgov	7	0	7	3	3	6	7	2
Centralgov	7	7	0	3	3	6	7	2
Private	3	3	3	0	2	2	3	1
Univ	3	3	3	2	0	3	3	2
NGO	6	6	6	2	3	0	6	2
Research	7	7	7	3	3	6	0	2
School	2	2	2	1	2	2	2	0
Number of convergences	35	35	35	17	19	31	35	13

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Figure 2. Influence and interdependence between actors in the management of mangrove ecosystem areas in Tangerang District, Indonesia
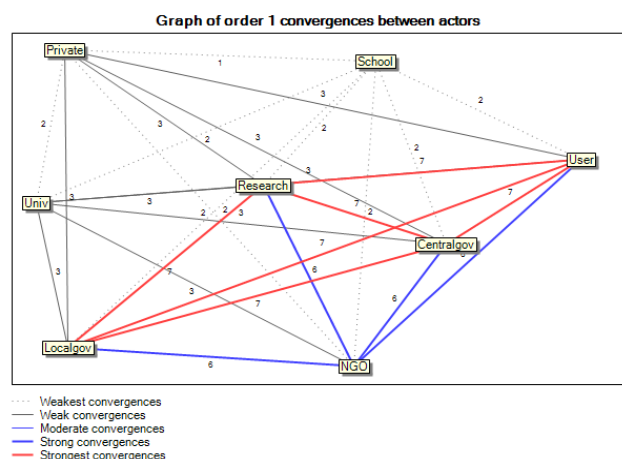

Figure 3. The level of convergence between actors in the management of mangrove ecosystem areas in Tangerang, Indonesia

Figure 3, describes the relationship between one actor and another, where the level of convergence between actors can be categorized into very weak, weak, moderate, strong, and very strong. The red line on the CAA graph illustrates the strong interrelationships between the actors, including the user community, the central government, local governments, and research institutions, meaning that these actors can work together to achieve the goals of managing the mangrove ecosystem areas in the Tangerang. Meanwhile, the other lines show that they have relatively weak convergence. These actors are categorized as unable to synergize because there is no compatibility with some of their missions or goals so that later will lead to a conflict of interest.

Divergence analysis between actors explains that each pair of actors who have goals and do not hold the same position (one actor supports and the other is against it), so there is a possibility of conflict between actors. Godet (1982; 1991; 2006) explains that the matrix of divergences between actors and actors (1DAA) identifies the level of conflict intensity between actors with different interests related to the formulated goals. There is no divergence between actors in managing mangrove ecosystem areas in the Tangerang, where the number of divergences is 0 for all actor relationships (Table 7).

Problems and conflicts that tend to occur due to multiple management entities are fragmentation in decision making, duplication or overlapping of authority (jurisdiction) is ineffective and inefficient. Environmental management contestations in coastal and marine areas are characterized by overlapping regulations, weak synergy, and coordination of each sector in planning, implementation, evaluation, and monitoring (Bodin et al. 2019).

The relationship between actors and strategies for managing mangrove ecosystem areas in Tangerang

The Matrix of Actors-Objective (MAO) shows the valence of each actor concerning each formulated mangrove ecosystem management strategy, where the value is -1 (negative) if the actor does not support the plan, the value is 0 (zero) if the actor tends to be neutral to the

achievement of the strategy and the importance of +1 (positive) if the actor supports the achievement of the plan.

Table 8 explains that four actors, namely the user community, local government, central government, and research institutions, support the seven strategies that have been set. The private sector tends to be neutral in 4 designs, namely the development of mangrove ecosystem ecotourism, monitoring border conservation, coastal community development movement programs, and increasing knowledge of mangrove ecosystem management for the community. Meanwhile, secondary schools only support two strategies: increasing knowledge of mangrove ecosystem management for the community and management of mangrove ecosystems based on collaborative management.

The central and local governments have the authority to make policies or regulations related to managing mangrove ecosystems (Table 9). According to Andrieu et al. (2020), the law on mangrove ecosystem management includes all laws and regulations officially issued by government agencies to regulate the relationship between humans and coastal and marine resources. From a hierarchical point of view, higher-level statutes and regulations will be followed up by implementing rules that should not conflict with higher-level laws and regulations (Zaldivar-Jimenez et al. 2017; Thompson 2018). All problems, such as conflicts of interest between institutions must be resolved by referring to the laws and regulations that have a higher level.

Based on the actor scale on MACTOR, it shows that all actors, namely the local community, local governments, central government, private sector, universities, NGOs, research institutions, and high schools, support the collaborative management-based management strategy of mangrove ecosystems (Figure 4).

Figure 5 shows a graph of the distance between strategies that can provide an overview of the design relationship. The possible closeness between strategies is depicted in red which offers a stronger connection than the color blue. This graph also describes a scenario where the actors take the same position, either for or against (Godet 1982; Godet 1991).

Table 7. DAA Matrix: level of divergence between actors in the governance of mangrove ecosystem areas in Tangerang District, Indonesia

1DAA	User	Localgov	Centralgov	Private	Univ	NGO	Research	School
User	0	0	0	0	0	0	0	0
Localgov	0	0	0	0	0	0	0	0
Centralgov	0	0	0	0	0	0	0	0
Private	0	0	0	0	0	0	0	0
Univ	0	0	0	0	0	0	0	0
NGO	0	0	0	0	0	0	0	0
Research	0	0	0	0	0	0	0	0
School	0	0	0	0	0	0	0	0
Number of divergences	0	0	0	0	0	0	0	0

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Table 8. The valence level of actors in the governance strategy of mangrove ecosystem areas in Tangerang District, Indonesia

1MAO	Rehab	Ecotourism	Silvo	Coastbord	Community	Knowledge	Comanage	Absolute sum
User	1	1	1	1	1	1	1	7
Localgov	1	1	1	1	1	1	1	7
Centralgov	1	1	1	1	1	1	1	7
Private	1	1	0	0	0	0	1	3
Univ	1	0	0	0	0	1	1	3
NGO	1	0	1	1	1	1	1	6
Research	1	1	1	1	1	1	1	7
School	0	0	0	0	0	1	1	2
Number of agreements	7	5	5	5	5	7	8	
Number of disagreements	0	0	0	0	0	0	0	
Number of positions	7	5	5	5	5	7	8	

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Table 9. The level of actor mobilization towards the governance strategy of mangrove ecosystem areas in Tangerang District, Indonesia

3MAO	Rehab	Ecotourism	Silvo	Coastbord	Community	Knowledge	Comanage	Mobilisation
User	3,3	1,1	2,2	2,2	4,3	4,3	3,3	20,7
Localgov	2,0	2,0	3,0	3,0	3,0	2,0	3,0	17,8
Centralgov	4,4	3,0	3,0	1,5	3,0	1,5	4,4	20,7
Private	1,0	2,1	0,0	0,0	0,0	0,0	3,1	6,2
Univ	1,0	0,0	0,0	0,0	0,0	3,1	2,1	6,2
NGO	4,5	0,0	3,4	3,4	3,4	3,4	3,4	21,5
Research	1,5	1,5	1,5	1,5	2,2	2,2	1,5	12,0
School	0,0	0,0	0,0	0,0	0,0	1,5	1,0	2,5
Number of agreements	17,8	9,6	13,0	11,5	15,9	18,1	21,7	
Number of disagreements	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
Degree of mobilisation	17,8	9,6	13,0	11,5	15,9	18,1	21,7	

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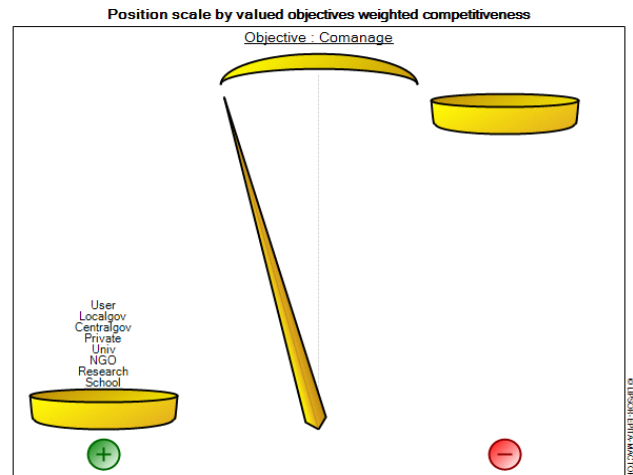
Figure 4. The scale of actors in the management strategy of mangrove ecosystem areas based on collaborative management in Tangerang District, Indonesia
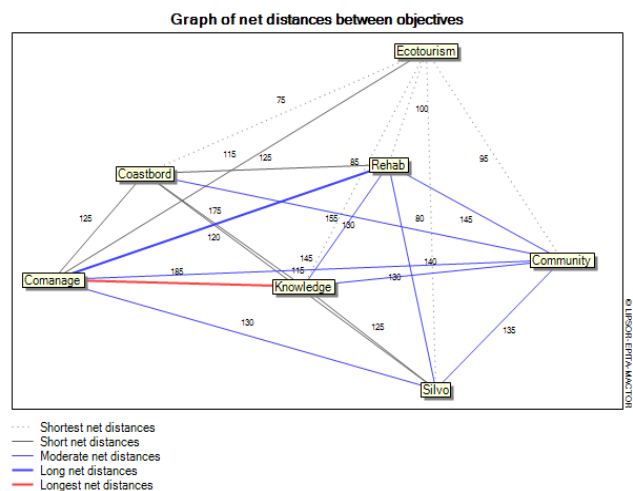
Figure 5. Graph of the distance between strategies in the management of mangrove ecosystem areas in Tangerang District, Indonesia

The governance strategy of mangrove ecosystem areas in Tangerang District must be developed systematically through (i) understanding that the management of mangrove ecosystem areas and the resources they contain are carried out in an integrated manner; (ii) determination of sustainable development goals and objectives; (iii) development of conflict resolution capacity; (iv) development of planning capacity, implementation of monitoring and evaluation in a synergy; (v) development of active participation of actors; (vi) preparation and harmonization of laws and regulations related to management; and (vii) the development of regional and international cooperation.

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