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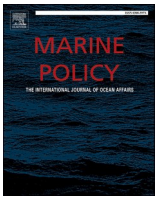

Full length article

Community knowledge, attitudes and practices towards environmental conservation: Assessing influencing factors in Jor Bay Lombok Indonesia

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ABSTRACT

Local people surroundings Jor Bay in Lombok, Indonesia, have an established knowledge system, which role an important factor that determines the success of bay management. Knowledge, attitudes, and management practices by the community significantly affect the effectiveness of Jor Bay management. The study aims to identify knowledge systems and community management practices in conserving marine resources of Jor Bay which are related to the effectiveness of management of the bay, as well as identifying factors that influence KAP in the management of Jor Bay. This study uses a mix-approach both quantitative and qualitative, with statistical tests. Data collected using a questionnaire. The study found that there were gaps between community knowledge, attitudes, and practices. Community knowledge and attitudes aspects are in the medium category, while community practices are low. Socio-economic factors, which are education, age, and occupation, were affected by KAP status. The community knowledge system is a significant factor that influencing succeeds the bay management. In Jor Bay, fishers are the most active bay users and closest to bay resources; paradoxically, the fisher has the lowest KAP level than other occupations. An adaptive management change in socio-economic, cultural, and knowledge system-based strategy is needed to improve Jor Bay conservation and management.

1. Introduction

Bay is a complex system and plays important economic and ecological roles in regional socio-ecological systems, and their habitats link land to the ocean [1]. The complexity of the system is illustrated by the connection of natural and human elements interacting together in complex dynamics resulting from various factors, such as heterogeneity of biota, non-linear dynamics with thresholds related to parameters, such as nutrient concentration and water quality, feedback loops, and other factors resulting from the merging of human and natural systems [2]. This situation illustrates the knowledge of nature and its interactions with the surrounding social/human system becoming increasingly important due to the abundant wealth of marine resources that can provide significant welfare to coastal communities. It means that the loss of ecosystem services will lead to a proportionate impact on people [3]. This knowledge is related to the new thinking that the basis of resource economics is no longer in the form of capital, neither natural resource itself nor labor. That all firstly comes from knowledge [4].

Normative knowledge of coastal and marine resources will underlie community attitudes towards the environment and produce effective management practices, thereby ensuring the sustainability of coastal resources. Awareness of sustainable management will arise from the community's understanding of the resources' characteristics and the benefits of these resources. Much local knowledge plays a vital role in developing the socio-economy in indigenous peoples [4]. However, community knowledge about resources does not always show attitudes that align with their knowledge and do not automatically produce management practices. Several studies measured that people's attitudes to be inconsistent with practices [5].

The threat is getting stronger for a multi-use bay like Jor Bay because the condition tends to worsen due to aquaculture activities. The condition is tendtends getting worse due to aquaculture activities that are very sensitive and have limited carrying capacity. It is necessary to understand the biological process in an aquaculture dominant coastal system and need a tool for further aquaculture management to ensure the sustainability of aquaculture activities in the bay, such as an

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ecosystem model to be complemented to study the aquaculture-environmental interaction and the carrying capacity for this bay [5].

Jor Bay Community has agreed to form a bay management regulation that binds the entire community through a Communique Letter for the Jerowaru Village Head and a Joint Agreement Letter by both Village Head of Jerowaru and Pare Mas Village. Based on this community institutional regulation, the government has recognized and ratified by Decree of East Lombok Marine and Fisheries Agency. Then this rule becomes a local regulation called *Awiq-Awiq*[1] *Teluk Jor*. The *Awiq-Awiq* is implemented and enforced by the *Lembaga Pemangku Awiq-awiq Teluk Jor (LPATJ)* (The Jor Bay's Management Institute) [6]. This institutional system is based on a local knowledge system built in the community through a dynamic process. It is finally institutionalized into a local institution in a small bay area, a common pool resource as its main feature. Knowledge and human attitudes around shared resources will greatly influence the community's behavior and practices and determine resource management effectiveness.

This phenomenon occurs in many areas around the world. Society is a dynamic system and therefore becomes a complex system. Unfortunately, the complexity of the relationship between nature and society has not been thoroughly studied [7]; therefore, it is necessary to assess complex systems' changes based on local knowledge. To fully understand how the system directs and manages the conditions of their transformation and reinforces the threshold's contradictions, it is necessary to examine local practices [8].

Many factors affect the relationship pattern between KAP and the quality of the ecosystem, direct or indirect, and the most important socio-economic and demographic factors. To examine how the dynamics of the local knowledge system in the community, it is necessary to be studied the level of KAP, which are important factors as input to the management policy of Jor Bay. The study aims to identify knowledge systems and community management practices in conserving marine resources of Jor Bay which are related to the effectiveness of management of bay, as well as identifying factors that influence community's KAP in the management of Jor Bay.

2. Materials and methods

2.1. Study area

The geographic setting for this study was Jor Bay. Jor Bay is a small bay with a water area of only 916.67 ha. It is characterized by semi-closed water resources that have with a complete ecosystem such as mangroves, coral reefs, sea grass, and coastal plain area and small islands. Jor Bay is located at two coastal villages (Jerowaru and Paremas Village), Jerowaru Sub District, East Lombok Regency, West Nusa Tenggara Province Indonesia. Geographically, the Jor Bay is at 8° 48' 37.3" S 116° 29' 50.6" E (Fig. 1).

2.2. Criteria of KAP

The questionnaire structure design was constructed to obtain as objective as possible information provided by the respondents. The questionnaire survey had both open and close-ended questions. The questionnaire survey had four different parts:

a. The socio-demographic profile;
b. The knowledge information assessed are (1) understanding of existing resources in coastal and marine areas, (2) resources that can be utilized, (3) coastal ecosystems (mangroves, coral reefs and seagrass, (4) ecosystem benefits, (5) the types of activities that can damage and destroy marine resources and ecosystems, and (6) the conservation of marine and coastal ecosystem resources.
c. In the attitude aspect, the questionnaire asks respondents' perceptions about various situations in the surrounding phenomena, whether good or bad situations. The respondents are then asked to determine their attitude towards the situation. The kind of attitude assessed included: (1) willingness or refusal to become individuals who are ready to conserve resources, (2) approval for sanctions for resource destroyers, (3) approval for the need for effective management for the preservation and conservation of coastal ecosystems, (4) the need to prevent waste and pollutant sources from entering the sea, and (5) the attitude of firm sanctions against those who destroy the bay's resources.
d. The questionnaire related to community practices were assessed (1) activities carried out in utilizing resources and ecosystems in Jor Bay, (3) involvement in bay resource conservation activities (planning meetings to implementation actions), (3) involvement in management activities together with management groups/organizations, and (4) procedures for the use of resources (environmentally friendly or destructive) such as in fishing, cultivating and taking ecosystems and (5) actions taken in monitoring.

2.3. Study design and sampling techniques

A cross-sectional study was conducted on respondents with a minimum age of 18 years, assuming that 50% of individuals know bay resources at a 95% confidence level and a margin of error of 0.05. The calculated sample size was 86 for the questionnaire-based survey. A three-stage sampling strategy was used to collect the required data. First, two villages were selected using a purposive sampling technique. In the second stage, households were selected using a systematic random sampling method in selected villages. Finally, the individuals involved in the study were selected using a simple random sampling technique.

2.4. Data collection

The study was conducted by a survey method, with a quantitative and qualitative approach. The study was carried out by a community-based cross-sectional study approach using a questionnaire in January–December 2019. Respondents have selected to represent stakeholders and resource users (fishing communities, mariculturist, fish processors, boatmen and government officers, etc.).

2.5. Scoring

The KAP of participants were scored based on techniques [9]. For each aspect of the questionnaire, KAP includes four answer options (A, B, C and D), where each answer shows a score that ranges from 0 to 3. Answer A = score 3 is considered as knowledge, attitude and good practice as ideal conditions. Answer B = score 2 is considered sufficient, answer C = score 1 is considered insufficient, while score D = score 0 is considered bad.

2.6. Data analysis

The data entry, editing, and cleaning were carried out using Microsoft software. In the KAP level assessment, we use the ratio value (0–1), which means getting closer to one (1.00) indicates the higher value in achieving the highest score in the KAP aspect. We categorized it into 4 levels of KAP. If the ratio is 0–0.25, it means that the achievement is very low; if the ratio is 0.26–0.50, the achievement is low; if the value is 0.51–0.75, it means that the achievement is medium if the ratio is > 0.76 they achieve the high category level.

The Pearson correlation coefficient (r) is calculated to describe the close relationship between aspects of knowledge, attitude, and practice

[1] *Awiq-awiq* is a customary based regulations or laws that are compiled and stipulated by members of the community regarding the rules for community life in the religious, cultural and socio-economic fields (https://kbbi.web.id/awik-awik) and also management of other common resources.

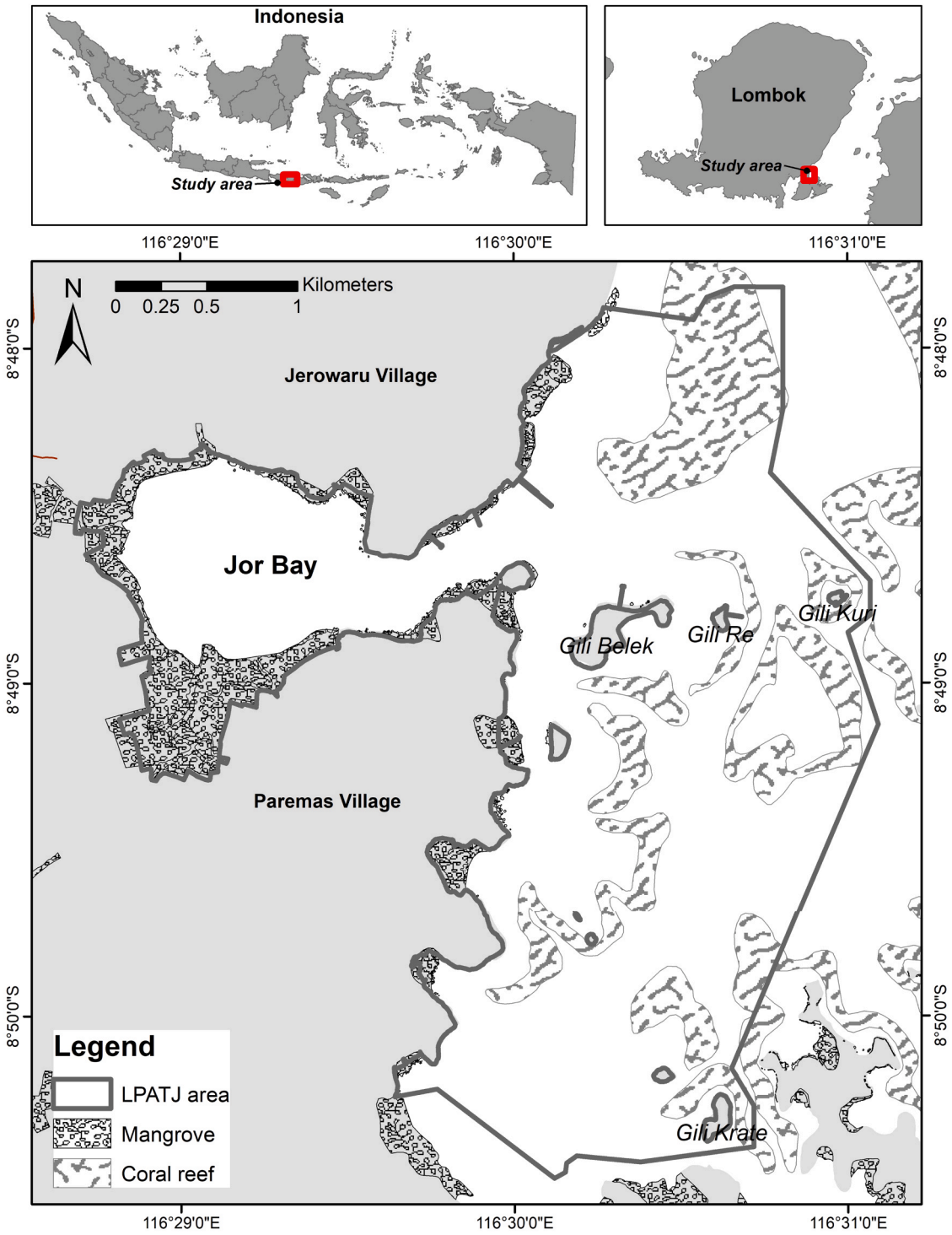

Fig. 1. Map of the research site in Jor Bay, Lombok, Indonesia.

and to describe the linear relationship between the three aspects. To investigate whether there were any significant differences between the categories of socio-economic characteristics to aspects of knowledge, attitude, and practice (KAP), analysis of variance (ANOVA) - single factor was conducted. If there differences, further tests are conducted using the *t*-test to find significantly different factors from each other. P-values < 0.05 were considered statistically significant.

3. Results

3.1. Demographic characteristics of the participants

A total of 86 participants were included in the study (Jerowaru 46 people (51.16%) and Paremas are 42 people (48.83%)). Male gender (72.09%), age ranges from 41 to 45 years (24.42%), fisherman (68.60%), and Senior High School education (27.91%) were the dominant demographic features.

3.2. Level of community knowledge, attitudes and practices

The level of community knowledge as a whole shows good knowledge. It is shown by an index of 0.73, including the medium category. The level of community attitudes index is 0.74, including the medium category. However, the assessment of the aspects of community practices toward managing Jor Bay only reached an index of 0.52, still included in the medium category. For the practice aspect, the attainment was the lowest compared to knowledge and attitudes (Fig. 2).

3.3. Comparison of KAP level achievements in two villages

Despite using the same resources, both villages (Jerowaru and Paremas) have different village government structure units, with different socio-economic entities. The assessment results of the KAP level in the two villages are also different (Fig. 3). There were no significant differences in the level of knowledge and attitudes in the two villages, only in terms of knowledge of Jerowaru slightly higher achievements than Paremas Village (0.74–0.72). While in the attitude aspect of the Paremas community was slightly better (0.75) compared to the people of Jerowaru (0.74), even though they both were in the medium category. The difference is seen in practices, where the Jerowaru Village has better achievement (0.54, categorize as a medium) compared to the village of Paremas (0.44, categorize as low).

3.4. Relationship between socio-economic characteristics and level of knowledge, attitude, and practice

The analysis shows that there is a close relationship between the socio-economic characteristics, which consists of sex, age, education, and occupation, with the level of the KAP (Fig. 4).

The socio-economic characteristic has a relationship with the level of knowledge, attitudes, and practices. The gender factor (4a) does not indicate any different correlation in aspects of practices. Men and women are of equal value with a ratio value of 0.52 (medium). However, gender shows differences in achievements in the aspects of knowledge and attitudes, where men have better knowledge values (0.75) than women (ratio 0.69), although it is still equally included in the medium category. This shows that men have a higher value of knowledge and attitudes than women. In the age factor (4b), the age that shows the highest achievement in KAP aspect is the age category 31–35 years with the achievement of the knowledge ratio is 0.79 = high, attitude 0.81 = high, and practice = 0.60 = medium. Age 31–35 is considered the most progressive age.

The education level factor also shows the effect on KAP. Respondents with university graduates have better KAP level compared to other levels of education. There are only differences between Diplome level and Bachelor graduates, where the highest value of the ratio of knowledge and practice is possessed by Diplome graduates, while in the attitude aspect the highest achievement is obtained for Bachelor.

The occupation factor also influences the KAP aspect, where the highest value in the knowledge and practice aspect is owned by fisheries product processors with a knowledge ratio of 0.89 and practices of 0.79 (including the high category). In comparison, the highest value on the attitude aspect is owned by the mariculturist with a ratio of 0.88 (high). Communities in the profession of government officials also have KAP aspects that are quite consistent where the gap between the three aspects is relatively not different.

This study also initiate that fisher is the lowest achievement level in the knowledge aspect (ratio of 0.70 in the medium category) and practices (ratio of 0.45 in the low category). This achievement was the lowest compared to other occupation categories. Occupations that are similar achievements as fisher are traders/entrepreneurs. An interesting finding of this study is that housewife have the highest consistency of values between KAP, reaching 0.80 for knowledge (including high category), and attitude ratio of 0.83 (high category)), while the aspect of the practices reaches 0.75 = medium tend to a high category, which is the highest value compared to other occupation.

3.5. Understanding knowledge by the community in bay management and conservation

Based on the assessment, the type of knowledge most widely understood by the public is about the basic understanding of coastal and marine (score 232 from score 0–250) (Fig. 5). Other knowledge that is also quite well understood is about the utilization of coastal resources (215), knowledge of coastal ecosystems (mangroves, coral reefs, and seagrass (204), as well as knowledge of damaging activities, while knowledge of the conservation of ecosystems (mangrove and coral) reef) is among the least known (141 and 131).

3.6. Community attitude towards bay management and conservation

Various attitudes are shown in response to the current situation and phenomenon of resources and management by the community around Jor Bay on various management and conservation situations (Fig. 6). The highest value of community attitudes related to Jor Bay management is readiness and willingness to be a conservation champion (210.5). The approval of sanctions for marine destroyers (206.5), followed by supports coastal conservation (190), Response towards Garbage Disposal and Pollution and (188.5) and Respond towards Coastal offenders/destroyers (171).

3.7. Community practices in bay management and conservation

Actual actions and behaviors carried out by the community in Jor

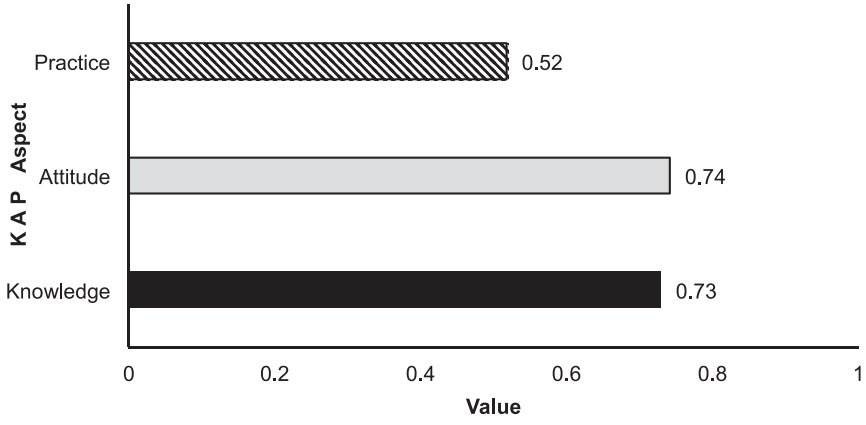

Fig. 2. Level of community knowledge, attitudes, and practices around Jor Bay.

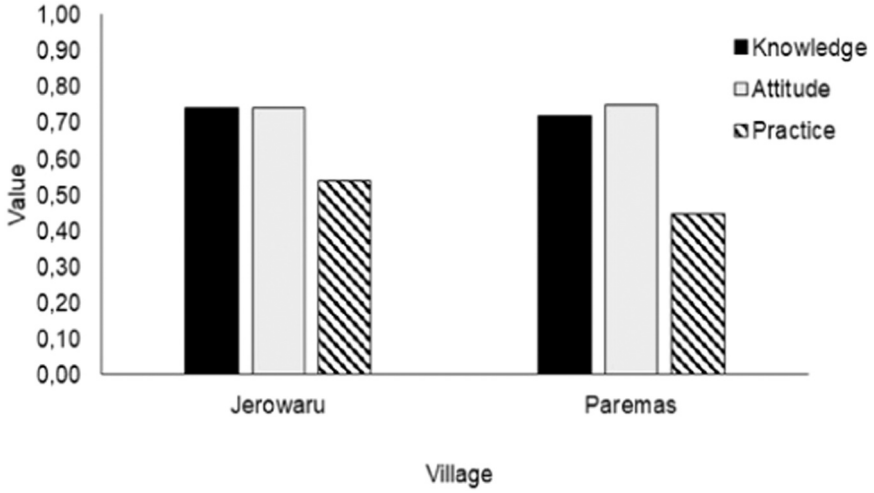

Fig. 3. Comparison of KAP in Jerowaru and Paremas villages.

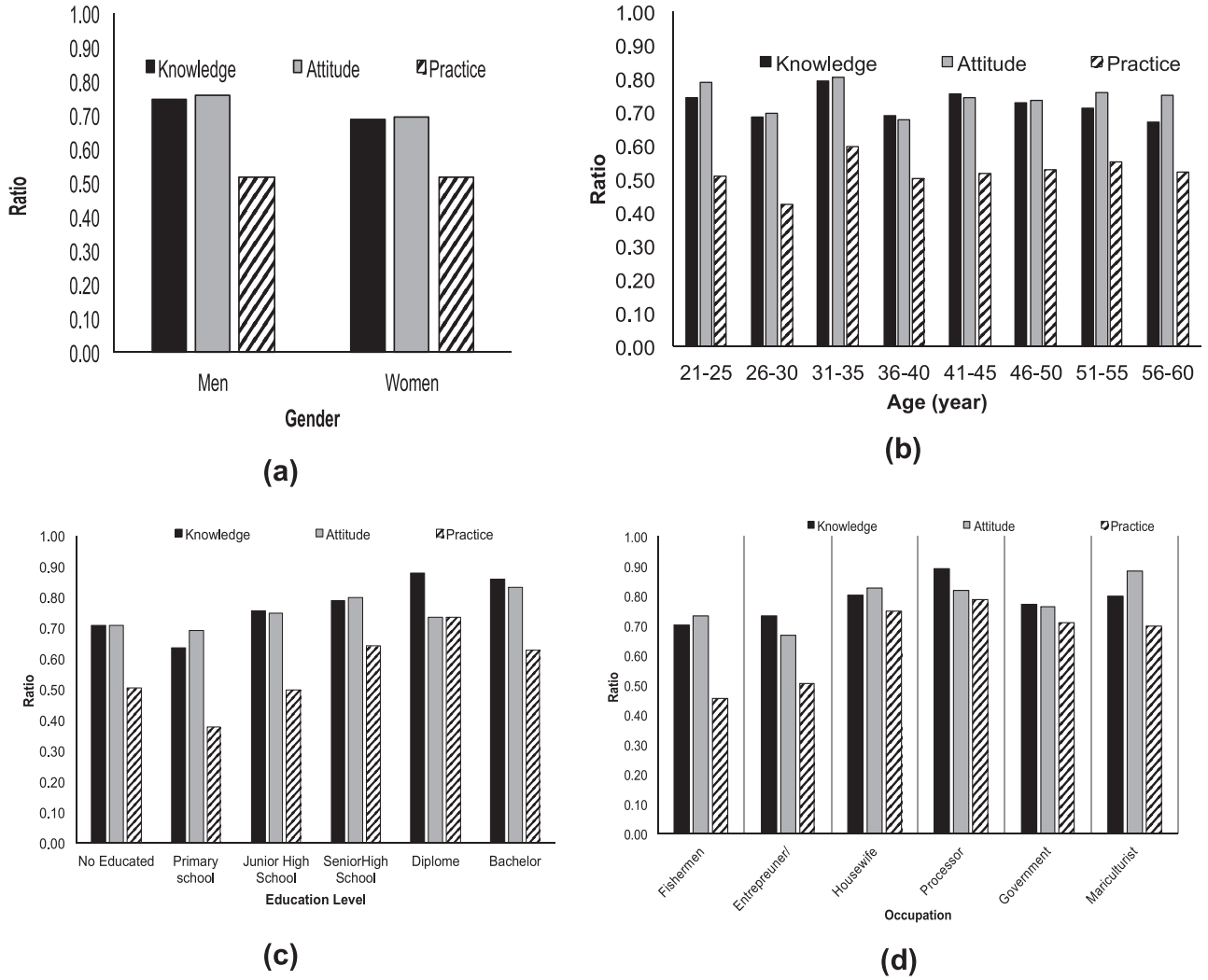

Fig. 4. Level of KAP based on socio-economic characteristics: Gender (a); Age (b); Educational Level (c); and Occupation/livelihood (d).

bay management constitute the highest level in the hierarchy of knowledge systems and are the embodiment of motor awareness. Management actions and practices carried out by the Jor Bay community (Fig. 7). The practice aspect taken is not as high as the aspects of knowledge and attitudes. The practices which have value more than 200 point is on practices in utilize mangroves ecosystem selectively and environmentally considered, i.e., harvesting fruits or take indirect benefits from the existing mangroves (247,5), the rest is < 200 which are

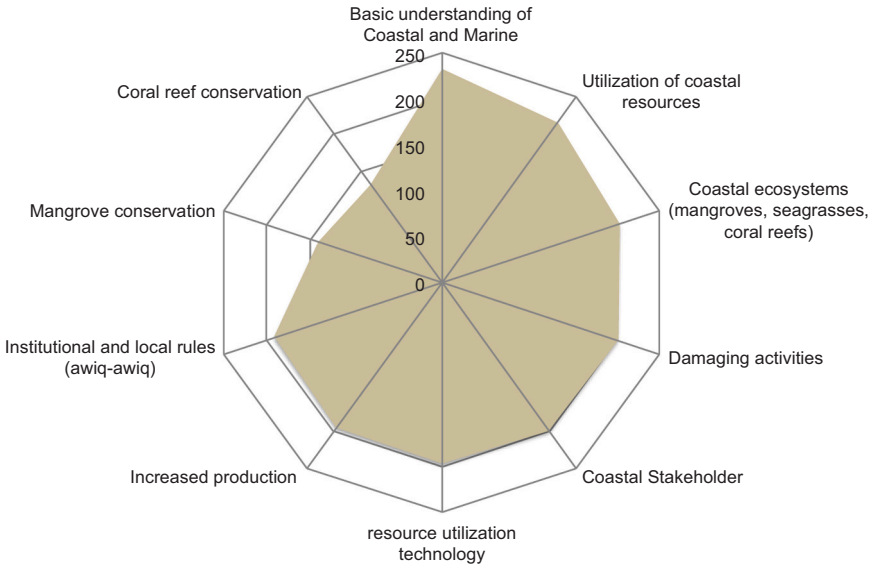

Fig. 5. Types of knowledge understood by the community.

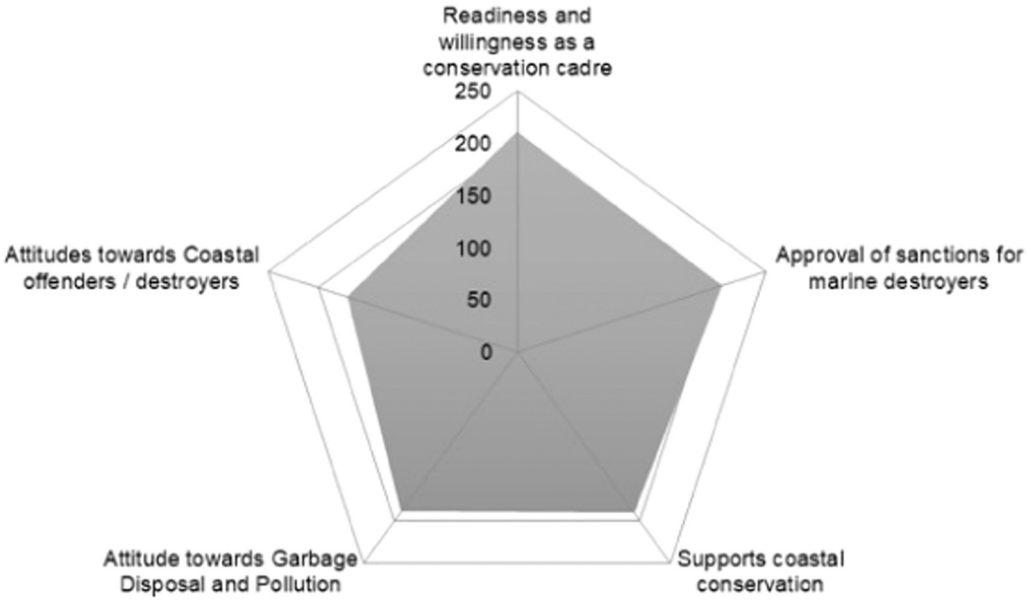

Fig. 6. The attitude of the community towards various conditions and situations in the Jor Bay management.

involved in resource conservation discussion (195), selective and friendly fishing practices (176.3), involvement in bay management activities (174), and eco-friendly mariculture practices (158). In contrast, resources monitoring are only carried out by a small number community (41) Table 1.

3.8. Relationship between KAP aspects

Based on the correlation test using Pearson correlation coefficient analysis (Table 2), the strongest relationship is between knowledge and practice aspects ($r = 0.67$). The correlation between attitude and knowledge has a medium relationship ($r = 0.59$), and the weakest relationship is between practice and attitude aspects ($r = 0.43$).

3.9. Relationship between KAP and Jor Bay Management effectiveness

The knowledge system in Jor Bay is very closely related to the quality of bay management. The Bay management has been existing since 1970′s, which running very dynamically, starting from a near-collapse due to destructive fishing practices and resource destruction, conflicts amongst fishing gears, and lack of regulation. The concept of co-management based on local rules (*awiq-awiq*) has implemented the intervention of the area-based management model. Establishment of *Lembaga Pemangku Awiq-awiq Teluk Jor* –LPATJ (The *Awiq-awiq* of Jor Bay management Institution) results from the bay management process. However, the management performance of Jor Bay has only reached the Medium level in the aspect of organizational performance; however, in terms of the institutional function of bay management is still low (unexpected performance) [6]. This performance should be coexistence with the community knowledge, attitude and practices in the bay [10].

3.10. The socio-economic characteristics of the community in Jor Bay

The results of further tests with ANOVA on the socio-economic

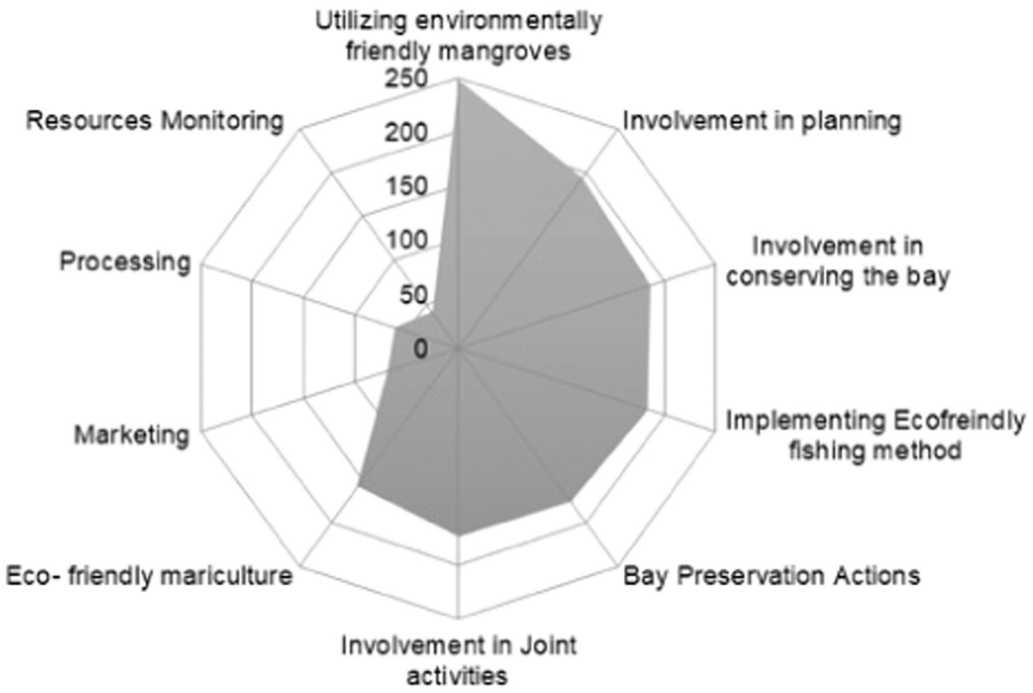

Fig. 7. Types Practices carried out by the community in managing and protecting the Jor Bay.

Table 1
Socio-economic demographic characteristics of participants.

Variables	Participants (n = 86)	
	Total	Percentage (%)
Gender		
Male	62	72.09
Female	24	27.91
Age (year)		
21–25	7	8.14
26–30	10	11.63
31–35	11	12.79
36–40	11	12.79
41–45	21	24.42
46–50	15	17.44
51–55	4	4.65
56–60	7	8.14
Education		
No School	21	24.42
Elementary School	21	24.42
Junior HS	15	17.44
Senior HS	24	27.91
Diploma	1	1.16
Bachelor	4	4.65
Graduate	0	0
Occupation		
Fisher	59	68.60
Entrepreneur	9	10.47
Housewife	4	4.65
Processor	4	4.65
Government Officer	8	9.30
Mariculturist	2	2.33

Table 2
Correlation test results between KAP aspects.

	Knowledge	Attitude	Practice
Knowledge	1		
Attitude	0.5901	1	
Practice	0.6743	0.4388	1

characteristics of the people in Jor Bay show significant differences, except age characteristics (Table 3). This is indicated by a p-value < 0.05. The results of further tests on the respondent's character by education and occupation level are presented in Table 4 and Table 5.

The *t*-test on educational factors showed that the education level with a significant difference was between elementary and junior high schools. As for attitude and practice, respondents with a junior high school education had a significant difference from those who have no school, elementary school, and junior high school.

The *t*-test on occupation type in all aspects of KAP showed that mariculturists and fishers significantly differ from all occupation types. Fisher has the lowest ratio value for the practice aspect (Fig. 4(d)).

4. Discussion

The world faces the domination and hegemony of knowledge. Knowledge has been dominating by academicians. Although local people's knowledge has begun to be adopted, the gap between knowledge producers and users of knowledge remains [11]. Discussions about the KAP community related to conservation are very interesting to recognize the need to co-produce knowledge toward decision-making inputs into the policy domain. Solving the complex environmental problems that society faces require participatory approaches that produce usable science and link science to decision making [12]. Community knowledge systems are very important to be used as consideration becomes more objective in increasing problem complexities. This knowledge will form a better attitude and practice.

Table 3
Results of ANOVA on the socio-economic characteristics.

No.	Respondent characterize	p-value		
		Knowledge	Attitude	Practice
1.	Level of education	**0.00087**	**0.01691**	**0.00024**
2.	Gender	0.08887	**0.03762**	0.94830
3.	Occupation	**0.00471**	**0.00391**	**0.00001**
4.	Age	0.56144	0.35360	0.80334

Note: p-value < 0.005 (indicates a significant difference).

Table 4
Results of further tests on Educational Factors.

Education level		Knowledge	Attitude	Practice
Elementary school	Junior HS	0.008		
	Senior HS	0.000		
	Universities	0.002		
Senior HS	No school		0.014	0.016
	Primary school		0.004	0.000
	Junior HS			0.020

Table 5
Results of further tests on Occupational Factors.

Occupation		Knowledge	Attitude	Practice
Mariculturist	Fisher	0.004164	0.000203	0.026734
	Entrepreanur	0.000475	0.000153	0.000022
	Housewife	0.000169	0.000093	0.000004
	Fish Processor	0.007174	0.021480	0.000860
	Governmental	0.027904	0.001045	
Fisher	Entrepreanur			0.000001
	Housewife			0.000001
	Fish Processor			0.008403
	Mariculturist			0.026734

There is a gap between the knowledge and attitudes with the practices. This also proves that although knowledge and attitudes as community perception to the natural resources are high, if the community practices are low, the management cannot automatically run well. The factors that greatly affect the quality of Jor Bay are precisely what communities have been practiced. Good community knowledge in Jor Bay results from the extension and environmental education by government agencies, non-governmental organizations (NGOs), and universities for many years ago. Knowledge influences awareness to behave and practicing conservation management. Practices are actions taken to feel, think, and act responsibly in such a way as to protect public health and the environment [13].

Demographic and socio-economic factors influence people's attitudes toward environmental conservation behavior. This study can help policymakers formulate better conservation policies to improve marine resources conservation and promote positive socio-economic development in conservation areas [14]. This finding also provides evidence that KAP ultimately depends on demographic, socio-economic, and geographical characteristics, making it important to understand the role of these characteristics in various contexts [15].

Although the age factor is not significantly different, people aged 31–35 are better at practices. Additionally, this age category is the most productive phase and they have received enough knowledge so that it can be practiced in management action. The gender aspect shows a significant difference. Men are higher than women. The man has more opportunities to access information. Therefore, the conservation program needs to encourage involvement from the women and increase access to information sources.

Education is key to human resources quality, based on three of intelligence; cognitive, affective and psychomotor indicators. People who have a higher education should have a higher KAP level too. Education supports humans in improving their quality. Although there was a possibility for people who have not high formal education qualifications, they achieve better KAP level because they have access to information sources and informal capacity building easily. As for the aspect of the practices, a good education should encourage people to have the ability to practices their knowledge, but in fact, the practices are not only determined by the level of education but also awareness, interaction with other parties and moral foundation in the family.

The most influential group of occupation on knowledge and practices aspects is the fish product processing, while the highest attitude aspect is shown by mariculturist. Unfortunately, fisher shows the lowest in knowledge and practice level compared to other occupations include housewife. This result is interesting, fisher as the most active resource users have not yet been involved in many practices in the coastal management program in Jor Bay, including the conservation program. Since fisher is the closest party to bay resources, they should know better the condition of marine resources and their ecosystems due to being in the bay daily. This condition is certainly worrying; this is possible because they only focus on fishing activities. The fisher's orientation of the movement is only from home to sea and back home. The possibility of carrying out activities to interact with other people is less, and obtaining information and other enlightenment opportunities are minimal. Meanwhile, to prepare fishing equipment and to selling fishing, harvest matter is carried out by his wife or family members.

Fish processors and mariculturists group achieve the best KAP level. Due to traditional thinking, which is commonly practiced in the fisheries system, income sources are only expected from nature. For the processors and mariculturist are different, they should change inputs factor to be output (harvest) by using technology, and these processes need other parties and meet other people. Thus, the opportunity to gain information and enlightenment will be greater. This condition proves that the cosmopolitan factor determines the KAP level. People with good levels of cosmopolitanism will be more pro-environmental [16]. Cosmopolitan orientation and pro-environment behavior are positively correlated [17].

Another interesting finding in this study is housewife have the highest consistency in the KAP level. In the bay management strategy, involving housewife will encourage improved management practices because housewife have an educational role. Increasing access to information sources to the housewife will be easier to disseminate knowledge and other campaign contents to other family members (children, husbands, and siblings). Access to information about conservation rules is also a factor contributing to conservation [18]. This finding ultimately proves that conservation depends on demographic, socio-economic, and geographical characteristics. These characteristics are important to understand these characteristic's roles in various contexts [19]. The results of this study confirm how important it is to consider socio-economic factors and involve local communities when planning and implementing conservation efforts [20].

Various action change theories suggest that a person's basic knowledge will shape one's attitude towards an object or result. Then attitude can predict intentions and motivations for changing practices in managing resources. This process also occurs in communities around Jor Bay. Forming a knowledge system is not instant but the result of the dynamic process of community relations with bay resources, including the conflict process and the bay's declining functions. Since the knowledge is influenced very closely by the socio-economic characteristics, to encourage sustainable management in Jor Bay, we need more recommendations that social considerations be included in ecological design and technical engineering inclusively and sustainably through educational programs for the community [4,21–23].

According to the study results, the weakest aspect is in the practices. We need to encourage generating real practices in bay management. By a considerable level of knowledge and positive attitude in the Jor Bay community, efforts to conserve the bay will have broad support and significant interest from the public, creating opportunities for policy support and conservation actions. For future effective conservation actions, broad support needs to be translated into evidence-based policies that focus on native ecosystems and address many of the threats faced by communities and governments [24].

Identifying the knowledge system is a crucial phase in resource management planning, which will increase further involve the community in conservation. By involving the community and the academician, decision-makers, implementers, and researchers are expected to unite the relationship between KAP better to protect resources. This involvement will increase the community's trust and ownership in the management design process as well as in system maintenance [25]. One

such approach to community involvement is the development of asset-based communities, which involve identifying and involving local community assets (people, institutions, etc.) in a deliberate and community-driven way [26]. Research about rural community knowledge can be a valuable source of information for documenting the historical dynamics of landscapes and monitoring environmental changes, which may be particularly relevant for landscape-oriented conservation policies to prevent biodiversity loss due to abandonment of traditional land-uses [27].

Local communities will play a crucial role in program management by increasing women participation, education, and knowledge, providing facilities and equipment, and implementing coherent and coordinated programs [28]. Inclusive and representative engagements can be used to collect systematic data in partnership with communities that can lead to truly sustainable programs [11,29]—understanding human consciousness and rationality as the main driver for explaining human behavior vis-à-vis the environment can be done by focusing more on social and cultural approaches. This approach to cover the lack of concern of this approach to research on the biological underpinnings and evolution of actual human behavior, cognition, and environmental use, is also important to consider [30]. Scaling up is needed for concrete conservation intervention outcomes; it requires more focused and actionable science [31–33] to conceptualize environmental, social science to inform conservation in the context of Anthropocene. Knowledge and appreciation of ecosystem services sources for community livelihoods are not automatically implementing in conservation behavior and practices. The community behavior and practices in adopting pro-environmental behavior influence normative considerations, attitudes towards marine biodiversity, and perceived behavioral control beliefs [34].

The recommendations to increase pro-environmental behavior in Jor Bay, are (a) Increasing the campaign program by information dissemination and education of marine conservation, especially to the fishers and outsiders; (b) Increasing consistent efforts to control community behavior, and an institution that has strong authority to control community behavior is required. In Jor Bay, LPATJ, as a management agency, should take the lead to control critical community behavior. The community understands that paying attention to the public interest will greatly help policymakers develop conservation strategies that are responsive to public preferences (c) Capacity building, particularly in the real bay conservation action, which will encourage improved quality of human practices and nature conservation. The recommendations will significantly benefit the community, allowing them to refresh themselves to be more actively involved in protecting the bay environment. The government and all parties can take new steps to improve the bay protection policy more effectively. Communities can also organize themselves through better management institutions to protect their environment.

5. Conclusion

There are gaps in the KAP of Jor Bay. The level of knowledge and attitude is at a Medium level, while the practices still low. The community well understands the characteristics and potential of existing coastal and marine resources and how to utilize coastal areas. Inconsistently, this understanding does not make the number of people willing to practice according to their knowledge and attitudes still limited. Consequently, management action taken is getting low performance causes the quality of the ecosystem in Jor Bay also continues to decline, both coral reef and mangrove ecosystems, seagrass beds and the productivity of fishery resources relatively decline. Socio-economic factors such as gender, education, age, and livelihood affect the KAP level. Knowledge influences awareness to behave and practices in conservation management.

CRediT authorship contribution statement

All authors had an equal contribution to this study.

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