Rational Choice, Structural Factors, and Cultural Values in the Livelihood Strategies of Fishing Families Amid Climate Change (A Case Study of Fishing Families in Bengkulu City, Indonesia)

Lesti Heriyanti[1*], Vina Salviana Darvina Soedarwo[2], Asep Nurjaman[2], Susiyanto[3]

[1]Student of Doctoral Program of Sociology, Universitas Muhammadiyah Malang, Indonesia

[2]Doctoral Program of Sociology, Universitas Muhammadiyah Malang, Indonesia

[3]Universitas Muhammadiyah Bengkulu, Indonesia

***Corresponding Author**

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ABSTRACT

The Fourth Industrial Revolution and the accelerating impact of climate change have jointly reconfigured the ways in which Indonesia's coastal communities secure their livelihoods. Although the nation possesses vast marine potential, approximately 12.5% of its coastal population continues to live in extreme poverty (BPS, 2025). In Bengkulu City, more than 3,500 active fishermen depend on marine conditions that they perceive as increasingly unpredictable, marked by high waves, irregular rainfall, and shifting fishing seasons. This study examines the livelihood strategies of fishing families along the coast of Bengkulu City by integrating the perspectives of economic rational choice, structural constraint, and cultural value. A qualitative case-study design was employed, with data gathered through in-depth interviews, participant observation, documentation, and life-history exploration involving sixteen key informants (fishermen, fishermen's wives, and fishermen's children) in the Pasar Bengkulu and Malabero sub-districts, supplemented by five additional informants from the wider community. Data were analysed thematically and interpreted through James Coleman's Rational Choice Theory, enriched by Max Weber's theory of social action. The findings indicate that the livelihood strategies of Bengkulu fishermen cannot be adequately explained through a purely structural or purely cultural lens. Fishermen construct rational choices that are simultaneously shaped by the local philosophy of "ikan sejerek, bereh secupak, madar," which foregrounds simplicity, sufficiency, and communal solidarity. This value system constitutes a distinctive work ethic that diverges from Western capitalist logic yet remains functionally adaptive under conditions of ecological uncertainty. At the same time, structural constraints — limited access to capital, conflict with trawler vessels, and weak policy enforcement — continue to restrict fishermen's room for manoeuvre. This study is expected to contribute theoretically to coastal economic sociology and to offer policy recommendations for fisher empowerment grounded in local wisdom and ecological context.

Keywords: rational choice, livelihood strategy, climate change, cultural values, Bengkulu

INTRODUCTION

Indonesia, as an archipelagic nation, possesses vast marine and fisheries potential. Its marine territory of 3.25 million km² is estimated to carry an economic value of approximately USD 1.3 trillion per year per year (KKP, 2020). This potential should, in principle, constitute a primary asset for improving the welfare of coastal communities, particularly fishing families. At the normative level (das sollen), the Indonesian government has launched a range of pro-fisherman policies, including vessel and gear assistance, fisherman insurance, and the strengthening of the blue economy, all intended to reduce poverty and raise the standard of living of coastal populations. The empirical reality (das sein), however, tells a markedly different story. Statistics Indonesia (BPS, 2025) recorded that approximately 12.5% of the coastal population still lives in extreme poverty, a figure that has in fact risen relative to the previous year. This discrepancy indicates that existing policy instruments have

not yet effectively addressed the structural problems confronting fishermen. Income uncertainty, limited access to markets and technology, and the compounding impact of climate change further intensify the complexity of coastal poverty. Bengkulu Province, with a coastline of approximately 525 km, holds substantial potential in capture fisheries; however, this potential does not automatically translate into fisherman welfare. Various studies indicate that the catches of Bengkulu fishermen fluctuate and tend to decline (Putra et al., 2026), a trend largely driven by unpredictable natural conditions, including the phenomenon of climate change (Supriyadi et al., 2019). This volatility in catch and income compels fishing families to continually seek alternative livelihood strategies in order to sustain their households (Putri & Heriyanti, 2024; Abdullah et al., 2022). The ideal condition (das sollen) for Bengkulu fishermen is reflected in a legal framework that should, in principle, operate to their advantage: Law No. 7 of 2016 concerning the Protection and Empowerment of Fishermen, Fish Farmers, and Salt Farmers obliges the government to guarantee business certainty, provide risk protection such as fisherman insurance, and improve fisherman welfare (Putra et al., 2026). Bengkulu fishermen are further protected through the prohibition of trawl nets and other environmentally destructive gear, aimed at achieving ecological sustainability, or eco-fishing (Nur & Nissa, 2024), and are granted marine spatial justice through an exclusive fishing zone along the coastal lane (Zone I) reserved for small vessels under 10 GT, free from competition or disturbance from larger vessels. Government-provided climate-mitigation support — including accurate and accessible weather-information systems and capital assistance during periods when fishermen are unable to go to sea owing to extreme weather — further underpins this normative ideal (Patriana & Satria, 2015). Yet the reality confronting fishermen in the field diverges considerably from this normative picture (Safas et al., 2024), as Bengkulu waters continue to experience recurring conflict, unpredictable weather, and shrinking fishing grounds that place fishing households in a persistently vulnerable position. Against this backdrop, the central problem addressed in this study is how fishing families in Bengkulu City construct rational livelihood strategies under the combined pressure of structural constraint, cultural value, and the escalating impact of climate change. Specifically, this study aims to analyse the economic rational choices, structural factors, and cultural values that shape the livelihood strategies of Bengkulu fishing families amid climate change, employing James Coleman's Rational Choice Theory, enriched by Max Weber's theory of social action, as the primary analytical lens.

METHODOLOGY

This study adopts a constructivist paradigm, which holds that social reality is the product of intersubjective agreement among subjects, continuously produced through ongoing social interaction (Berger & Luckmann, 1966; Denzin & Lincoln, 2000). This paradigm directed the researcher toward an inductive, interpretive process of data collection and analysis appropriate for capturing the meanings that fishermen themselves attach to their livelihood choices. A qualitative approach employing a case-study design was adopted, supported by interview guides, participant observation, documentation, in-depth interviews, and the exploration of informants' life histories. The case-study design was selected for its capacity to provide a thorough, contextual account of a specific phenomenon — in this instance, how fishing families construct adaptive strategies to climate change within a local socio-cultural framework. The research was conducted within the coastal fishing communities of Bengkulu City, with particular focus on the Pasar Bengkulu and Malabero sub-districts of Teluk Segara District, both predominantly inhabited by Malay ethnic fishing communities that continue to apply principles of local wisdom in constructing their family livelihood strategies. The unit of analysis was the fishing family (household), comprising the fisherman, his wife, and his children residing under one roof.

Primary data were obtained directly from traditional fishermen whose principal occupation is fishing, supplemented by secondary occupations undertaken to meet household needs; data sought included income, household expenditure, sources of livelihood, family members' economic contributions, household composition, and wage systems. Secondary data were drawn from Statistics Indonesia (BPS), the Marine and Fisheries Agency, sub-district monograph records, and relevant scientific literature.

Informants were selected through purposive sampling on the basis of direct involvement in fishing activities, representation of the community's various strata, and willingness to share in-depth life experience, complemented in the field by a snowball mechanism. The study involved sixteen principal informants — heads of fishing households, fishermen's wives, and working fishermen's children — together with five supporting informants comprising community figures, sub-district officials, customary leaders, and fisher-group administrators. Data collection combined in-depth interviews, participant observation, documentation, and life-

history narration. Data validity was established through source and method triangulation, and the data were analysed qualitatively using an interactive model (Miles et al., 2014; procedures are described below), framed within Coleman's Rational Choice Theory and enriched by Weber's theory of social action.

Fieldwork and interview protocol

Fieldwork was carried out from October 2025 to April 2026, a period of approximately six months, through 20 visits to Pasar Bengkulu and Malabero. The interviews were conducted by the lead researcher together with four research assistants, in Bahasa Indonesia and Bengkulu Malay. Access to the community was negotiated through the head of the neighbourhood association (*ketua RT*), who then designated senior fishermen as the initial informants for the study.

In-depth interviews followed a semi-structured interview guide derived from the study's analytical framework and organised around five topic areas: (1) household composition, income sources, and the economic contribution of each family member; (2) fishing practice, gear, and seasonal patterns; (3) perceived changes in weather and sea conditions over the preceding five years and the household's responses to them; (4) access to capital, markets, institutions, and government programmes; and (5) local values, including the meaning and use of *ikan sejerek, bereh secupak, madar*. Household heads, wives, and children were asked adapted versions of the guide, and the five supporting informants were asked about community-level arrangements, policy implementation, and customary norms. Interviews lasted approximately 45 minutes and took place at informants' homes, fish-landing sites, the fish market, and places where fishermen relax or gather. Informants were free to answer according to the social conditions they experienced. Life-history interviews were conducted by asking informants to narrate the turning points in their livelihoods from childhood to the present.

Participant observation covered fish landing and sale, preparation and repair of fishing gear, and informal gatherings at the shore, over a total of six months. Documents examined included sub-district monographs, fisher-group records, and reports of the Marine and Fisheries Agency.

Data coding and thematic analysis

All interviews were transcribed verbatim, and the excerpts quoted in this article were translated from Bahasa Indonesia and Bengkulu Malay into English by the researchers and research assistants and checked by the research supervisors, with local terms retained. Analysis followed the interactive model of data condensation, data display, and conclusion drawing and verification (Miles et al., 2014), operationalised through the phases of thematic analysis described by Braun and Clarke (2006): familiarisation with transcripts and field notes, open coding, searching for and reviewing themes, and defining and naming themes. Coding was done manually using spreadsheets. Open coding produced 40 initial codes (for example, 'switching gear', 'selling at the market', 'borrowing from boat owners', and 'sharing catch'), which were grouped into five categories and then into the themes reported in the Results. Coding was carried out by the lead researcher with the assistance of the research assistants. Themes were derived inductively; they were then interpreted deductively against Coleman's rational-choice concepts and Weber's four types of social action, and the resulting mapping is presented in Table 3. Trustworthiness was supported by source triangulation (across household heads, wives, children, and supporting informants), method triangulation (interviews, observation, and documents), member checking, peer discussion, and analysis of the cases encountered during the research.

Sample adequacy and data saturation

The sample was designed to achieve analytical rather than statistical adequacy. Following the information-power logic of Malterud et al. (2016), a relatively small sample is justified when the study aim is narrow (livelihood strategies of fishing households in two adjacent sub-districts), the informants are highly relevant to that aim and were purposively selected on the basis of household role, fishing gear, and generation, the interviews are in-depth and life-history interviews, and the analysis is theory-guided. Adequacy was judged during fieldwork and analysis rather than fixed in advance. The five supporting informants were included to corroborate and contextualise household accounts rather than to extend the range of themes.

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RESULTS

Research location and informant profile

The coastal area of Bengkulu City extends along a shoreline of approximately 17.22 km within Teluk Segara District, an area of 2.365 km² characterised by gently sloping sandy beaches and river estuaries that function as daily centres of fisheries trade. This study focused on the sub-districts of Pasar Bengkulu and Malabero, home to predominantly Malay fishing communities that retain strong kinship systems, substantial social capital, mutual-help traditions, and a distinctly maritime culture. Sixteen informants participated in the study, comprising four senior fishermen who own their own vessels, four senior fishermen operating with borrowed or shared equipment, one younger household head who owns a 5 GT boat, four junior fishermen (sons of fishermen with under ten years of experience), and three fishermen's wives who operate independent micro-enterprises to support household income (Table 1) and the five supporting informants such as community figures, officials, customary leaders, fisher-group administrators. The supporting informants gives information about the cultural values that still exist in fisherman communities in Bengkulu. Educational attainment among informants varied considerably: most senior fishermen completed only elementary or junior secondary schooling, fishermen's wives generally completed senior secondary school, and one junior fisherman held a bachelor's degree in economics, illustrating a generational gap in educational access that itself forms part of the community's broader adaptive narrative.

Table 1: Profile of Research Informants (n = 16)

No.	Name	Age (yrs)	Role in the Family / Occupational Status	Gear / Type of Enterprise
1	Mrs. AnA	39	Fisherman's wife	Food stall (warung) and trading fish in market
2	Mr. Endang	43	Household head / senior fisherman / boat owner	10 GT boat
3	Mr. Asri	48	Household head / senior fisherman / boat owner	Longline (pancing rawai)
4	Mr. Effendi	50	Household head / senior fisherman	Nylon gillnet
5	Mr. Yuli	55	Household head / senior fisherman	Gillnet
6	Awang	37	Fisherman's son / junior fisherman	Longline (pancing rawai)
7	Mr. Madi	55	Household head / senior fisherman	Beach seine net
8	Mrs. Meri	50	Fisherman's wife	Laundry service
9	Mrs. Tati	46	Fisherman's wife	Soft-drink stall
10	Yandi	25	Fisherman's son / junior fisherman	Longline (pancing rawai)
11	Chandra	23	Fisherman's son / junior fisherman	Longline (pancing rawai)
12	Mr. Endri	52	Household head / senior fisherman	Beach seine net
13	Mr. Sumrizal	62	Household head / senior fisherman / boat owner	10 GT boat
14	M. Rafi	20	Fisherman's son / junior fisherman	Longline (pancing rawai)

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15	Mr. Rismanto	77	Household head / senior fisherman / boat owner	10 GT boat
16	Jeff	30	Household head / fisherman / boat owner	5 GT boat

Source: Processed research data, 2026.

The local philosophy of "ikan sejerek, bereh secupak, madar"

A central factor shaping fishermen's rational choices is the enduring influence of inherited cultural values, particularly the philosophy "*ikan sejerek, bereh secupak, madar*" — literally, "a kilo of fish, an one quarters kilograms of rice, and take it easy." *"Ikan sejerek"* denotes the practice of bundling small fish caught by net into one-kilogram lots (*compok'an*), typically sold for IDR 15,000–25,000 depending on species and size, a practice that reflects the limited range and capacity of small traditional vessels. "*Bereh secupak"* refers to the roughly 1.4 kilogram measure of rice (priced around IDR 23,000–25,000) considered sufficient for a household's daily needs, while *madar* denotes a period of rest and relaxation — conversing, smoking, or playing cards with fellow fishermen after returning from sea — during which concerns over unfinished work or economic hardship are temporarily set aside.

As one senior fisherman, Mr. Rismanto (77), explained:

"When the waves are high, we cannot use gillnets. So we switch to fishing at the estuary or work as crew on a boat owner's bigger vessel. Our people simply refuse to sit idle — rather than have no income at all, we would rather do any work connected to the sea."

This statement reflects the flexibility that fishermen have long practised as an inherited adaptive mechanism, now intensified by the growing impact of climate change. The findings indicate that this philosophy exerts a paradoxical, double-edged influence on fishermen's work ethic. A narrow interpretation — contentment with a minimal catch and relaxation once basic needs are met — may dampen economic motivation (need for achievement, or n-Ach; McClelland, 1961) and reinforce poverty. A deeper reading of the same philosophy, however, carries values of simplicity, gratitude, and concern for others that can function as positive social capital for community-based livelihood strategies. As Mr. Madi (55), a senior fisherman deeply versed in local values, observed:

"'Ikan sejerek, bereh secupak, madar' does not mean laziness. It means being grateful for what you have, but still trying. Once you have enough to eat, you share with a neighbour who has not caught anything yet. That is what our ancestors taught us."

The study further identifies a generational divergence in interpretation: younger fishermen tend to read the philosophy progressively, as encouragement to remain grateful while continuing to strive, whereas some older fishermen invoke it to justify limiting effort once basic needs are satisfied. Beyond this local philosophy, three additional factors were found to shape fishermen's rational livelihood choices: the capacity to read natural signs (*nenengok tando alam*) — the interpretation of wind, cloud, and current patterns as a navigational aid in locating fish; access to economic resources such as capital, technology, and markets; and social institutions and government policy, including licensing, subsidised-fuel access, and the enforcement of protective regulations.

Livelihood strategies of fishing families

Data drawn from in-depth interviews, observation, and documentation indicate that fishing families in Malabero and Pasar Bengkulu have constructed diverse livelihood strategies in response to income uncertainty from fishing, which may be grouped into three principal patterns. *First,* diversification within the fisheries sector. Most heads of fishing households do not depend on a single fishing activity; they switch fishing gear according to season, work as crew on a boat owner's vessel, or develop small-scale aquaculture in ponds of their own or belonging to others. This pattern reflects a flexible, adaptive strategy that has long existed but has, according to informants, intensified as the impact of climate change has grown more pronounced. *Second*, diversification into

non-fisheries sectors. When income from fishing proves insufficient, fishing families expand into small-scale trading at markets or door to door, construction labour, motorcycle-taxi driving, and other casual work, alongside the involvement of wives and children in home-based economic activities such as the production of fish crackers, shrimp paste, and other processed products, as well as the rental of fishing equipment within the community. As Mrs. Ana (39), a fisherman's wife who also trades fish at the market, described:

"I help my husband by selling fish at the market every morning. If there is no catch from him, I buy from other fishermen and resell it. It helps cover our daily expenses. My eldest child also helps make fish crackers to sell to nearby shops."

This pattern is consistent with the concept of off-farm income diversification developed by Ellis (1999), in which the diversification of income sources constitutes a central pillar of household economic resilience. *Third,* the strengthening of social capital as a collective livelihood strategy. Beyond individual economic strategies, the Malabero fishing community has developed collective mechanisms through the strengthening of social capital. Fisher groups, whether organically formed or facilitated by government, provide a platform for sharing information on fishing locations, weather conditions, and market prices, while systems of mutual assistance in boat and gear repair remain well maintained. Informal lending arrangements between fishermen, and between fishermen and boat owners, likewise constitute part of a social-capital network that, while not always favourable to small-scale fishermen, functions as a crucial social safety net when income from the sea declines sharply.

Climate change impacts and the principal challenges facing fishing families

Because evidence about climate-related change in this study comes from different sources, this section distinguishes three levels of evidence (Table 2). *Community perceptions* are what informants reported in interviews and life histories. *Observational evidence* is what the researchers recorded themselves during participant observation. *Secondary environmental data* are independently measured. Statements that rest only on community perceptions are reported as perceptions and are not presented as measured environmental change.

Table 2: Levels of evidence for climate-related claims

Level of evidence	Source in this study	What it can and cannot show	Claims in the Results that rest on it
Community perceptions	In-depth interviews and life histories with the 16 principal and 5 supporting informants	Shows how fishing families experience, interpret, and respond to changing conditions; cannot establish the magnitude, timing, or cause of environmental change	Fewer days safe for fishing over the preceding five years; fish now sought farther offshore; perceived link between climate-related pressure and rising debt
Observational evidence	Participant observation and field notes (Pasar Bengkulu and Malabero; six months, October 2025–April 2026)	Records what the researchers saw at the time of fieldwork (e.g. gear in use, boats idle ashore, distance travelled to fishing grounds); limited to the fieldwork period and sites	Reliance on simple gear and small-capacity vessels

Source: Authors' analysis, 2026.

Field data identify four principal challenges confronting fishing families in Malabero and Pasar Bengkulu in responding to the impact of climate change, as perceived and experienced by informants. First, declining income owing to a reduction in the number of days safe for fishing: nearly all informants 11of 16) reported that, over the preceding five years, the frequency of days unsafe for fishing due to extreme weather has increased significantly, directly reducing household income and compelling fishermen to seek alternative income sources. Second, a shift in fishing grounds and seasons: informants reported that species once readily found near shore must now be sought farther out to sea, requiring greater operational capacity and cost; they attributed this to

warmer seas and changing weather, a link that the interview data alone cannot confirm. Third, limited capacity for technological adaptation: most Malabero fishermen continue to rely on simple gear and small-capacity vessels capable of operating only in near-shore waters, rendering them highly vulnerable to changing coastal conditions associated with climate change. Fourth, a growing burden of debt and dependency on boat owners: the economic pressure exerted by climate change, as informants described it, has driven many fishermen toward increasing reliance on loans from boat owners or informal moneylenders, reinforcing a structure of economic dependency that impedes fishing families' capacity to escape the cycle of poverty.

Two cautions apply to these findings. First, informants' accounts of climate change are interpretive: they reflect lived experience of weather and sea conditions and may also draw on media or government communication about climate change. Second, changes in catch and income in Bengkulu waters have other plausible drivers, such as conflict with trawler vessels, weak policy enforcement, and limited access to capital (see Abstract and Introduction). The study therefore treats climate change as one of several interacting pressures and does not claim to quantify its separate contribution. Triangulating the perceptions reported here with meteorological and sea-surface temperature records is an important next step.

DISCUSSION

Mapping empirical themes onto Coleman's and Weber's concepts

To make the analytical logic explicit, Table 3 maps the principal empirical themes reported in the Results onto the concepts of Coleman's (1990) rational-choice theory and the types of social action distinguished by Weber (1978). The mapping treats the two frameworks as complementary: Coleman's concepts (actors, interests, resources and control over them, social capital, and the movement between macro-level conditions and micro-level choices) identify *what* structures a choice, while Weber's types identify the *orientation* that gives the choice its meaning. The sections that follow develop the most important rows.

Table 3: Mapping of empirical themes to Coleman's concepts and Weber's types of social action

Empirical theme and evidence	**Coleman's concept**	**Weber's type of action**	**Interpretive note**
Stopping or changing fishing on high-wave days: switching gear, working at the estuary, crewing on larger boats, or taking construction work (Mr. Rismanto; livelihood patterns 1–2)	Purposive action: actors with interests choose among alternatives given the resources they control (labour, gear); weather risk and operating cost change the relative payoff of each option	Instrumentally rational (*zweckrational*)	Climate-related hazard narrows the choice set rather than removing choice; the decision weighs expected catch against safety risk and cost
Household pooling of income: wives' stalls, laundry, and fish trading; children making fish crackers (Mrs. Ana; Table 1)	Control over resources distributed across household members; the household pools labour and income to meet shared interests	Instrumentally rational, with a traditional element (family division of labour)	Supports treating the household, not the individual fisherman, as the decision-making unit
Sharing catch with a neighbour who has caught nothing (Mr. Madi)	Social capital as obligations, expectations, and trustworthiness; informal reciprocity backed by community norms	Value-rational (*wertrational*), grounded in local philosophy and Islamic values; traditional element	Sharing is not reducible to calculated return, yet reciprocity also sustains the safety net that later benefits the giver

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Mutual help in gear repair; information on fishing locations, weather, and prices; informal lending among fishermen and with boat owners	Social capital as information channels and obligations; norms that sustain network closure	Instrumentally rational, with a traditional element	Bonding capital buffers household shocks but weakens when the whole community is affected at once (see below)
Growing debt to, and dependency on, boat owners and moneylenders	Unequal control over resources; macro-level structure that conditions the options available to actors at the micro level	Instrumentally rational action under constraint	Shows how structural position limits rational choice; the ties that provide credit also reproduce dependency
Sufficiency and rest: *ikan sejerek, bereh secupak, madar*, including some older fishermen limiting effort once needs are met	Interests include non-monetary goods (leisure, communal standing); a norm of sufficiency shapes how interests are weighed	Traditional (inherited custom) and value-rational (gratitude, simplicity); affective in *madar* (companionship, relaxation)	Source of the ambivalence discussed below: social capital or dampened motivation (n-Ach), depending on interpretation. Evidence for the affective element is limited to descriptions of *madar*
Reading natural signs (*nenengok tando alam*) to locate fish and judge sea conditions	Information as a resource that reduces risk when choosing where and when to fish	Traditional action (inherited practice) used instrumentally	Shows Weber's types operating as mixed ideal types rather than separate categories
Preference for work connected to the sea and for occupations that do not diminish social standing (Mr. Rismanto; Discussion below)	Preferences and status concerns restrict the set of alternatives actors treat as acceptable	Value-rational, with an affective attachment to the sea	Explains why diversification is selective rather than open-ended
Generational reinterpretation of the philosophy: younger fishermen read it as 'grateful but still striving', some older fishermen as a reason to limit effort	Change in norms and preferences across actors, with possible macro-level consequences for community norms	Movement from traditional toward value-rational and instrumental orientations	At present the generational pattern rests on researcher synthesis rather than direct quotation

Source: Authors' analysis, 2026.

Three patterns emerge from the mapping. First, decisions about when and how to fish, and about pooling household income, are dominated by instrumental rationality; in Coleman's terms they are choices made within a context that climate-related risk, limited capital, and dependency on boat owners have already narrowed. Second, norms of sharing and sufficiency are better understood through value-rational and traditional action: Coleman's concept of social capital explains how such norms create obligations and information channels that help households, but not why actors accept them as legitimate. Third, the evidence is uneven across Weber's types. Instrumental and value-rational action are well supported by informants' statements; traditional action is supported by inherited practices such as reading natural signs and the *madar* custom; and affective action is supported only by descriptions of *madar* and of attachment to sea-related work. The claim that all four types are

present should therefore be read as a tentative interpretation, with the affective element requiring further evidence.

Rational choice in the perspective of James Coleman's theory

The livelihood strategies of fishing families in Malabero and Pasar Bengkulu can be understood through James Coleman's Rational Choice Theory (Coleman, 1990), which conceives social life as the outcome of actors' rational decisions to maximise the satisfaction of needs and desires while accounting for the availability and control of resources within a social system. Every livelihood strategy adopted by these families reflects a rational calculation weighing at least three dimensions: the anticipated benefit of a given course of action, the risk and cost it entails, and the resources the actor is able to control. When a fisherman elects not to go to sea on a day of high waves and instead works as a construction labourer, this decision embodies a clear rational choice: the safety risk and operational cost of fishing, weighed against the likely catch, tips the balance toward an alternative economic activity. The collective dimension of Coleman's theory is equally relevant for understanding the social capital that has developed within the Malabero fishing community. Collective behaviours such as mutual assistance, the sharing of information on sea conditions, and solidarity during hardship emerge because each actor recognises that reliance on the community's social network enables individual interests to be pursued more efficiently. Social norms that develop within the community, including values rooted in local philosophy, function as behavioural regulators that sustain a broader social equilibrium.

In Coleman's (1990) terms, the actors are fishermen, their wives, and their children; their interests are livelihood security and, for some, status and leisure; and the resources they control include labour, gear, boats, information, and relationships. Climate-related hazards, access to capital, dependency on boat owners, and regulatory enforcement form the macro-level context that conditions the micro-level choice set, and the aggregate of household choices (for example, many households diversifying at once) feeds back into community-level conditions such as the capacity of informal networks to absorb shocks. Social capital appears in Coleman's sense as obligations and expectations, information channels, and norms backed by community sanction. Table 3 links each of these concepts to specific empirical themes.

Multiple livelihood strategies as an adaptive response to climate change

The finding that Malabero fishing families construct multiple livelihood strategies is consistent with the livelihood-diversification concepts advanced by Scoones (1998, 2009) and Ellis (1999). Within the sustainable-livelihoods framework, diversification of income sources constitutes a key strategy for strengthening household resilience against the various shocks and stresses associated with climate change. Importantly, this study finds that the decision to diversify is not a purely economic calculation detached from socio-cultural context. The values held by the Malay fishing community of Bengkulu, including the philosophy of "*ikan sejerek, bereh secupak, madar*," indirectly delimit the spectrum of livelihood choices regarded as appropriate and dignified within the community; alternative work tends to be adopted only insofar as it does not diminish a fisherman's social standing or remains connected to the coastal ecosystem. The involvement of women and other family members in the pursuit of livelihood constitutes a further significant finding. It reinforces the argument that the appropriate unit of analysis in coastal livelihood studies is not the individual fisherman alone but the fishing household as an integrated economic decision-making unit — a view consistent with the framework proposed by Deere and de Janvry (1979), who emphasise the importance of understanding the underlying processes through which households pursue survival strategies.

The ambivalence of local wisdom in shaping work ethic

The ambivalent role of the philosophy *"ikan sejerek, bereh secupak, madar*" in shaping fishermen's work ethic constitutes one of this study's most significant theoretical contributions. On the one hand, the philosophy embodies values with the potential to function as positive social capital: simplicity of life, gratitude, concern for others, and a rejection of greed. On the other hand, a narrow interpretation of the same philosophy may reinforce a disposition of premature contentment that dampens economic motivation. This ambivalence resonates with the culture-of-poverty perspective originally developed by Oscar Lewis (1966) and subsequently elaborated within the context of fishing-community poverty by Kasim (2022): cultural values that once functioned as adaptive

strategies suited to particular living conditions can, as socio-economic contexts change substantially, evolve into structural barriers to social mobility. This study, however, also demonstrates that local wisdom is not static. A process of negotiation and reinterpretation is under way among Malabero and Pasar Bengkulu fishermen, particularly among the younger generation. A more adaptive reinterpretation of the local philosophy — one that foregrounds work ethic and social concern rather than passivity — carries the potential to become a transformative force for fishing communities confronting climate change.

The dynamics of social capital amid climate change

The strengthening of social capital as a collective livelihood strategy in Malabero and Pasar Bengkulu underscores the importance of the social dimension in livelihood studies. Systems of mutual assistance, information-sharing, and economic solidarity among fishermen constitute a robust form of bonding social capital, one shown to serve an important adaptive function under the pressure of climate change: when income from fishing declines sharply owing to prolonged adverse weather, community social networks act as a buffer that prevents fishing families from descending into deeper economic crisis, through informal borrowing arrangements, the sharing of catch, and mutual assistance in gear repair. This study nonetheless identifies the functional limits of this form of social capital. When the entire community confronts economic pressure simultaneously — as occurs during prolonged lean seasons driven by climate change — the capacity of the community's internal social network to absorb the shock becomes severely constrained, rendering external intervention, whether through responsive government policy or wider social networks, indispensable.

Max Weber's social action and the meaning behind fishermen's choices

From the perspective of Max Weber's theory of social action, every economic action undertaken by Malabero fishermen constitutes not merely a mechanical stimulus–response behaviour but a meaningful action involving interpretation and value judgement. Weber distinguishes among instrumentally rational action (zweckrational), value-rational action (wertrational), traditional action, and affective action (Weber, 1978). This study finds that the livelihood choices of Malabero and Pasar Bengkulu fishermen represent a complex admixture of the four types, although the evidence for affective action is more limited (Table 3). The decision to shift from fishing to land-based work during adverse weather is dominated by instrumental rationality, whereas the decision to continue sharing a catch with a neighbour who failed to go to sea is more strongly shaped by value-rationality rooted in local philosophy and the Islamic values held by the community. It is precisely this interplay between instrumental and value rationality that renders the livelihood strategies of Bengkulu fishing families distinctive, and not fully reducible to a purely rationalist economic explanation.

Traditional action is most clearly visible in practices inherited across generations, such as reading wind, cloud, and current patterns (*nenengok tando alam*) and the *madar* custom of resting and talking after returning from sea; these practices persist because they are habitual, and they are also used instrumentally to reduce risk. Affective action is suggested by the companionship and release of tension that informants associate with *madar* and by their attachment to work connected to the sea, but the material on this point is thinner than for the other types, and we treat it as tentative. Weber's types are ideal types, and most livelihood choices combine several orientations at once, as Table 3 shows.

Social transformation and an integrated theoretical framework

This study further finds that the Malabero and Pasar Bengkulu fishing communities are undergoing significant social transformation in response to the combined pressures of climate change and modernisation, manifest in shifting livelihood structures, changing gender roles in income generation, the weakening of traditional social ties, and the emergence of new value orientations oriented toward individual economic mobility. This transformation carries both opportunity and risk: a more open, adaptive orientation toward livelihood diversification may strengthen community capacity to confront climate change, whereas the erosion of traditional social ties and adaptive local wisdom may, over the longer term, weaken community resilience. Theoretically, a comprehensive account of fishermen's rational choices in constructing livelihood strategies amid climate change requires an analytical framework that integrates three dimensions simultaneously: an economic-structural dimension (access to productive resources, market structure, and the availability of alternative

employment), a socio-cultural dimension (values, norms, and local wisdom shaping the orientation of economic action, linked to Weber's theory of social action and the concept of social capital), and an ecological dimension (coastal environmental conditions and the impact of climate change on the productive capacity of marine ecosystems) — a dimension frequently overlooked within conventional economic sociology but one that informants' accounts suggest exerts a strong influence on the choices available to fishermen. The integration of these three dimensions within a single coherent analytical framework is expected to enrich the study of coastal poverty in Indonesia.

Limitations

This study has several limitations. The sample comprises 16 principal informants from two predominantly Malay sub-districts, so the findings are transferable to similar settings rather than statistically generalisable. Accounts of climate-related change rest largely on informants' perceptions, recalled over about five years, and are only partly corroborated by observation and secondary environmental data (Table 2); the study therefore cannot quantify the contribution of climate change relative to other pressures such as trawler competition, weak enforcement, or limited capital. Quotations were translated from Bahasa Indonesia and Bengkulu Malay into English, which may alter nuance.

CONCLUSION

Based on the findings and discussion presented above, this study arrives at four principal conclusions. First, fishing families along the coasts of Malabero and Pasar Bengkulu construct diverse livelihood strategies as an adaptive response to income uncertainty from fishing, particularly as intensified by climate change (as perceived by informants), comprising diversification within the fisheries sector, diversification into non-fisheries sectors involving the whole family including women and children, and the strengthening of community social capital as a collective livelihood strategy. Second, fishermen's rational choice of livelihood strategy is shaped by four interacting groups of factors: natural conditions and climate change, which directly determine the availability of fisheries resources and the number of days safe for fishing; social, cultural, and work-ethic values, which shape the normative orientation and boundaries of economic action; access to economic resources such as capital, technology, and markets; and social institutions and government policy. Within Coleman's rational-choice framework, the interaction of these four factors constitutes the structural context that determines the spectrum of choices rationally available to each fisherman as an actor. Third, the socio-cultural values of the Bengkulu Malay fishing community, symbolically embodied in the philosophy *"ikan sejerek, bereh secupak, madar*," play an ambivalent role in fishing families' capacity to confront poverty. A shallow interpretation of this philosophy risks encouraging a disposition of premature contentment that dampens economic motivation (n-Ach), whereas a deeper understanding of its philosophical meaning carries positive values of simplicity, gratitude, social concern, and the rejection of greed that can constitute valuable social capital and a source of community resilience. Fourth, fishing families in Malabero and Pasar Bengkulu confront at least four principal challenges in responding to climate change: reduced income from fewer safe fishing days, shifting fishing grounds and seasons, limited capacity for technological adaptation, and a growing burden of debt and structural dependency on boat owners, compounded by economic pressure. These challenges reinforce one another, forming a cycle of poverty that is difficult to break without systematic and comprehensive intervention.

These findings suggest that local government and relevant agencies should develop more holistic, climate-adaptive fisher-empowerment policies that address not only technical and economic capacity but also the socio-cultural dimensions of fishing communities, incorporating accessible capital-assistance schemes, continuous business mentoring, and improved access to weather and marine information for small-scale fishermen. Fisher groups and community institutions should likewise be strengthened to function more effectively as social safety nets and platforms for economic collaboration, including the reinterpretation and revitalisation of local wisdom to foreground work ethic, innovation, and social solidarity. Future research would benefit from comparative studies of livelihood strategies across fishing communities with differing socio-cultural contexts, longitudinal tracking of livelihood-strategy change as climate-change intensity increases, and participatory action research that actively involves fishing communities in formulating and testing locally grounded adaptation strategies.

Declarations

Ethical approval and informed consent. This study involved human participants. Before each interview, the purpose of the study, the voluntary nature of participation, the right to withdraw at any time, and the intended use of the data were explained, and informants gave verbal informed consent All 16 principal informants were adults (aged 20–77 years; Table 1). State whether the five supporting informants were also adults. To protect confidentiality, the names in Table 1 and in the quotations are pseudonyms / informants consented to being named, and identifying details were removed from any data that are shared.

Conflict of interest. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article. If any exist, describe them here.

Data availability. The interview transcripts and field notes contain personal information and cannot be shared publicly in full because of the confidentiality assurances given to informants. Secondary data come from publicly available sources cited in the text and the reference list.

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