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# Utilization of Ketinting Engine Assistance and Socio-Economic Changes among Traditional Fishermen

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**ABSTRACT**
Traditional fishermen in coastal Indonesia continue to face persistent productivity constraints due to limited access to efficient fishing technology. This study investigates the utilization of ketinting engine assistance and its contribution to productivity improvement and socio-economic change among fishermen in Torombia Village, Kulisusu District, North Buton Regency, Southeast Sulawesi. A qualitative case study design was employed. Data were collected through semi-structured in-depth interviews, participant observation, and documentation, involving village officials, representatives of the Marine and Fisheries Service, recipient fishermen, and non-recipient fishermen selected through purposive and snowball sampling. Data were analyzed using the interactive model of Miles, Huberman, and Saldaña, while trustworthiness was ensured through source and method triangulation. The findings indicate that ketinting engine assistance improved operational efficiency, expanded access to more productive fishing grounds, and increased catch volume from 3–5 kg to more than 10 kg per day, along with better catch quality. The assistance also contributed to greater household financial stability, improved capacity to meet educational and healthcare needs, and reduced reliance on informal loans. The study concludes that appropriate technology, when supported by local institutions and social capital, can enhance the social functioning of coastal communities, although its long-term sustainability depends on continuous technical training and improved local spare-parts access.

**Keywords:** *Appropriate Technology; Fishermen Productivity; Ketinting Engine Assistance; Social Functioning; Socio-Economic Change.*



## INTRODUCTION

Indonesia's coastal communities largely depend on small-scale capture fisheries as their primary source of livelihood. However, despite the country's vast marine resources, the welfare of traditional fishermen remains relatively low. This condition is closely related to limited access to productive resources, particularly efficient fishing technology, which is essential for improving fishermen's productivity and sustaining

their livelihoods. In the context of social welfare, adequate access to productive resources is necessary to enable coastal communities to meet their economic and social needs and perform their social functions.

In coastal communities, adequate access to productive resources, particularly efficient fishing technology, is essential for improving fishermen's productivity (Faharudin, 2014). However, the limited modernization of fishing equipment continues to constrain the productivity of traditional fishermen (Eli Nurlaela et al., 2025). This challenge is further intensified by external pressures such as fuel price fluctuations, climate change–induced extreme weather events (Wibowo, Suwarto, Winarno, & Permatasari, 2025).

In Torombia Village, Kulisusu District, North Buton Regency, fishing constitutes the main livelihood of coastal households. However, fishermen still rely on traditional fishing methods with limited operational equipment, which restricts fishing range, operational efficiency, and catch volume. These constraints ultimately suppress fishermen's productivity and income. Productivity in this context is understood not merely as an increase in catch volume but also encompasses operational efficiency and the broader improvement of fishermen's socioeconomic household conditions (Fitriyanti, 2025). Within this context, appropriate technology becomes a strategically relevant solution for small-scale fishermen with limited capital (Mahpudin et al., 2025).

The ketinting engine (long-tail outboard engine) is an appropriate technology widely used by traditional fishermen in Indonesia because it is relatively inexpensive, simple to operate, and adaptable to local water conditions (Suartika, Okariawan, Wijana, & Saputra, 2021). The use of the ketinting engine as a propulsion system for traditional boats is an adaptive response aimed at increasing mobility, expanding fishing grounds, and reducing operational costs amid the capital constraints faced by fishermen (Situmeang, A Kinseng, & P Lubis, 2020). A number of studies have demonstrated that the use of long-tail outboard engines significantly increases the range and fishing intensity of traditional fishermen, ultimately resulting in improvements in both the volume and quality of catches (Rahmasari, 2017). The role of this engine is particularly significant in extending fishing time and expanding fishing grounds—two critical variables that directly influence fishermen's productivity (Nurlaela, Ripaldi, Saputra, Choerudin, & Nababan, 2025).

Recognizing the importance of this technology in enhancing fishermen's productivity, the local government through the Marine and Fisheries Service (Dinas Kelautan dan Perikanan/DKP) of North Buton Regency has implemented a fishing equipment assistance program providing ketinting engines to small-scale fishing groups in Torombia Village since 2017. Such assistance programs constitute part of broader coastal community empowerment efforts aimed at fostering economic independence and improving the social functioning of fishermen (Suharto, 2017). The success of technology assistance programs for fishermen cannot be separated from the role of local institutions; the strengthening of fishing groups represents the primary foundation for the sustainability of technology-based empowerment programs in coastal areas (Wibisono, Sari, & Asnawati, 2021). Furthermore, fishermen's empowerment and the dynamics of coastal economies are substantially determined by the extent to which fishing communities are capable of developing their collective capacity to utilize available resources and technology (Kusnadi, 2009).

Nevertheless, a number of studies indicate that the effectiveness of technology assistance programs for fishermen does not always correspond proportionally to their stated objectives. The provision of fishing equipment is frequently unaccompanied by adequate mentoring and facilitation, resulting in suboptimal utilization of distributed equipment (Jufri, Said, & Rahim, 2018). Field observations also reveal disparities among beneficiaries; some fishermen have been able to utilize the ketinting engine to significantly increase their income, while others continue to face obstacles such as engine malfunction, high repair costs, and limited fuel supply (Azizah, 2023). This unequal utilization affects not only individual productivity but also the social capital and overall cohesion of fishing communities (Rahim & Dwi Hastuti, 2016). Studies examining the social dimensions of technology assistance utilization remain considerably limited, while aspects such as fishermen's perceptions, adaptation dynamics, and the social interactions formed around the use of the ketinting engine have received insufficient scholarly attention (Arief Setyanto et al., 2023).

This research gap constitutes an important foundation for the present study. The specific context of Torombia Village characterized by a coastal community with primary dependence on small-scale fisheries and a distinctive geographical setting renders this area a highly relevant locus for examining the dynamics of technology adoption and its implications for fishermen's welfare. Accordingly, this study aims to: (1) analyze the dynamics of ketinting engine assistance utilization in enhancing fishermen's productivity in Torombia Village, and (2) analyze the contribution of ketinting engine assistance utilization to improvements in productivity and changes in the socioeconomic conditions of fishermen in Torombia Village, Kulisusu District, North Buton Regency. The findings of this study are expected to provide a theoretical contribution to the scholarship on coastal community empowerment, as well as practical recommendations for local governments in designing assistance programs that are more effective, well-targeted, and sustainable.

## METHOD

This study employs a qualitative approach with a case study design to examine in depth the dynamics of ketinting engine assistance utilization and its impact on fishermen's productivity. The qualitative approach was selected because it is capable of capturing the experiences, perceptions, and social realities of informants in a contextual manner that cannot be reduced to numerical data alone (Creswell & Poth, 2017). The case study design was utilized to understand the phenomenon within the boundaries of its real context, specifically within the fishing community of Torombia Village, Kulisusu District, North Buton Regency, Southeast Sulawesi Province, in a coastal area directly bordering the Buton Strait. The study site was determined through purposive selection based on the following criteria: Torombia Village is a recipient village of the ketinting engine assistance program from the Marine and Fisheries Service (DKP) of North Buton Regency, the majority of its population earns a living as traditional fishermen, and there exists variation in engine utilization conditions among the aid recipients that is relevant for exploration (Campbell et al., 2020).

Data were collected through three complementary techniques. First, semi-structured in-depth interviews were conducted with informants selected through purposive sampling and snowball sampling techniques, comprising the Village Head,

representatives of the Marine and Fisheries Service (DKP) of North Buton Regency, fishermen who received the assistance, and non-recipient fishermen as comparative informants (Palinkas et al., 2015). In total, 12 informants participated in this study, consisting of one village official, one DKP representative, eight fishermen who received ketinting engine assistance, and two fishermen who did not receive the assistance as comparative informants. Second, participant observation was carried out to directly observe fishing activities, the physical condition of ketinting engines, and maintenance practices performed by the fishermen. Third, documentation was collected in the form of field notes, photographs, assistance distribution documents, and official reports from relevant institutions as triangulation sources (Campbell et al., 2020). Secondary data were obtained from DKP program reports, regional fisheries statistical data, and scientific literature from journals and reference books relevant to the topic of appropriate technology utilization within fishing communities (Mahpudin et al., 2025).

Data analysis was conducted using the interactive analysis model of Miles, Huberman, & Saldaña (2019), which encompasses four systematic stages. The first stage was data collection, in which all interview transcripts, observation notes, and documents were compiled simultaneously. The second stage was data condensation, which involved the inspection and sorting of data based on consistency, relevance, and completeness of information. Ambiguous data were confirmed through member checking, while irrelevant data were filtered out. All data were subsequently analyzed using thematic analysis through an open coding process to identify patterns of ketinting engine utilization and the socio-economic dynamics of the fishermen, which were then synthesized narratively (Braun & Clarke, 2006). The third stage was data display through thematic matrices and descriptive narratives that organized the findings into two primary dimensions, namely the dynamics of utilization and its contribution to the socio-economic conditions of the fishermen, with reference to the framework of social functioning and community empowerment (Ife, 2016). The fourth stage was the drawing and verification of conclusions, carried out through the integration of findings and analytical interpretation to understand the relationship between appropriate technology utilization and changes in fishermen's welfare, as well as its connection to the policy implications of sustainable fishing gear assistance programs (Patton, 2015).

The trustworthiness of the data was ensured through four criteria adapted from Lincoln, Guba, & Pilotta (1985), credibility through source and method triangulation as well as member checking; transferability through in-depth contextual description (thick description); dependability through an audit trail and supervisor consultations; and confirmability through researcher reflexivity and systematic documentation of the entire data collection process. Relevant modifications to the standard analytical procedure were applied at the data condensation stage, in which the open coding process was conducted through thematic analysis to identify patterns of ketinting engine utilization and the socio-economic dynamics of the fishermen.

## RESULT

### *Fishermen's Adaptation to Ketinting Engine Use*

The ketinting engine assistance program implemented by the Marine and Fisheries Service of North Buton Regency has been distributed to fishermen in Torombia Village since 2017, with additional units provided in 2025. The utilization of these engines was

reported by fishermen to influence several aspects of their fishing activities. The findings indicate several observable changes related to fishing activities, including operational practices, safety perceptions, and patterns of interaction among fishermen.

The transition from manual propulsion (paddling) to simple mechanization through ketinting engines occurred through a gradual adaptation process, influenced by the fishermen's age, fishing experience, and intensity of technology use in daily activities. The assistance distribution mechanism, beginning with fishermen data collection, administrative verification (National ID and Fisherman's Card), and proposal submission to the regency level, positioned the village government as a key actor in bridging fishermen's interests and bureaucratic structures. This is reflected in the explanation of the Torombia Village Secretary:

> *"The process begins with fishermen data collection at the village level, then we verify documents such as the National ID and Fisherman's Card. Once the data is complete, we draft a proposal to the District Fisheries Service. When the assistance arrives, we summon the fishermen to the village office for goods handover and signing of the handover report."*

Operationally, the utilization of ketinting engines significantly increased time and physical energy efficiency for the fishermen. Physical energy previously consumed by paddling could now be fully redirected toward core fishing activities. One recipient fisherman described the change as follows:

> *"Back when we used paddles, we were exhausted before even reaching the fishing spot. Now with the ketinting engine, we arrive quickly and are not too tired, so we can focus more on catching fish."*

Beyond physical efficiency, the ketinting engine also provided psychological benefits in the form of increased safety and confidence when facing unpredictable weather conditions, as reflected in the statement of a senior fisherman:

> *"Before with paddles, we were always anxious when the weather suddenly turned bad. Now with the engine, when we see signs of changing weather, we can head back to shore much faster."*

Regarding human resource capacity, the research found that the engine assistance was not accompanied by continuous technical training. The DKP representative acknowledged this condition:

> *"Regular assistance is indeed unavailable. So far, only basic operational guidance has been provided at the time of handover. In-depth mechanical training is still limited."*

Most fishermen reported learning to operate and repair the ketinting engines independently through experience and assistance from fellow fishermen. To overcome these limitations, fishermen relied on mutual assistance, including sharing technical knowledge, borrowing fuel, and helping each other when engine breakdowns occurred at sea. The Village Secretary confirmed:

> *"When an engine breaks down at sea, other fishermen immediately help tow it back. Regarding fuel, there is also a borrowing system among members."*

***Productivity and Socio-Economic Changes***

Fishermen who had access to ketinting engines were able to reach more distant and productive fishing grounds, including reef areas yielding higher-value commodities. One fisherman directly described the change in fishing range:

*"Before with paddles, we only dared to stay near the shore where the water was calm. Now with the engine, I can already fish out in the open sea or beyond the headland where there are more fish. Before, we would never have dared, we might not have had the strength to paddle back."*

This expanded range directly impacted the volume and quality of catches. The same fisherman added:

*"Before with paddles, catching 3 to 5 kilograms was already a blessing, and even those were small fish from the shallows. Now when the weather is good, we can catch more than 10 kilograms. The fish quality is also better, we often get large reef fish because we can now fish in deeper areas."*

The findings on productivity changes are summarized in the following table:

**Table 1.** The Impact of the Use of Ketinting Engines on Fishermen's Productivity

| Aspect | Before Ketinting Engine | After Ketinting Engine |
|---|---|---|
| **Fishing range** | Near coastal waters | Open sea & reef areas |
| **Travel time** | Long and exhausting | Shorter and more efficient |
| **Catch volume** | 3–5 kg/day | ≥10 kg/day |
| **Fish economic value** | Low–moderate | Moderate–high |
| **Fishing intensity** | Limited | More flexible |

Source: Primary Data, 2025

The DKP representative further confirmed that this individual-level productivity improvement contributed to regional fisheries output:

*"This assistance has contributed positively to the increase in the regency's fisheries production figures. Fishermen can now go to sea every day without being hindered by weather or distance."*

Several fishermen reported improvements in their household economic conditions after using the ketinting engines. One fisherman described the concrete change in his household life:

*"Before, the catch was only enough for that day's meals. Now when the catch is abundant, I can save money for other needs such as children's school fees and house repairs. Most importantly, daily household needs are no longer as difficult as before."*

Financial independence also reduced dependency on informal loans, as expressed by another fisherman:

*"Before, I often had to borrow from neighbors just to buy rice. Now the catch is enough to cover daily needs, and I no longer need to borrow money as often."*

From the social dimension, the adoption of ketinting engines did not trigger destructive competition among fishermen, but rather strengthened community social cohesion. The Village Secretary observed:

*"They are actually more solid now. They often gather to discuss engine problems or share information about fish locations."* A fisherman further confirmed: *"Because we have the same engine, we cooperate more often. If someone's engine breaks down at sea, others immediately help tow them back to shore."*

## DISCUSSION

### *Dynamics of Ketinting Engine Utilization*

The dynamics of ketinting engine utilization in Torombia Village indicate that the transition from manual propulsion to mechanized fishing represents more than a technical change. It reflects a broader adaptive process experienced by fishermen in responding to new technology within their daily fishing activities.

The role of the village government in mediating the distribution of assistance also appears to be important in this process. The structured involvement of village institutions reflects the argument of Ife (2016) that technology-based empowerment programs are more sustainable when they are embedded within existing local governance structures.

The findings also indicate that the use of ketinting engines increases fishermen's sense of safety and confidence when operating at sea, particularly when weather conditions change unexpectedly.

This finding is consistent with the concept of appropriate technology proposed by Mahpudin et al. (2025), which emphasizes not only technical efficiency but also the compatibility of technology with the real conditions faced by its users.

The finding that human resource capacity remains limited due to the absence of sustained technical training directly challenges the adequacy of the current program design. The theoretical framework of Suharto (2017) on community empowerment explicitly distinguishes between *giving* resources and *building capacity*, two fundamentally different forms of intervention with substantially different long-term outcomes. The present study confirms that the program has succeeded in the former but fallen short in the latter, resulting in reactive rather than preventive maintenance practices among fishermen. This gap between resource provision and capacity development represents the most critical structural weakness in the current assistance model.

Notably, the emergence of social capital as a compensatory mechanism for absent formal training aligns with Kusnadi (2009), who argued that the empowerment of fishing communities is fundamentally rooted in their collective capacity for mutual support. However, this study reveals an important nuance: while social capital effectively cushions minor technical failures and fuel shortages, it cannot substitute for formal mechanical knowledge when major breakdowns occur. This finding suggests that the strength of social capital in Torombia Village, though genuine, operates within a bounded capacity that formal training could meaningfully extend rather than replace.

### *Socio-Economic Impacts of Ketinting Engine Utilization*

The documented increase in catch volume from 3–5 kg to ≥10 kg per day, alongside the qualitative shift toward higher-value reef fish species, reflects a transformation in productive capacity that cannot be fully explained by technical factors alone. In the framework of social functioning theory (Suharto, 2017), productivity is understood not merely as an output measure but as an expression of a fisherman's capacity to fulfill his economic and social roles simultaneously. The ketinting engine, by reducing physical exhaustion and expanding fishing range, fundamentally alters the conditions under which this capacity is exercised, enabling fishermen to perform their productive role more fully and consistently than was previously possible under manual conditions.

This multidimensional understanding of productivity connects directly to the welfare framework established in Law Number 11 of 2009, which defines social welfare as the condition in which citizens are able to meet material, spiritual, and social needs to live decently and develop themselves to fulfill their social functions (Faharudin, 2014). The evidence from this study, including improved household income, reduced dependency on informal loans, and increased ability to finance children's education and healthcare, indicates that the ketinting engine assistance has contributed meaningfully to moving fishermen's households closer to this standard. This represents a significant empirical validation of the welfare framework in the specific context of coastal fishing communities in eastern Indonesia.

The finding that socio-economic improvement was achieved despite the persistent barriers of fuel price fluctuation and limited spare parts access is particularly significant when read against the theoretical backdrop established in the introduction. Where Azizah (2023) identified operational cost barriers as a primary obstacle to fishermen's welfare improvement, this study demonstrates that strong pre-existing social capital, specifically the inter-member fuel borrowing system, functions as a community-level buffer that absorbs external economic shocks. This finding enriches the understanding of appropriate technology adoption by highlighting that its success is not determined by technology alone, but by the social ecosystem into which it is introduced. In communities with strong social solidarity, even imperfectly supported technology interventions can generate meaningful welfare improvements.

From the social dimension, the finding that uniform technology strengthens rather than disrupts social cohesion speaks directly to the theoretical concern raised by Arief Setyanto et al. (2023) regarding the relationship between technology adoption and community social dynamics. The present study empirically resolves this theoretical tension by demonstrating that when technology is distributed equitably within a community rather than selectively to a few, it becomes a shared social reference point that deepens existing bonds rather than creating new divisions. In the framework of Kusnadi (2009) on coastal community empowerment, this represents an ideal outcome where technological and social capital reinforce each other in a mutually constitutive dynamic, ultimately strengthening the social functioning of the entire community rather than benefiting only individual recipients.

Taken together, these findings indicate that the effectiveness of ketinting engine assistance in Torombia Village is closely related to the alignment between technology, local institutional support, and existing social relations among fishermen.

When this alignment is strong, particularly in the distribution process and collective use of technology, the outcomes tend to be positive. However, the absence of continuous technical training and limited spare parts infrastructure may pose challenges for the long-term sustainability of the program.

## CONCLUSION

This study shows that the utilization of ketinting engine assistance in Torombia Village has contributed to significant improvements in the productivity and socio-economic conditions of traditional fishermen. The transition from manual propulsion to mechanized fishing has increased operational efficiency, expanded fishing areas, and

improved catch volume and quality. As a result, fishermen's households experienced greater financial stability and reduced dependence on informal loans. These findings highlight that appropriate technology assistance, when supported by local institutional mechanisms and strong social relations among fishermen, can enhance the social functioning of coastal communities. However, the sustainability of such programs requires complementary efforts, particularly continuous mechanical training and improved access to spare parts at the local level.

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