Available *online* at : http://jurnalantropologi.fisip.unand.ac.id/

Jurnal Antropologi: Isu-Isu Sosial Budaya

| ISSN (Online) 2355-5963 |

When Conservation Meets Livelihood: Community Resistance to Lake Maninjau's Environmental Rescue Policy

*Ahmad Yudha[1], Alfitri[2], Azwar [3], Lucky Zamzami[4] **

[1] *Department of Sociology, FISIP, Universitas Andalas, Indonesia. E-mail:* ahmadyud391@gmail.com
[2] *Department of Sociology, FISIP, Universitas Andalas, Indonesia. E-mail:* alfitri@soc.unand.ac.id
[3] *Department of Sociology, FISIP, Universitas Andalas, Indonesia. E-mail:* azwar@soc.unand.ac.id
[4] *Department of Antropology, FISIP, Universitas Andalas, Indonesia. E-mail:* luckyzamzami@soc.unand.ac.id

ARTICLE INFORMATION

Submitted: 31st March, 2026.
Review: 29th April, 2026.
Accepted: 23rd May, 2026.
Published: 26th June, 2026.

KEYWORDS

Floating Net; Cage Fish; Farmers; Lake Conservation Policy; Resistance

CORRESPONDENCE

E-mail: luckyzamzami@soc.unand.ac.id

A B S T R A C T

This study explores the conflict between environmental sustainability and community livelihoods at Lake Maninjau, where the expansion of floating net cage aquaculture / keramba jaring apung (KJA) has accelerated environmental degradation. The conservation policy implemented by the Agam Regency government has sparked resistance, particularly in Nagari Koto Malintang, which is the only area to openly oppose the policy. A qualitative descriptive approach was used with purposive sampling to identify eleven informants, including KJA farmers, local officials, and community representatives. Data were gathered through in-depth interviews, field observations, and document analysis, and analyzed using the Miles and Huberman interactive model. The findings show that KJA farmers' resistance includes violating the ban on expanding KJA, rejecting pollution claims, and engaging in symbolic actions. Drawing on Popkin's theory, this resistance is a rational response to economic dependence and perceived risks from a policy that threatens their livelihoods. In conclusion, KJA farmers' resistance is not simply opposition to ecological goals but a strategic response to protect their livelihoods. This supports Popkin's view that farmers act based on rational considerations, weighing the policy's costs and benefits, and the influence of capital owners and political support.

A. INTRODUCTION

The interests of environmental management and conservation often trigger conflicts, especially when they directly clash with economic interests that have become established practices in community life. Economic activities carried out by communities that utilize natural resources significantly accelerate environmental degradation (Armayani et al., 2022). Environmental conflicts arise at various levels of community life, triggered by diverse interests regarding environmental resources, whether among community groups, the government, or the private sector. The complexity of these issues demands active involvement and shared responsibility from all stakeholders in managing and resolving environmental issues.

However, in Indonesia today, environmental management and the resolution of environmental conflicts are still far from improving; this is also evidenced by the high number of pollution cases across various regions. For instance, in West Sumatra Province, 238 villages were found to be experiencing water pollution, 158 villages were experiencing air pollution, and 27 villages were experiencing soil pollution (Badan Pusat Statistik (BPS) Provinsi Sumatera Barat, 2025). The large number of villages experiencing water pollution confirms that there are errors in managing aquatic environments; one such case of pollution occurred at Lake Maninjau.

Lake Maninjau, located in Tanjung Raya Subdistrict, Agam Regency, West Sumatra Province, is one of the lakes in critical condition designated under Peraturan Presiden No. 60 Tahun 2021 on National Priority Lakes. This lake was previously known as a major tourist destination and holds strong socio-cultural ties for the surrounding communities, making it integral to various aspects of daily life (Iswahyudi, 2025). The lake's degradation to a critical condition is attributed to exploitative practices in various forms, including local communities using the lake as a tourism business opportunity and attracting international tourists, The Batang Antokan River Sluice Gate is also utilized as a source for hydroelectric power generation (PLTA) by PLN, and massive fish farming using the

Floating Net Cage / *keramba jaring apung* (KJA) system is carried out by the community (Yusnani et al., 2024)

The multi-functional use of Lake Maninjau has, in practice, occurred for years without robust environmental management, leading to ongoing degradation of the lake's ecosystem. This situation is exacerbated by the weak implementation of lake management policies and the lack of environmental responsibility among stakeholders, making environmental issues in Lake Maninjau increasingly complex (Yuniarti, 2022a). In this context, floating net cage (KJA) fish farmers are often positioned as the primary actors responsible for lake pollution, even though this aquaculture activity has been ongoing for a long time and serves as the main livelihood for communities around Lake Maninjau.

KJA fish farming is a method that utilizes existing water bodies, employing open-mesh structures to facilitate feeding—a practice widely adopted in the fisheries industry (Rahma et al., 2023).The KJA method in Lake Maninjau has expanded rapidly and become the cornerstone of the local economy, The presence of floating net cage (KJA) operations also constitutes a labor-intensive industry, as it absorbs labor from feed suppliers, seed suppliers, porters, food stalls, vehicle rentals, and others; thus, KJA fish farming has become a significant livelihood that drives the economy of the communities around the lake (Soejarwo et al., 2022).

Fish farming activities using the Floating Net Cage (KJA) system in Lake Maninjau, while contributing economically to the community, also place pressure on the aquatic environment. The increasing number of KJA units exceeding the lake's carrying capacity, coupled with the use of high-protein feed, generates organic waste in both dissolved and solid forms, leading to a decline in water quality. The increased intensity of KJA activities has caused the accumulation of pollution loads in the waters of Lake Maninjau (Makmur et al., 2020a).

In response to these conditions, the Agam Regency Government enacted Regional Regulation No. 5 of 2014 on the Management of the Conservation of the Maninjau Lake Area, a key provision of which sets limits on the number of floating cage fish farms permitted to operate in the lake. The regulation stipulates that the carrying capacity of Lake Maninjau is limited to 6,000 cage fish farming plots (Regulation No. 5 of 2014, Article 7, Paragraph 3). However, current conditions indicate that the number of floating net cages in operation has exceeded this limit, resulting in increasing pressure on the lake's ecosystem and leading to a decline in water quality (Pramadinanti, 2023).

Through these conditions, we can observe a conflict of interests regarding the utilization of Lake Maninjau: on one hand, floating net cage (KJA) farmers seeking to optimize their business operations, and on the other, government policies that prioritize the preservation of Lake Maninjau through the reduction of KJA numbers. These conflicting interests have led to various forms of resistance from KJA farmers and community groups whose livelihoods depend on fish farming activities in the lake. One visible form of resistance is the effort to maintain the existence and number of KJAs already in operation. This action can be understood as a form of resistance, as defined in the Dictionary of Sociology as a defensive or repulsive force against certain pressures (Harahap et al., 2024).

To clarify the meaning of resistance, an explanation is needed of how this concept is understood in the social sciences. Initially, resistance was frequently discussed in the study of social movements, but attention was often directed toward the dynamics of movements at the macro level. This limitation prompted James C. Scott to develop a perspective that highlights forms of resistance at the micro level through interpretive ethnographic studies of the experiences of peasants in Southeast Asia (Rusmanto et al., 2023). Subsequently, research on resistance was expanded and enriched by several scholars, including Samuel L. Popkin which offers a distinct approach to understanding farmers' actions and choices within the rural socio-economic context (Osborne, 1982).

In his work, Popkin proposes viewing farmers' economic lives through the lens of rational decision-making and strategic interactions. This perspective is termed the political-economic approach. Such rational decisions stem from the assumption that economic actors will always weigh various alternatives to achieve their goals. Naturally, the considerations made are oriented toward the hopes and values they hold. In this way, they will naturally seek to maximize the utility value of their choices (Brown, 1982). Based on this approach, farmers are viewed as rational beings capable of making strategic choices based on cost-benefit calculations to maximize their personal or family interests. Thus, every action taken by farmers is not grounded in collective moral considerations but rather in the potential for profit that may be gained from such collective actions or as a reaction to the risks and uncertainties inherent in their daily lives (Osborne, 1982).

Through this framework, resistance can be understood as the result of how farmers assess changes that affect their livelihood calculations. These assessments relate to how they evaluate the magnitude of risks and opportunities arising from the current situation, including the policies being implemented. The extent to which the presence of such policies exacerbates the social living conditions of the community significantly influences the emergence of farmer resistance, both in form and scale (Khasanah et al., 2025). Thus, Popkin's definition serves as a foundation for examining what influences farmers' choices and how the level of risk inherent in the lake conservation policy shapes variations in KJA farmers' resistance, as observed in the following table.

Table 1.
Number of KJA in Each Village in Tanjung Raya Subdistrict in 2017, 2021, and 2022 (plots)

No.	Village	Year		
		2017	2021	2022
1	Koto Malintang	4,453	4,658	5,647
2	Koto Gadang	848	794	1,762
3	Koto Kaciak	939	499	791
4	Duo Koto	847	594	1,065
5	Bayua	3,711	3,254	4,122
6	Maninjau	1,934	1,376	1,561
7	Sungai Batang	1,934	2,098	2,582
8	Tanjung Sani	4,430	4,062	5,865
	Total	18,630	17,325	23,359

Source: (DKPP AGAM, 2025)

https://doi.org/10.25077/jantro.v28.n1.p85-94.2026

Based on the table above, of the nine Nagari in Tanjung Raya, Nagari Koto Malintang is the one with the highest number of KJA in those years and is even approaching the environmental carrying capacity limit set by the Agam Regency Government, which is 6,000 plots for the entire Lake Maninjau. Although the total number of KJA decreased in 2021, there was no decrease in several nagaris, including Koto Malintang. This was further reinforced by the actions of KJA farmers and the Koto Malintang community, who on September 21, 2024, reached an agreement rejecting any reduction or regulation of KJA. This was done through signing a petition and hanging protest banners at five strategic locations in Koto Malintang Village (Oktavia & Faoziyah, 2017; Soejarwo et al., 2022).

This situation indicates that the resistance occurring in Koto Malintang Village has a distinct character, given that not all villages in Tanjung Raya Subdistrict exhibit a uniform pattern of rejection toward the KJA reduction policy. Therefore, this study focuses on explaining the forms of resistance carried out by KJA farmers in Nagari Koto Malintang and the underlying factors in the context of Lake Maninjau management policies.

Although the issue of floating net cages (KJA) in Lake Maninjau has been extensively studied through various approaches and disciplines, the accompanying social dynamics continue to evolve. Changes in environmental conditions and policies are accompanied by increasingly significant factors influencing farmers' decisions to maintain their operations, while local governments face pressure to promptly resolve the issue of lake pollution. In this situation, the community does not merely adopt an attitude of acceptance or rejection but also exhibits observable patterns of behavior. Therefore, this study aims to described a perspective by highlighting how KJA farmers in Nagari Koto Malintang respond to and negotiate policy pressures through acts of resistance.

B. METHOD

This study employs a qualitative approach of a descriptive nature. A qualitative approach is a strategy used by researchers to observe, collect information, and analyze research findings (Have, 2013). The descriptive research type is highly appropriate because the researcher aims to describe and interpret the phenomenon of resistance occurring among KJA farmers in Nagari Koto Malintang. This aligns with the objective of descriptive research, which is to describe or depict various conditions and phenomena as they exist (Moleong, 2002; Neuman, 2006)

The data collection techniques used were in-depth interviews, observation, and document analysis (Creswell & Poth, 2016). In-depth interviews were conducted face-to-face using a semi-structured approach, allowing informants to speak freely and provide information at their own pace (Bryman, 2016). Observations were conducted on-site by observing the behavioral patterns of farmers, as demonstrated through their daily routines and interactions within the KJA farming community. Additionally, document analysis was performed by collecting documents related to resistance phenomena and lake conservation policies to validate the accuracy and reliability of the information obtained.

This study involved a total of 11 informants selected through purposive sampling based on their relevance to the issue of resistance to lake conservation policies. The informants were divided into two groups: first, 5 actor informants consisting of KJA farmers who met the criteria for actor informants, namely members of the policy resistance movement and those who had participated in resistance activities for at least three years; second, 6 observer informants consisting of 2 government officials (DPKP Staff, *Nagari* Secretary Staff) , 2 community leaders (*Wali Jorong*, FORKOPESDAM Leader) and 2 local community members who were aware of and directly interacted with farmers involved in resistance activities. Key informants were selected from both groups to provide a more comprehensive understanding of the resistance phenomenon.

C. RESULTS AND DISCUSSION

1. Forms of Resistance by KJA Farmers

The resistance carried out by farmers can take various forms of action; this is influenced by the extent to which individuals feel disadvantaged by changes to their ideal conditions. Such changes typically occur due to the influence of certain parties—such as the state or patrons—who hold greater power than the farmers (Brown, 1982; Osborne, 1982). In the context of the resistance movement by KJA farmers, policy changes aimed at saving the lake and limiting the number of KJA units allowed to operate create a situation that compels farmers to consider the actions they will take to maintain the ideal conditions for their well-being and that of their community (Khasanah et al., 2025).

Farmers' rationality is always closely tied to considerations of economic and social benefits; thus, farmers will take the most rational actions, leading to a variety of responses. This diversity of actions illustrates how disturbed the KJA fish farmers were by the situation they predicted. From this perspective, the farmers' resistance can be analyzed based on the form and level of action they took as their final considerations.

a) Individual and collective action

The resistance of KJA farmers in Nagari Koto Malintang is evident in their indifference toward lake-saving policies regarding reduction and control; in fact, they actively seek to increase the number of KJA plots they own. This continues to occur despite the ban on adding KJA plots; however, it is often not followed by government oversight or follow-up. When viewed through the rational justifications put forward by farmers, this implies that the policy at that time could not be considered something that was adhered to, as there was neither coercion nor ideal incentives for KJA reduction. This indifference persists even as the policy was established from 2014 until now, with an increase in the number of KJA plots still observed, as mentioned by Wahyu:

> *"As far as I recall, there were indeed regulations regarding the number of KJA that farmers were allowed to own; however, it can be said that the policy did not take effect. Consequently, many farmers have actually increased their KJA, especially since an increase in KJA means their income will rise"* (June 2025).

Wahyu's statement illustrates that while the existence of such regulations is acknowledged in theory, they are not strictly enforced in practice. Although the government has not consistently enforced regulations regarding the reduction of floating net cage units, other important issues help explain how resistance, particularly through the continued increase of floating net cage units, has persisted over time.

The key issue lies in the unclear validity of floating net cage data and the lack of serious identification of ownership status among farmers. This situation creates space for farmers to continue expanding floating net cage operations without strict oversight or administrative control.

The issue of inconsistent floating net cage data has also been indirectly highlighted in previous studies, particularly in the book "Dilema Pengelolaan Danau Secara Multifungsi" by the Indonesian Institute of Sciences (LIPI, 2021), which shows discrepancies in the number of floating net cage units recorded over several years. In practice, farmers are also often reluctant to publicly disclose the actual number of floating net cage units they own, as noted by a staff member of the Agam Melsa DPKP:

> *"But we do not really know because sometimes there are also outside parties such as investors, yet people claim that the capital is their own. In our area, there is no proper data regarding investors because people are unwilling to talk about it."* (June 2025)

This explanation suggests that the resistance demonstrated by KJA farmers can operate at the individual level, primarily through the continued expansion of KJA and weak disclosure of ownership status. These forms of resistance are carried out through everyday practices of non-compliance, enabled by rational calculations oriented towards protecting personal income sources from policies perceived as economically threatening. These actions are also chosen because they carry relatively low risks, primarily due to the lack of strict identification and anonymity surrounding KJA ownership practices. As Popkin's perspective that farmers tend to choose actions perceived as more beneficial and realistic to maintain their economic sustainability while avoiding unfavorable obligations (Tuwu & Arsyad, 2021).

However, over time, patterns of resistance among KJA farmers expanded beyond individual non-compliance. The emergence of collective resistance was closely associated with the issuance of Presidential Regulation No. 60 of 2021 on National Priority Lakes, which accelerated lake pollution control efforts and positioned Lake Maninjau as a nationally strategic site for environmental management. This elevation of the issue to the national level created a perception of stricter policy implementation and increased regulatory pressure on KJA activities.

In response, individual forms of resistance were increasingly seen as insufficient. Resistance gradually shifted toward more collective forms, characterized by coordinated responses, joint opposition, and intensified communication among farmers who shared similar concerns.

This collective resistance became visible during a protest at the Tanjung Raya District Office in June 2021, when dozens of KJA farmers gathered to reject the government's plan to reduce floating cages in Lake Maninjau. Farmers from several *nagari* came together carrying banners containing messages such as "*Kami Menolak Pengurangan KJA di Danau Maninjau*" and "*Selamatkan Jiwa Kami, Jangan Bunuh Usaha Kami*." In addition to displaying banners, farmers also attended the government socialization meeting being held at the district office to directly voice their objections and demand reconsideration of the policy. These actions reflected not only symbolic opposition, but also coordinated efforts to publicly challenge the planned reduction of KJA as part of the lake revitalization program (KataSumbar, 2021).

The formation of this collective action cannot be understood solely as a spontaneous expression of solidarity. Following Popkin's rational peasant perspective, participation in collective action is shaped by calculations of costs, expected benefits, perceived likelihood of success, and the role of local actors in mobilizing resources. Based on this perspective, the actions of KJA farmers can be better understood as rational choices shaped by such considerations. For instance, this is reflected in an Beti's statement:

> *"Yes, I joined in with the others for the petitions before. I also responded when people asked the community, saying that I was against it. That's basically what I could do so far, because there are already others handling things like meetings, where only representatives attend."*(June 2025)

Within a broader scope, the collective resistance against the reduction of KJA can also be understood as being concentrated in Nagari Koto Malintang. This condition indicates that, among the various area, Koto Malintang emerged as the most active location that met key considerations and was considered suitable as a strategic base for collective actions among farmers. This may relate to the presence of stronger communication networks, shared dependency on KJA-based livelihoods, and more cohesive farmer coordination compared to other areas. Recognizing this, the collective movement among KJA farmers can be seen as a strategically localized form of resistance rather than a uniformly distributed response across all area in the district.

From the statement above, we can see that collective action is part of the process of gaining individual benefits, and there is also a high likelihood of free-riding within the movement. The shift from individual to collective action is also marked by a greater need for resistance to protect themselves and their families.

Through these two forms of resistance, we understand that this resistance occurs because KJA farmers perceive the regulations as less urgent, given the large number of farmers with diverse circumstances, and the fact that the government fails to enforce these regulations in the field, making violations a rational choice. This mismatch between the needs of the farming community and the existence of inappropriate policies constitutes a critical and recurring error. Consequently, the choice farmers consider is to ignore the regulations and even resist the pressure, as KJA offers far greater benefits than simply following the rules (Rahma et al., 2023).

https://doi.org/10.25077/jantro.v28.n1.p85-94.2026

b) Institutional Form

The resistance movement of KJA farmers has evolved into a form of institutionalized resistance, particularly after the establishment of the Forum Komunikasi Petani dan Pedagang Danau Maninjau (FORKOPESDAM). The successful formation of this organization may be regarded as part of an institutionalized resistance movement, which (Agocs, 1997) defines as forms of resistance embedded and expressed through organizational structures and processes of legitimation, decision-making, and resource allocation. One example of this institutionalized resistance can be observed in the articulation of KJA farmers' aspirations regarding the floating net cage reduction policy during a meeting held at the Working Chamber of the Agam Regional House of Representatives (DPRD Agam) in November 2024.

Figure 1. Meeting to convey aspirations of community leaders and FORKOPESDAM

Insert the source here

The establishment of FORKOPESDAM subsequently transformed the behavior of KJA farmers by making their resistance movement more organized and coordinated. The existence of an organizational structure became a crucial element in strengthening peasant resistance, as it enabled the management of collective resources while also providing protection and advocacy through active membership in FORKOPESDAM, as stipulated in its Deed of Establishment and Articles of Association.

This transformation occurred because, according to Samuel L. Popkin (1986), collective peasant resistance fundamentally faces inherent challenges. Popkin argues that peasants tend to act as free riders; consequently, resistance movements often shift toward securing resources and protecting their members. Therefore, effective collective resistance can only emerge when a movement is led by leaders who are capable of providing greater choices and tangible benefits for those participating in the resistance.

c) Discursive and Symbolic Form

Based on a study conducted by LIPI, when pollution first became apparent, LIPI assessed that the factor accelerating environmental degradation in Lake Maninjau was organic waste from KJA activities exceeding the environment's carrying capacity. However, this study did not immediately influence the perspective of the community, particularly KJA farmers (Oktavia & Faoziyah, 2017). The farmers denied the findings and tended to shift the narrative of the lake's pollution to other factors, such as the impact of hydroelectric power plant construction or domestic waste issues. Most of them did not trust the results of the study conducted by LIPI. Consequently, when facing other parties, they tended to claim that the pollution was not solely caused by KJA. An example of this diversionary tactic was found in a statement by informant Beti as follows.

> "*If asked whether KJA is the cause of the lake's pollution, I might be the first to disagree. After all, we can't just say it's solely KJA – there are many factors involved. Perhaps there will inevitably be changes over time*" (June 2025).

Based on this statement, there appears to be a desire to blame other factors for the pollution, so that those other factors must be addressed first. This sentiment is not limited to a single informant; the denial that KJA is the cause of the pollution has also created tension between KJA farmers and PLN, which is viewed as the primary factor behind the pollution. Furthermore, the presence of the Batang Antokan River Sluice Gate, which is used by PLN, is indeed viewed as an issue that requires attention. However, this situation has also led to a stance of resistance and self-defense from the conflicting parties. This is evident in the statement provided by Hendri.

> "*Actually, there is an impact, but it's not entirely as reported by LIPI. Because, in reality, the main cause of the pollution doesn't come from the fish cages, but from trash entering the lake – whether from the mountains or from the mainland. Furthermore, the lake's natural cycle has not been functioning normally since the construction of the dam. The project was solely focused on drawing surface water to power the turbines, while sedimentation and the lake's natural cycle were neglected. This indicates negligence on the part of PLN for failing to consider the ecological impacts on the balance of Lake Maninjau*" (June 2025).

This statement also underscores the existence of other issues that require resolution beyond the KJA problem itself. In reality, the issue of lake pollution is a shared responsibility, so both those directly and indirectly involved must be fully engaged to ensure ideas and proposals for saving the lake are fully accepted. However, the community's attitude has been one of not taking on this shared responsibility or making sacrifices for the common good. This is acknowledged by Febri in the following explanation.

> "*The communities around Lake Maninjau are aware that the lake is polluted, but the primary cause is not the floating net cages (KJA). For example, from the direction of Nagari ( ), there are various rivers flowing into the lake, and people dispose of trash there, ultimately polluting the rivers. Second, there are activities by the PLN hydroelectric power plant (PLTA) that draw water from the upper part of the lake, causing water retention; meanwhile, there are no automatic tunnels to discharge sediment, so sedimentation cannot flow smoothly*" (July 2025).

Based on the above description, it is evident that farmers indeed adopt a perspective focusing on factors outside the KJA as the cause of pollution. This can also be viewed as a form of resistance; from the perspective of farmers' rationality, shifting the blame is an effort to transfer shared responsibility to those with greater resources to address the issue. Although pollution issues directly affect them, they essentially possess the ability to manage their own risks by outmaneuvering pollution incidents (Silvia & Resdati, 2025). This means that through this collective project, most farmers in Nagari Koto Malintang prefer to act as free riders. By employing this strategy, farmers can protect their interests while avoiding the risk of losing their security in an open confrontation.

Ongoing policy pressure from the central and local governments has heightened the vigilance of KJA farmers at Lake Maninjau. The designation of Lake Maninjau as a National Priority Lake in June 2021 marked a pivotal moment affirming the government's policy direction, particularly the accelerated reduction of fish cage numbers. For farmers, this policy is not merely perceived as environmental conservation rhetoric but as a direct threat to the sustainability of their livelihoods. This awareness has subsequently driven farmers to take more overt steps to protect their interests than they had previously.

One form of resistance chosen was a symbolic action involving the display of banners conveying messages of dissent against the policy. These banners were placed in public spaces with high visibility, particularly along the main road connecting Lubuk Basung and Maninjau. This choice of action allowed the message of resistance to be conveyed widely, efficiently, and relatively safely for the farmers. This can be observed in the following image.

Figure 2. Banner opposing the policy to reduce fish cages in Nagari Koto Malintang

Placing banners on main roads demonstrates the use of public spaces as a medium for political communication. By erecting these banners, the farmers convey their message of rejection openly yet non-confrontationally, thereby affirming their status as stakeholders directly affected by the policy. Their efforts did not end with a single event in June 2021; they also brought banners bearing their aspirations to the Tanjung Raya Subdistrict Office. By bringing banners into official spaces, it demonstrates how symbols have crossed from the streets into local government locations. This also visibly underscores the persistence of the actions being carried out continuously. The actions taken by these farmers can also be seen as an opportunity to maximize limited resources.

If the phenomenon described above is viewed through Popkin's framework, the changes in the KJA farmers' resistance strategies emerged not merely from moral principles but as a result of resource utilization and the capabilities of their leaders. Consequently, this approach became the most rational choice for maintaining the KJA farmers' bargaining position against policies that threaten them. Thus, this active collective action becomes a more measured strategy for achieving the desired goals (Brown, 1982; Osborne, 1982).

2. Factors Contributing to Resistance

The repeated acts of resistance carried out by farmers against this lake conservation policy—specifically the policy to reduce KJA—can be understood through Samuel Popkin's political economy theory. Popkin observes that farmers' economic lives are heavily influenced by individual considerations, which in turn shape the existence of collective actions. Through this perspective, farmers are seen as rational beings. Farmers' rationality is fundamentally oriented toward their own well-being, that of their families, and their communities—factors that provide opportunities for them to achieve greater well-being and sustain it. Thus, collective actions such as resistance are undertaken based on various considerations assessed by KJA farmers.

As previously explained, various calculations are made before farmers decide to participate in collective actions. Using this perspective, we will examine the factors that influenced KJA farmers in Nagari Koto Malintang to choose to maintain the KJA and resist the Lake Maninjau conservation policy.

a) Benefits of Choosing KJA for Farmers

Floating net cage (KJA) fish farming has become the primary economic foundation for the communities around Lake Maninjau, particularly in Nagari Koto Malintang. For farmers, KJA is not merely a supplementary economic activity but a livelihood that supports the household needs of both owners and workers. The central role of KJA in the local economic structure creates a strong dependency and makes it the primary reference in the community's economic decision-making. This can be seen through the following overview of KJA farmers' income over a single cycle.

Table 2.
Estimated income of KJA farmers by work segment in a single production cycle

Work Segment	Estimated income	Notes
Harvest Workers	Rp150.00–300.000	Depending on the amount of harvested fish
KJA Manager	Rp4,000,000–8,000,000	Depends on the number of KJAs and the agreement with the investor/profit-sharing system
Investor	Rp15,000,000	Generated from 1 KJA plot

Source: Primary Data, 2025

https://doi.org/10.25077/jantro.v28.n1.p85-94.2026

The main appeal of KJA lies in its relatively high and more predictable profit margins compared to other economic sectors in the village. Income from KJA is considered sufficient to meet daily living expenses and, in many cases, exceeds income from traditional agricultural work. These benefits are not only individual but also contribute to increased purchasing power among the community and the overall economic circulation of the village. In addition to financial benefits, production flexibility is a key advantage of KJA enterprises. Farmers have the freedom to determine harvest cycles according to economic needs and capital availability. This flexibility distinguishes KJA from rice farming or plantation businesses, which have long harvest cycles that are difficult to accelerate. Thus, KJA is viewed as a business that is more adaptable to the economic dynamics of farming households.

Although the village of Koto Malintang possesses other economic potentials such as agriculture, plantations, and tourism, these sectors have not yet been considered viable alternatives. Economic transformation programs within the lake conservation policy have not yet addressed farmers' basic need for income security (Purba et al., 2023). This situation is exacerbated by limited land ownership on land, particularly due to the dominance of customary land, making the relocation of KJA operations difficult to achieve without concrete land provision by the government. In the long term, KJA has shaped the economic culture of the Koto Malintang community. The dependence built up over the years makes a transition to other sectors feel risky and unrealistic. In fact, the existence of KJA has also altered economic migration patterns, as some community members choose to stay or return to the village because KJA operations are seen as capable of providing a decent livelihood.

If the policy to reduce KJA operations is strictly enforced, farmers face the risk of job loss, loss of capital, and disruption to the village's economic stability. Within Popkin's framework, these conditions explain why farmers choose to maintain KJA operations and resist the policy. This choice can be understood as a rational action to minimize economic risks and protect their livelihood investments, not merely as a rejection of environmental policies (Utomo & Maulina, n.d.; Yuniarti, 2022a)

b) The Dominance of KJA Capitalists

When explaining farmers' movements in rural areas, Popkin employs the patron-client relationship to describe the strategies adopted by both parties to derive mutual benefit. Indeed, Popkin explicitly defines the patron-client relationship as one that reflects both monopolistic practices and exploitation, as the patron seeks to restrict the client's access to prevent direct engagement with the market. By understanding the patron-client relationship in its economic and political dimensions, the strategies employed by both parties to protect their interests become evident (Rustinsyah, 2019).

Operating a floating net cage (KJA) fish farming business requires substantial financial capital. This is especially true following the shift in KJA construction to steel structures, which can cost approximately Rp 3,000,000–4,000,000 per plot for a 5×5×5 m^3 plot. This does not include operational costs such as fish fry, labor wages, and fish feed; in total, farmers require an investment of Rp 29,000,000 per plot (Stepandi et al., 2024). This situation has led many farmers to collaborate with investors to operate their aquaculture businesses.

The presence of investors is crucial for the sustainability of KJA fish farming operations. Consequently, many farmers actively seek out investors, whether local or external. Capital in Nagari Koto Malintang generally comes from local actors, as evidenced by the presence of toke who can assist in the KJA production process, particularly by financing pellet feed or fingerlings. These actors in the production process are commonly referred to as toke; they typically control key aspects of the KJA business's economic network in Nagari Koto Malintang (Rahma et al., 2023).

Investors/toke play various important roles in the KJA fish production network; they typically act as collector-farmers and have market access, giving them greater economic resources compared to other KJA farmers. Through these relationships, KJA investors can expand their capital scale, thereby widening the competitive disparity between investors and KJA farmers. From the farmers' perspective, they are forced to remain in these relationships due to the lack of alternative employment opportunities. This reality is also evident in the high number of KJA plots, which leads to significant labor and capital requirements. KJAs with more than 10 plots generally have high initial capital requirements, thereby indirectly necessitating investors. In Nagari Koto Malintang, the presence of KJAs with more than 10 plots is shown in the following table.

Table 3.
KJA Ownership by Jorong in Nagari Koto Malintang

Jorong	KJA Owners ≤ 10 Plots	KJA Owners > 10 Plots	Total Owners	Total KJA
Muko-Muko	11	15	26	618
Tanjung Alai	16	40	56	1,663
Pauh Taruko	12	25	37	844
Rambai	12	32	44	1,444
Ambacang	1	35	36	1,070
Total	**52**	**147**	**199**	**5,185**

Source: DPKP, 2025

Based on the table, it is evident that 147 individuals own KJA units comprising more than 10 plots. This illustrates the significant need for capital and KJA resources among the community of Nagari Koto Malintang. Consequently, there is a high likelihood that numerous investors will be required to finance their operations. Thus, indirectly, many farmers ultimately have no choice but to opt for KJA units funded by investors as the ideal option. On the other hand, this reality also makes farmers increasingly dependent on KJA production resources controlled by investors. It is thus clear that one of the key factors influencing the phenomenon of resistance to lake conservation policies is the presence of investors who have indirectly established strategies that keep farmers and KJA workers under their influence—from controlling production inputs, enforcing loyalty contracts, to the dominant presence of policy-rejecting groups—all of which have been successfully

implemented. This reality means that alternative options available to farmers are not available within the community itself (Adisel et al., 2023; Alfitri et al., 2023)

c) Policy in the Rational Calculations of Floating Net Cage (KJA) Farmers

The Policy to Reduce the Number of Floating Net Cages (KJA) in Lake Maninjau The policy to reduce the number of Floating Net Cages (KJA) in Lake Maninjau was formulated as part of efforts to save an ecosystem undergoing degradation; thus, it is normatively positioned as a policy that must be adhered to for the sake of the environment. However, in social practice, this policy is interpreted differently by KJA farmers who depend on fish farming for their livelihoods. It is this discrepancy in policy implementation that forms the basis for farmers' resistance to the lake conservation policy (Mughits, 2025; Syandri & Yunus, 2014).

From the farmers' perspective, the policy is not evaluated solely based on its ecological objectives but through considerations of its impact on family well-being and the sustainability of their livelihoods (Rahma et al., 2023). Resistance can be understood as the result of rational calculation, when compliance with the policy is not perceived as a safe choice for household economics. This situation leads to lake conservation policies being treated as a direct threat to the primary livelihood of KJA farmers.

Historical experiences also shape how farmers interpret policies. During the early development phase of KJA, local governments demonstrated support through facilitation and assistance that reinforced the understanding that fish farming is a legitimate and strategic enterprise. The subsequent policy shift restricting KJA is perceived as a betrayal of the government's previous stance, as expressed by Ismet:

> *"What's the point of officially recognizing it if, in the end, our cages are also reduced? In 1993, the inauguration was held with great fanfare. Yet, this is the reality..." (June 2025).*

Farmers view the government's shifting stance as closely tied to the growing discourse on tourism development, in which KJA are positioned as the primary cause of lake degradation. This sentiment is reflected in Hendri's statement:

> *"There are many factors causing the decline in Lake Maninjau's water quality, including the lake's siltation process. However, due to the tourism development discourse, fish cage farmers are being scapegoated for this damage" (June 2025).*

The direction of tourism policy is reinforced by the designation of Lake Maninjau as a National Strategic Tourism Area and a national priority lake, aimed at developing tourism that offers greater revenue potential for the government. For KJA farmers, this policy amplifies the potential for conflicts of interest with tourism stakeholders. Within Popkin's framework, these conditions drive farmers to prioritize the protection of individual economic interests over long-term collective interests, including environmental sustainability issues (Osborne, 1982). Farmers' rational orientation is manifested through efforts to maintain KJA as their primary source of income, even though they are aware of future environmental risks (Alfitri, 2023). As long as the lake can still be used for fish farming, KJA operations will continue. This is reflected in Wahyu's statement:

> *"If such a policy were implemented, the community would see no benefit. In fact, such a policy would actually reduce the income of those working in the cages" (June 2025).*

Farmers' resistance is growing stronger because lake conservation policies are not accompanied by clear and sustainable guarantees of alternative livelihoods. The offer to transition to land-based livelihoods is deemed insufficient to ensure livelihood sustainability, so the policy is perceived as a threat, not an opportunity (Siregar et al., 2024). In this context, persisting with the floating cage aquaculture business remains the most rational choice as it continues to provide economic certainty for farmers.

d) The Role of Political Entrepreneurs

From Popkin's perspective, farmers' collective action does not occur automatically but depends on the presence of political entrepreneurs—individuals who invest time, manage resources, and coordinate others to generate collective benefits. For farmers, the presence of such actors serves as a rational consideration in assessing whether their participation will yield tangible benefits or instead pose risks (Brown, 1982).

The resistance of KJA farmers in Nagari Koto Malintang exhibits a pattern consistent with this framework. Opposition to the KJA reduction policy intensified when local figures emerged who not only represented farmers' concerns but also actively devised strategies, managed consensus, and bridged relationships with external parties. In this context, leaders are not positioned as passive symbols but as the primary drivers of collective action. This was also mentioned by Beti as follows.

> *"Everyone is involved; well, those who are involved are directly connected to this KJA, meaning they all make their living from the lake. But the leaders also emerged from our shared concerns" (June 2025).*

This statement was further validated by Irzal's explanation regarding the existence of FORKOPESDAM:

> *"This forum is so that they (the government) don't act recklessly, making assumptions or taking actions that would actually harm all parties – and certainly, they themselves would suffer the most. That's why this forum is where we gather to think of alternative solutions, starting with dialogue; we'll first offer advice to the government, and we'll request a meeting agenda for dialogue"* (June 2025).

The establishment of the Forum for Communication between Farmers and Traders of Lake Maninjau (FORKOPESDAM) demonstrates how leadership is institutionalized. This forum serves as a platform for dialogue, advocacy, and the consolidation of farmers' interests , while also enhancing farmers' confidence that their aspirations are channeled through relatively safe and organized channels. The forum's legal standing, established by Ministry of Home Affairs Decree No. AHU-

https://doi.org/10.25077/jantro.v28.n1.p85-94.2026

0006662.AH.01.07.2022, reinforces its position as a rational instrument in confronting policy pressures (Rahma et al., 2023).

Other symbols are also used to represent the community's presence, so that acts of resistance are not seen merely as the efforts of the KJA activists but involve a broader community. The traditional identity of the Minangkabau people also influences the actions of the community in Nagari Koto Malintang to consider participating in the resistance efforts. Given the existence of the traditional philosophy "Duduak samo randah tagak samo tinggi" (Sitting low, standing tall), which serves as the foundation for the community's actions and decision-making, the spirit of solidarity in that decision-making process is not reflected in the formulation of the lake conservation policy (Komala et al., 2024; Makmur et al., 2020a)

The presence of Maninjau community leaders in formal institutions such as the Agam Regional People's Representative Council (DPRD) serves as an additional political resource. Farmers view this representation as opening opportunities to advocate for the KJA issue within official government forums. According to Popkin's logic, such access enhances the estimated likelihood of collective action success, thereby making farmer participation more rational. Figures like Alber, a member of the Agam Regional People's Representative Council (DPRD) for the 2024–2029 term, can be understood as a political entrepreneur who manages the collective interests of farmers while simultaneously strengthening his political credibility. Farmers' support, in the form of social legitimacy and organizational involvement, is reciprocated through policy advocacy and the protection of KJA's economic interests, creating a mutually beneficial reciprocal relationship (Fossati, 2025),

Thus, the resistance of KJA farmers in Nagari Koto Malintang is not driven solely by moral or emotional attitudes, but by a rational calculation regarding the presence of leaders, institutions, symbols, and available political access. Within Popkin's framework, farmers' involvement in collective action becomes a rational choice because it increases the chances of preserving economic investments and avoiding the risk of losing their livelihoods due to KJA reduction policies.

D. CONCLUSIONS

Floating net cage farmers (KJA) in Nagari Koto Malintang have shown resistance to the Lake Maninjau rescue policy as a logical way to maintain their economic sustainability. This resistance took many forms, including ignoring laws limiting the number of cages, rejecting scientific findings about the source of lake pollution, and carrying out symbolic actions, such as putting up protest banners in public places. Samuel Popkin's perspective holds that this action is not just a rejection of ecological goals; rather, it is the result of strategic considerations in which farmers prioritize household income security when there are no guaranteed livelihood alternatives.

The high economic dependence on the farmers sector as well as the dominance of the toke, or capital owners, over the production network, are the two main components that support this resistance. In addition, local institutions and political actors, such as FORKOPESDAM, provide farmers with opportunities to support or oppose government policies. The most logical option to sustain Lake Maninjau's economy is collective resistance, as the government cannot provide alternative solutions and farmers believe the policy threatens their right to life.

E. ACKNOWLEDGMENT

The author would like to express sincere gratitude to all parties who contributed to the completion of this research. Special thanks are extended to my supervisor for their guidance and valuable feedback, which greatly shaped the study.

REFERENCES

Adisel, A., Suryati, S., & Riswanto, R. (2023). Portraying Patron-client in Fishermen Work Relationships: A Phenomenon from Bengkulu, Indonesia. *JSW (Jurnal Sosiologi Walisongo)*, *7*(1), 25–36.

Alfitri, A. (2023). Partisipasi Petani Dalam Pengelolaan Sampah Plastik Melalui Bank Sampah di Kota Padang. *Jurnal Antropologi: Isu-Isu Sosial Budaya*, *25*(1), 142–152.

Alfitri, A., Afrizal, A., Helmi, H., & Raharjo, S. (2023). Insentif Dalam Pengelolaan Sampah Plastik: Pengalaman Negara Jerman Serta Kota Surabaya Dan Kota Padang, Indonesia. *Menara Ilmu: Jurnal Penelitian Dan Kajian Ilmiah*, *17*(1).

Armayani, R. R., Lubis, H. K., & Sari, N. (2022). Hubungan antara ekonomi dengan lingkungan hidup: Suatu kajian literatur. *SINOMIKA Journal: Publikasi Ilmiah Bidang Ekonomi Dan Akuntansi*, *1*(2), 175–182.

Badan Pusat Statistik (BPS) Provinsi Sumatera Barat. (2025). *Number of Villages/Subdistricts by Type of Environmental Pollution,*.

Brown, I. (1982). The Rational Peasant: The Political Economy of Rural Society in Vietnam. By Samuel L. Popkin. University of California Press: Berkeley, 1979. Pp. xxii, 306. *Modern Asian Studies*, *16*(1), 168–169.

Bryman, A. (2016). *Social research methods*. Oxford university press.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

DKPP AGAM. (2025). *Number of KJA in Each Village in Tanjung Raya Subdistrict in 2017, 2021, and 2022*.

Fossati, D. (2025). What Drives Voting Behavior in Southeast Asia? Evidence from Candidate

Choice Experiments in Five Countries. *Journal of Current Southeast Asian Affairs*, *44*(3), 436–460.

Harahap, S., Hendrik, H., & Yanti, C. W. (2024). Analysis of the Floating Net Cage Business for Tilapia (Oreochromis niloticus) at Lake Maninjau Nagari Tanjung Sani, Tanjung Raya District, West Sumatra Province. *Jurnal Perikanan Dan Kelautan*, *29*(2), 217–221.

Have, P. ten. (2013). Understanding Qualitative Research and Ethnomethodology. In *SAGE Publications*. https://doi.org/10.1017/CBO9781107415324.004

Iswahyudi, E. (2025). Human Rights and Legal Reforms in Indonesia: Challenges and Progress. *The Journal of Academic Science*, *2*(2), 734–743.

KataSumbar. (2021). Tolak pengurangan keramba Maninjau, puluhan petani datangi kantor camat Tanjung Raya. Retrieved from https://katasumbar.com/tolak-pengurangan-keramba-maninjau-puluhan-petani-datangi-kantor-camat-tanjung-raya/

Khasanah, F., Sirrinqoufin, S. A., Mardhatilla, F., & Fauzi, N. A. (2025). Rice Farmers' Rationality and Adaptation to Double Pressure: Input Price Increases and Grain Price Fluctuations in Indramayu Regency. *Jurnal Agrosci*, *3*(1), 24–36.

Komala, P. S., Zulkarnaini, Z., Kurniati, R. I., & Fauzi, M. (2024). The effect of anthropogenic activities on the spatial distribution of total nitrogen and total phosphate in Lake Maninjau. *Journal of Water and Land Development*, 71–78.

Makmur, S., Muthmainnah, D., & Subagdja. (2020). Fishery activities and environmental condition of Maninjau Lake, West Sumatra. *IOP Conference Series: Earth and Environmental Science*, *564*(1), 012025.

Moleong, J. L. (2002). Metodologi Penelitian Kualitatif. In *Remadja Karya*.

Mughits, A. (2025). The Cultural Role of Traditional Leaders in Initiating The Formulation of Sharia Regional Regulations in West Sumatra. *Islam Transformatif: Journal of Islamic Studies*, *9*(1), 133–147.

Neuman, W. L. (2006). Social Research Methods: Qualitative and Quantitative Approaches. In *social research* (Vol. 8).

Oktavia, P., & Faoziyah, U. (2017). Challenges In The Restoration Of Lake Maninjau: Bridging Actors'interests For Sustainability. *Editors*, 38.

Osborne, M. (1982). The Rational Peasant: The Political Economy of Rural Society in Vietnam. By Samuel L. Popkin. Berkeley: University of California Press, 1979. Pp. xxi, 306. Preface, Chronology, Bibliography, Index. *Journal of Southeast Asian Studies*, *13*(1), 195–197.

Pramadinanti, F. (2023). Sustainability Management of the Lake Maninjau Area towards Environmental Pollution from the Jinayah Fiqh Perspective: Pengelolaan Kelestarian Kawasan Danau Maninjau terhadap Pencemaran Lingkungan dalam Perspektif Fiqih Jinayah. *DELICTUM: Jurnal Hukum Pidana Islam*, *2*(1), 31–43.

Purba, K., Chandra, P. S. C., Ratna, I., Asmara, C. J., & Azizah, Z. (2023). Ecotourism Approach: Lake Maninjau Tourism Governance in Maintaining Environmental Sustainability. *Proceeding International Conference on Economic and Social Sciences*, *1*, 426–441.

Rahma, F., Irwan, P., & Putra, I. M. (2023). Rationality Actions of KJA (Floating Net Cage) Workers After the Tubo Sulfur Disaster in Nagari Koto Malintang. *Tanjung Raya District, Agam Regency*, *2*(1), 471–482.

Rusmanto, J., Ulfarita, E. S., & Farid, M. (2023). Challenging the Hegemony of the Grand Paradigm of Social Movement Studies: A Review of Paradigmatic Weaknesses. *Journal Ilmu Sosial, Politik Dan Pemerintahan*, *12*(2), 271–287.

Rustinsyah, R. (2019). The significance of social relations in rural development: A case study of a beef-cattle farmer group in Indonesia. *Journal of Co-Operative Organization and Management*, *7*(2), 100088.

Silvia, S., & Resdati, R. (2025). Dampak Tubo Belerang terhadap Sosial Ekonomi Masyarakat Kawasan Danau Maninjau Nagari Koto Malintang Kecamatan Tanjung Raya Kabupaten Agam. *ETNOREFLIKA: Jurnal Sosial Dan Budaya*, *14*(3), 486–505.

Siregar, H. S. S., Haskar, E., & Farda, N. F. (2024). Hak konstitusional pembudidaya ikan di kawasan Danau Maninjau. *Otentik Law Journal*, *2*(1), 28–40.

Soejarwo, P. A., Koeshendrajana, S., Apriliani, T., Yuliaty, C., Deswati, R. H., Sari, Y. D., Sunoko, R., & Sirait, J. (2022). Management of Floating Net Cages (KJA) Aquaculture in an Effort To Save Maninjau Lake (Pengelolaan Perikanan Budidaya Keramba Jaring Apung (Kja) Dalam Upaya Penyelamatan Danau Maninjau). *Journal Kebijakan Sosek KP*, *12*(1).

Syandri, H., & Yunus, T. (2014). State of aquatic resources Maninjau Lake West Sumatra Province, Indonesia. *Journal of Ecology and Environmental Sciences*, *5*(1), 109.

Tuwu, D., & Arsyad, M. (2021). Farmer Adaptation Strategy to Their Environment in the Village of Makoro Binongko Wakatobi. *Indonesian Journal of Social and Environmental Issues (IJSEI)*, *2*(1), 7–13.

Utomo, A. A. H. M. A., & Maulina, M. L. S. I. (n.d.). *Assessment of Good Fish Farming Practices (CBIB) in Tilapia Floating Net Cages (KJA) at Jatiluhur Reservoir, Sukasari District, Purwakarta Regency*.

Yuniarti, I. (2022). *Socio-ecological dimensions of sustainable tropical lake management: lessons learned from interdisciplinary research in Lake Maninjau, Indonesia*.

Yusnani, Y., Dewata, I., Syah, N., Frinaldi, A., & Putra, R. P. (2024). Analysis of the development of floating cages in Lake Maninjau. *AIP Conference Proceedings*, *3001*(1), 080014.