

# Community participation levels on coastal resources conservation in Rembang Regency of Indonesia

Bambang Argo Wibowo<sup>1,2\*</sup>, Azis Nurbambang<sup>2</sup>, Rudhi Pribadi<sup>1</sup>, Indradi Setiyanto<sup>2</sup>,  
Kukuh Eko Prihantoko<sup>2</sup> and Himawan Arif Sutanto<sup>3</sup>

<sup>1</sup>*Doctorate Program of Marine Science, Faculty of Fisheries and Marine Science, Diponegoro University, Jl. Prof. Soedharto, SH.Tembalang, Semarang, Indonesia*

<sup>2</sup>*Department of Capture Fisheries, Faculty of Fisheries and Marine Science, Diponegoro University.*

<sup>3</sup>*Sekolah Tinggi Ilmu Ekonomi Bank BPD Jawa Tengah, Jl. Soekarno Hatta No. 88, Semarang, Indonesia*

(Received 10 February, 2021; Accepted 15 April, 2021)

## ABSTRACT

Natural resources have significant and importance role for fishery activities, environmental conservation, marine tourism and other related environmental service activities. It is needed to be well managed with increasing coastal community activity. The research aimed to examine the perceptions and levels of local community participation in coastal resource management and to study the roles of government in increasing community empowerment to manage coastal resources in three villages of Rembang Regency. The result indicates that the levels of community participation in the research location in coastal resource management is at moderate level. Meanwhile, the level of government participation in community empowerment for coastal resources management is at moderate level with a value range of 59.57-69.40%. The levels of community participation and the roles of the government in resource management in coastal areas need to be increased through the practice of implemented activities and programs. Further research concerning with strategies is needed. This is intended to increase the participation levels and the government roles in managing coastal resources in the research location.

*Key words* : Community, Coastal resources, Government, Participation, Rembang

## Introduction

The coastal areas and small islands in Indonesia are known for their natural wealth and diversity of natural resources, both renewable and un-renewable (Safira, 2020). These natural resources, when combined with reliable human resources and supported by science and technology together with policies for proper utilization and management, may become huge assets for national development (Sara *et al.*, 2011). Available opportunities are natural wealth resources and potential human resources

to grow and develop their utilization (Brooks *et al.*, 2013). Natural resources have significance and importance for fishery activities, environmental conservation, marine tourism and other related environmental service activities. Natural resources from the oceans and beaches are an important component of human well-being (Neumann *et al.*, 2017; Isoni *et al.*, 2019). The world's coastal areas generate most of the marine services, and their support for coastal economies and livelihoods is critical in less developed regions (Kildow and McIlgorm 2010; Visbeck *et al.*, 2014). People come to the beach for a variety of

reasons such as recreational, aesthetic, cultural, and spiritual, for the particular sense of place and well-being they associate with the coastal environment (Bell *et al.*, 2015; Setianingrum *et al.*, 2019)

The pressure of population growth and human activities in coastal areas causes pollution problems, decreased quality of resources, and lack of resources (Abedin *et al.*, 2014; Nuraini *et al.*, 2020). As stated by Hulu *et al.* (2019) that human activities have implications for the quality and quantity of natural resources, such as establishment of hotels and resorts, construction of ports and utilization of boats, coral reefs, snorkeling and diving, fishing, and pollution and land-based sedimentation (Hannak *et al.*, 2011; Alfionita *et al.*, 2018; Suciyo *et al.*, 2019). Besides, conflicts between stakeholders often occur because of overlapping interests in the utilization of coastal areas. This is due to many differences in perceptions among project actors in terms of area management related to overall policy making on balanced spatial planning and area management. Conflict over the determination of boundaries between regions in spatial terms as well as area management and the use of natural resources which is increasingly prevalent is also the problem itself.

This phenomenon also occurs in the coastal area of Rembang Regency, the area with a fairly rapid developed since it became a tourism area. As a developing area, it cannot be separated from its management and development problems. The increasing economic growth has resulted ecological pressures on coastal and marine resources. There is a decrease in the quality and carrying capacity of the waterside and marine ecosystems, especially as a result of seasand mining, beach reclamation, conversion of coastal lands and destructive fishing every year.

Community participation in planning development programs will help the government to ensure the programs which will be carried out are in accordance with the needs of local communities. Moreover, engaging community participation may create the community's sense of belonging and responsibility for the upcoming program so the community can participate in managing the resources they have. The community is a user who is directly related to the utilization and management of the coastal potential. One of the efforts that can be made to involve the community in planning coastal resource management development is to identify the potential of the area by give question and opinion directly

to the people who live in the coastal area of Rembang. Therefore, it is necessary to conduct research on community perceptions and participation in the implementation of coastal resource management and small islands. It had been known that their perceptions need to be considered as part of natural resource management strategies (Jefferson *et al.*, 2015; Bennett, 2016).

The purpose of this study is to examine the perceptions and level of local community participation in coastal resource management and the role of government in increasing community empowerment to manage coastal resources located in three villages, i.e. Pasar Banggi Tritunggal and Punjulharjo, Rembang Regency, Central of Java, Indonesia.

## Materials and Methods

This research was conducted in Rembang Regency, between Pasar Banggi to Karang Jahe Beach including Village of Pasar Banggi, Tritunggal and Punjulharjo. The data collection is carried out by observation, interviews and questionnaires. The research focused on assessing social aspects (using Likert scale), especially perceptions, participation and the role of the government in the management of coastal areas (in which involved 147 respondents). Data sampling to obtain information and knowledge (the acquisition of expert opinion) is determined or selected deliberately using purposive sampling using methods of Ballad *et al.* (2016) and Sugiyono (2017). The categories of respondents in this study are Academics, Department of Marine Affairs and Fisheries, Central Java Province, Capture Fisheries Entrepreneur, Fishing Vessel Owners, NGOs (environmentalists) and Fishermen.

## Results and Discussion

Rembang is one of the regencies in Central Java Province, lied between 06°30'-07°60'S and 111°00'-111°30' E. The area of Rembang Regency is 1035.7 km<sup>2</sup>, with a 63.5 km long coastline. Thirtyfive point fifty two percent of the area of Rembang Regency is a coastal area (367.87 km<sup>2</sup>) consisting of 6 (six) districts, namely Kaliiori, Rembang, Lasem, Sluke, Kragan, and Sarang District (Central Bureau of Statistics Rembang Regency, 2020). The research location included three villages which have their potential characteristics, i.e. Pasar Banggi, Punjulharjo and Tritunggal village. The location of each village



Fig. 1. Study Area Map in Rembang Regency

can be seen in Figure 1.

### The characteristics of the respondents

Based on the results of data analysis taken from 147 respondents in this study, 76% of the respondents were male and 24% were female (Table 1). The respondents' age in this study was grouped into 5 categories (Table 2) in which the most respondents were aged of 41-50 years (25.9%) and over 50 years (23.8%). This showed that the respondents in this study have got experience and understanding the condition of coastal area resources of Rembang Regency. The education level of the respondents was mostly Senior High School/Vocational High School (40.8%) followed by the Elementary School (28.6%). The respondent's education level was relatively low. The low education level became a challenge to increase the income of coastal communities as well as their knowledge related to the management of existing resources in the coastal area of Rembang Regency. While the majority of respondents' jobs

are fishermen (34%) and the private sector as factory workers was 15.6%

The average number of the respondents' family members was between 4 and 5 people (56.4%) as can be seen in Figure 7. A large number of families in the household will certainly increase the amount of family expenses, so that most of the income is used up for household consumption. Therefore, we need an effort to do community empowerment by utilizing existing resources in coastal areas without having to damage the environment due to the economic needs of the community which must be met immediately.

### Community Perceptions of Coastal Resource Areas

The community's responses to the Perception of Coastal Resource Areas in the coastal area of Rembang Regency which are given through their answers from a structured questionnaire are divided into three community groups, based on their residence, i.e. Pasar Banggi, Tritunggal, and Punjulharjo Village with different numbers of respondents. Respondents' responses related to the perception of mangrove conditions in the coastal area of Rembang Regency were presented in Table 2.

Based on Table 2, it can be seen that most people understand that the condition of the mangroves in three location were in good condition with the highest was in Punjulharjo Village (88.24%). This results was in accordance with Saputro *et al.* (2019). There were 3 mangrove species in Pasar Banggi Village,

Table 1. Respondent Characteristics

Characteristic	Frequency	%	Characteristic	Frequency	%
<b>Gender</b>			<b>Jobs</b>		
- Male	112	76	- Fisherman	50	34.0
- Female	35	24	- Labor	28	19.0
<b>Age (years)</b>			- Farmer	8	5.4
- < 20	13	8.8	- Traders	21	14.3
- 20-30	29	19.7	- Entrepreneur	14	9.5
- 31-40	32	21.8	- Civil servant	8	5.5
- 41-50	38	25.9	Housewife	18	12.2
- > 50	35	23.8			
<b>Education</b>			<b>Numbers of families</b>		
- No school	4	2.7	- 1 – 3	44	29.9
- Elementary	42	28.6	- 4 – 6	91	61.9
- Junior High School	30	20.4	- 7 – 10	12	8.2
- Senior High School	60	40.8			
- Bachelor	10	6.8			
- Master	1	0.7			

i.e. *Rhizophorastyllosa*, *R. mucronata*, and *R. apiculata* (Pribadi *et al.*, 2014) with the highest mangrove density of 62 ind./100m<sup>2</sup> and the highest mangrove thickness was 139 meters, which was supported by good environmental condition (Kushartono, 2009). In addition, there were also various species of mangrove association plant and various species of birds. In general, the people in the coastal area of Rembang Regency are aware on the importance of mangroves as a conservation place for various species of marine biota. If the area is still good, there will be good catches such as shrimp, crab and other fishery production. Although according to Annas *et al.* (2013) the condition of the mangrove ecosystem in Pasar Banggi was classified as one of the best in the Central Java. However, it is necessary to be aware of the damage to the mangrove ecosystem that can occur if there is no good coastal management. Pribadi *et al.* (2014) mentioned some of the biggest contributing factors to the damage to mangrove ecosystems on the coast of Rembang Regency, namely aquaculture, mangrove logging, reclamation and sedimentation, and environmental pollution. Internal factors such as interest, unidirectional needs, and community experience in mangrove management are expected to increase community enthusiasm for utilizing mangrove forests for their economic needs (Sulaiman *et al.*, 2019). While for external factors such as increasing the socialization intensity of the benefits of mangroves for food and drinks is expected to increase public perception

about the importance of mangrove processing.

Respondents' responses related to perceptions of coral reef conditions in study area are presented in Table 3. It was showed that the community perceptions regarding the current condition of coral reefs was high in those three research location, in the range of 78-92.16%. The community in the coastal area stated that the condition of coral reefs is in a good condition. However, it is need to be well managed so the coral reefs will not be damaged. The destruction can be caused by global climate change, predation of marine life and human activities such as taking, stepping on, and using trawl nets in fishing. Human pressure is a far greater direct threat to coral reefs than climate change (Ballad *et al.*, 2016; Suparno and Arlius, 2016; Madiyani *et al.*, 2018).

In order to protect coastal resources, the local government of Rembang Regency has established a marine protected area. Marine protected areas (MPA) are important instruments for fisheries conservation and management (Bennett and Dearden, 2014). MPAs can protect habitat, ecosystem structure, function and integrity, and species diversity, richness, size and density (Angulo-Valdés and Hatcher, 2010; Shah *et al.*, 2019). The results of respondents' answers related to community perceptions about the location of Marine Protected Areas can be seen in Table 4. Table 4 showed that most of community lived in those three villages did not know the existence of Marine Protected Areas (MPA) in the area. This became a challenge to pro-

**Table 2.** Community Perception of Mangrove Conditions based on Research locations

Mangrove Condition	Pasar Banggi		Tritunggal		Punjulharjo	
	Frequency	%	Frequency	%	Frequency	%
Very damaged	1	2.17	4	8.00	0	0.00
Damaged	17	36.96	21	42.00	1	1.96
Good	26	56.52	25	50.00	45	88.2
Very good	2	4.35	0	0.00	5	9.80
Total	46	100	50	100	51	100

**Table 3.** Community Perception of Coral Reef Conditions

Coral Reef Condition	Pasar Banggi		Tritunggal		Punjulharjo	
	Frequency	%	Frequency	%	Frequency	%
Very damaged	0	0.00	1	2.00	0	0.0
Damaged	2	4.35	6	12.00	1	1.9
Good	38	82.61	39	78.00	47	92.0
Very good	6	13.04	4	8.00	3	5.8
Total	46	100	50	100	51	10

vide better understanding and socialization to the community in the coastal area of Rembang Regency regarding the conservation area or marine protected area through community empowerment activities.

Based on Table 5, the people in Pasar Banggi Village (36.96%) generally stated that they understood about the sanctions for violating the rules, Tritunggal Village people (42%) did not understand the sanctions for rule violators and people in Punjulharjo Village (56.86%) said they understood enough about sanctions given to violators. This showed the need for socialization regarding sanctions for those who violate the rules, especially in Tritunggal Village. Involvement of the community in the management of MPAs is essential because of their traditional knowledge and are direct users of the resources (Fernandez and Subade, 2015).

### Community Participation in Coastal Resource Management Planning, Proposing, and Implementation

The community participation model referred to the eagerness of the people who live in the coast of Rembang Regency which includes Pasar Banggi, Tritunggal and Punjulharjo Village who actively participate in the management of coastal resources, started from the planning stage, activity implementation, supervision, to the resource maintenance/preservation stage. Participation is defined as an engagement or involvement of local communities in sustainable coastal resource management activities.

Community participation is a supporting factor in developing coastal areas management (Diarso *et al.*, 2012). The eagerness of community participation in coastal resource management was shown by their high enthusiasm to protect and to conserve as well as the hope for protecting or developing ecosystems in coastal areas (Vimal *et al.*, 2018). Local community participation in coastal resource management and provision of incentives to motivate the local community for managing resources to form the important component of sustainability (Gwambene and Karata, 2019).

At the planning stage, the community participated by providing ideas and concepts that will be applied in resource management. The community is the one who clearly understands about the condition of the resources in the coastal area. Therefore, a forum is needed to accommodate the aspirations of the community in working groups. It is believed that participatory planning is a better management model than the conventional model which is primarily based on expert input (Hassan *et al.*, 2011). Based on the average level of community participation in coastal resource management planning activities, those three villages are categorized into moderate (51,67-53,99%). This shows that the people in the coastal areas of Rembang Regency are not entirely involved in coastal resource management activities planning as can be seen in Figure 2. Based on Figure 2, it can be seen that most of the community is less involved in planning arrangement for

**Table 4.** Coastal Community Perceptions on Marine Protected Area

Knowledge of Marine Protected Area	Pasar Banggi		Tritunggal		Punjulharjo	
	Frequency	%	Frequency	%	Frequency	%
Not know	19	41.30	29	58.00	29	56.00
Knowing enough	10	21.74	3	6.00	13	25.00
Knowing	16	34.78	17	34.00	9	17.00
Very knowing	1	2.17	1	2.00	0	0.00
Total	46	100	50	100	51	10

**Table 5.** Perceptions of Sanctions Knowledge

The knowledge of Sanction	Pasar Banggi		Tritunggal		Punjulharjo	
	Frequency	%	Frequency	%	Frequency	%
Not understand	14	30.43	21	42.00	13	14.00
Quite understand	15	32.61	13	26.00	29	15.00
Understand	17	36.96	16	32.00	2	17.00
Very understood	0	0.00	0	0.00	7	0.00
Total	46	100	50	100	51	46



coastal resource management activities. Even the most of the people never gave their ideas related to coastal resource management (Figure 3). It was revealed that most of community in those three villages stated that they never conveyed ideas or ideas related to coastal resource management. To increase community participation in planning, coordination between the community, government and entrepreneurs is needed so the planning of development and management of coastal areas involves the majority of the surrounding community.

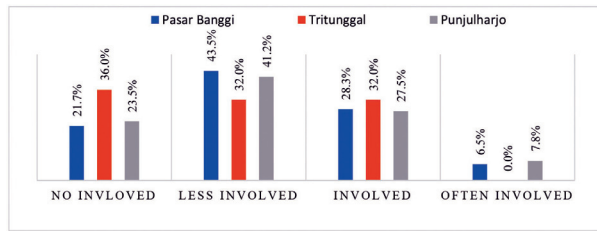


Fig. 2. Community Involvement in Planning for coastal resource management

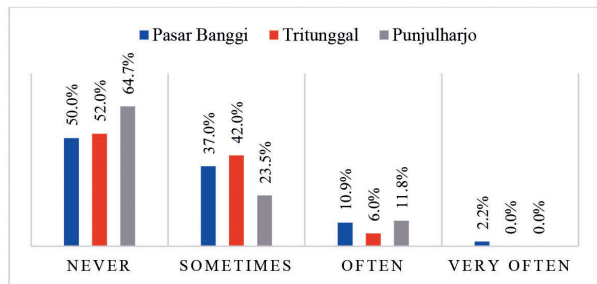


Fig. 3. The involvement of coastal community in Proposing ideas or concepts of resourcnes management

At the implementation stage of coastal resource management activities in the district, community involvement is in the moderate category (60,54-69.55%). This showed that there were not many people involved in coastal resource management activities in Rembang Regency. Therefore it was very important to increase community participation in managing coastal areas. Community participation here should be able to be done directly as the coastal area in Rembang Regency is relatively small. Smaller city tended to provide better conditions for direct participation of user and stakeholder groups in planning and decision-making processes and outcomes for coastal issues (Bennett, 2016). Most of the people in the three villages have understood the importance of mangrove areas for community life

sustainability. This was reflected in the perception of the community in Pasar Banggi (60.9%), Tritunggal (58%) and Punjulharjo (52.9%) who stated that they did not cut or damage the mangroves. As much as 37-42% of coastal community have participated in planting mangroves (Figure 4). This was in line with the findings Annas *et al.* (2013) that rehabilitation of mangrove was the most common forms of community participation of coastal resources management. In addition, most of the people (82-96,1%) in Pasar Banggi, Tritunggal, and Punjulharjo Village did not either take or harm the coral reefs in the Coastal Zone (Figure 5). This showed that the communities in the three villages have well realized the importance of maintaining and managing coastal areas.

At the stage of maintaining coastal resources in the coastal area of Rembang Regency, community involvement was in the medium and high categories (75.00-82,61%). This showed that the communities in those three villages have been active in protecting and maintaining the resources around them. The sort of community participation in maintaining and preserving coastal resources was by immediately reporting if there was damage in the coastal area, including abrasion, mangroves, sea pine, coral reefs. During monitoring of resources stage in the coastal area of Rembang Regency, community involvement of three villages were low (47.11-49.64%). Coastal community tended to be passive

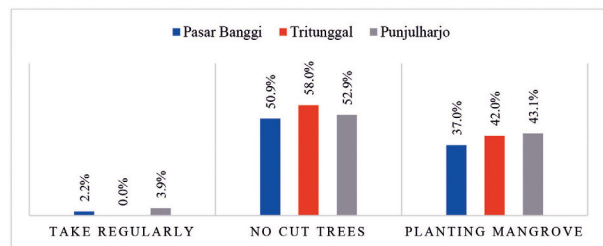


Fig. 4. The mangrove utilization by coastal community of Pasar Banggi, Tritunggal and Punjulharjo Villages

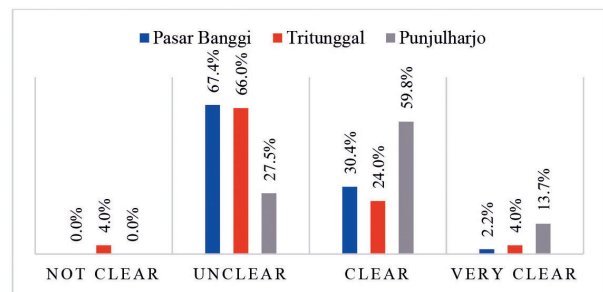


Fig. 7. Marking of Conservation area

and looked forward to the activities done by the government to develop their coastal areas. It has been widely argued that the effective management of protected areas requires collaborative approaches including the participation of local communities (Brooks *et al.*, 2013; Child, 2013). This paradigm encompasses a wide range of approaches such as community based natural resource management, buffer zones, indigenous or extractive reserves, participatory development, joint natural resource management and integrated conservation and development projects (Ruiz-Mallén *et al.*, 2015).

### Roles of Government

The public perception in Pasar Banggi, Tritunggal, and Punjulharjo Village towards the role of the government were in medium categories (59.57-69.40%). This showed that the community in the three villages believed that there is lack in government roles in managing coastal resources although there have been many programs carried out by the Rembang Regency government through environmental tourism, and marine and fisheries Institution,. Therefore, the government needed to be more involved not only in a few people or groups, but also the whole community in the Coastal Zone of Rembang Regency in making development and management activities for the coastal area (Krestiono *et al.*, 2018).

Community of coastal village such as Pasar Banggi and Punjulharjo stated that the establishment of Marine Protected Area as conservation areas was still unclear (66.0-67.4%) but not for Punjulharjo people, so the people sometimes do not know whether they have committed a violation because trasspassing the conservation boundaries area (Figure 5).

### Conclusion

The level of community participation in three villages of Rembang Regency was at the medium level, while the level of government participation in community empowerment for coastal resource management was also at medium level with a range of 59.57-69.40%. The level of community participation and the role of the government in resource management in coastal areas need to be increased through the practice of implemented activities and programs. Further research is needed concerning with strategies to increase the level of participation

and the government roles in managing coastal resources in the research location.

### References

- Abedin, M.A., Habiba, U. and Shaw, R. 2014. Community Perception and Adaptation to Safe Drinking Water Scarcity: Salinity, Arsenic, and Drought Risks in Coastal Bangladesh. *International Journal of Disaster Risk Science*. 5(2) : 110–124. <https://doi.org/10.1007/s13753-014-0021-6>
- Alfionita, S., Pursetyo, K.T. and Sahidu, A.M. 2018. Study of copper (Cu) contents in blood cockles (*Anadara* sp.) at Surabaya coastal waters. *IOP Conf. Series: Earth and Environmental Science*. 137 (2018) 012089. doi : 10.1088/1755-1315/137/1/012089.
- Angulo-Valdés, J.A. and Hatcher, B.G. 2010. A new typology of benefits derived from marine protected areas. *Marine Policy*. 34(3) : 635-644.
- Annas, N., Suryono, and Pribadi, R. 2013. Mangrove Ecosystem Conservation Study in Pasar Banggi Village, Rembang Regency. *Journal of Marine Research*. 2(2): 55-64. <https://doi.org/10.14710/jmr.v2i2.2352>.
- Ballad, E.L., Morooka Y. and Shinbo, T. 2016. Factors Inducing Community Participation in Coastal Resource Management: Case Study of MPAs in Gonzaga, Cagayan, Philippines. *Journal of Rural Problems*. 52(4) : 241–246. DOI: 10.7310/arfe.52.241
- Bell, S.L., Phoenix, C., Lovell, R. and Wheeler, B.W. 2015. Seeking everyday wellbeing: the coast as a therapeutic landscape. *Soc. Sci. Med*. 142 : 56–67. doi:10.1016/j.socscimed
- Bennett, N.J. and Dearden, P. 2014. Why local people do not support conservation: Community perceptions of marine protected area livelihood impacts, governance and management in Thailand. *Marine Policy* 44: 107-116.
- Bennett, N.J. 2016. Using perceptions as evidence to improve conservation and environmental management. *Conserv. Biol*. 30 : 582–592. doi: 10.1111/cobi.12681
- Brooks, J., Waylen, K. A. and Mulder, M.B. 2013. Assessing community-based conservation projects: A systematic review and multilevel analysis of attitudinal, behavioral, ecological, and economic outcomes. *Environmental Evidence*. 2: 2.
- Central Bureau of Statistics Rembang Regency, 2020. Rembang Regency in Figures. BPS-Statistics Rembang Regency. Publication Number: 33170.2002
- Child, B. 2013. Parks in Transition: Biodiversity, Rural Development and the Bottom Line. London, UK: Routledge.
- Diarto, Hendrarto, B. and Suryoko, S. 2012. Community Participation in Environmental Management of Tugurejo Mangrove Forest in Semarang City. *Journal of Environmental Science*. 10 (1) : 1-7. [In Indone-

- sian]
- Fernandez, C. and Subade, R. 2015. Perceptions toward marine reserves in Iloilo coastal communities, Central Philippines. *Asian Fisheries Science*. 28 : 198–212.
- Gwambene, B. and Karata, E. 2019. Marine conservation: local community perceptions of coastal resources conservation and livelihood implication in Bagamoyo. *Horticulture International Journal*. 3 (1) : 3135. DOI: 10.15406/hij.2019.03. 00108
- Hannak, J.S., Kompatscher, S., Stachowitsch, M. and Herler, J. 2011. Snorkelling and trampling in shallow-water fringing reefs: Risk assessment and proposed management strategy. *J. Environ. Manag.* 92: 2723–2733
- Hassan, G.F., Hefnawi, A. El. and Refaie, M.El. 2011. Efficiency of participation in planning. *Alexandria Engineering Journal*. 50 (2) : 203-212. <https://doi.org/10.1016/j.aej.2011.03.004>
- Hulu, M., Baiquni, M., Fandeli, C. and Wirasanti, N. 2019. Community Participation on Tourism Development in Parangtritis Tourism Area, Bantul Regency. *E-Journal of Tourism*. 6(2) : 225-234
- Isoni, W., Islamy, R.A., Musa, M. and Wijanarko, P. 2019. Species composition and density of mangrove forest in Kedawang Village, Pasuruan, East Java, Indonesia. *Biodiversitas*. 20(6) : 1688-1692. doi:10.13057/biodiv/d200626
- Jefferson, R., McKinley, E., Capstick, S., Fletcher, S., Griffin, H. and Milanese, M. 2015. Understanding audiences: making public perceptions research matter to marine conservation. *Ocean Coast. Manage.* 115 : 61–70. doi: 10.1016/j.ocecoaman.2015.06.014
- Kildow, J.T. and McIlgorm, A. 2010. The importance of estimating the contribution of the oceans to national economies. *Marine Policy*. 34 (3) : 367–374. doi:10.1016/j.marpol.2009.08.006
- Krestiono, M.B.A., Juwita, A.H., Gravitian, E. and Rahardjo, M. 2018. Valuation economy restoration program of mangrove forest PasarBanggi village district of Rembang. *International Journal of Marine Science*. 8(19) : 160-165. doi: 10.5376/ijms.2018.08.0019)
- Kushartono, E.W. 2009. Several Bio-Physical aspects of Soil Chemistry in the Region Mangrove Village of Pasar Banggi, Rembang Regency. *ILMU KELAUTAN: Indonesian Journal of Marine Science*. 14(2) : 76-83
- Madiyani, K.D.P., Triastuti, J. and Pursetyo, K.T. 2018. Inventory of the tropical coral reef fishes in Wondama Bay regency, West Papua, Indonesia. *IOP Conf. Series: Earth and Environmental Science*. 137 (2018) 012095. doi :10.1088/1755-1315/137/1/012095.
- Neumann, B., Ott, K. and Kenchington, R. 2017. Strong sustainability in coastal areas: a conceptual interpretation of SDG 14. *Sustainability Science*. 12: 1019–1035 <https://doi.org/10.1007/s11625-017-0472-y>.
- Nuraini, R.A.T., Widianingsih, W., Hartati, R., Mahendrajaya, R.T. and Soegiarto, A. 2020. Imposex in *Babylonia spirata* (Mollusc : Gastropoda) from Tanjung Mas Port, Semarang and Delta Wulan Waters, Demak, Indonesia. *Annals of Biology*. 36 (2) : 252-257
- Pribadi, R., Muhajir, A. and Widianingsih, Hartati, R. 2014. Pemangsaan Propagul Mangrove *Rhizophora* sp. Sebagai Bukti Teori Dominance-Predation. *ILMU KELAUTAN : Indonesian Journal of Marine Science*. 19(2) : 105-112. DOI: <https://doi.org/10.14710/ik.ijms.19.2.105-112>
- Ruiz-Mallén, I., Schunko, C., Corbera, E., Rös, M. and Reyes-García, V. 2015. Meanings, drivers, and motivations for communitybased conservation in Latin America. *Ecology and Society*. 20 : 33.
- Safira, E. 2020. Sustainable Coastal Resource Development in Ulele, Kota Madya Banda Aceh. *Constructivist Foyer*. 2(2): 84-91[In Indonesian]
- Saputro, D.A., Purwanti, F. and Rudiyananti, S. 2019. Mangrove Tourism Conditions in Pasar Banggi Village, Rembang Regency. *Management of Aquatic Resources Journal (MAQUARES)*. 8(3) : 221-225. 2019. <https://doi.org/10.14710/marj.v8i3.24259>
- Sara, L., Hamid, A. and Safilu. 2011. Empowering coastal community by implementing natural resources management (Case study in Southeast Sulawesi, Indonesia). *Journal of Coastal Development*. 14(3): 202-213.
- Setyaningrum, E.W., Maghdalena, Dewi, A.T.K., Yuniartik, M. and Masithah, E.D. 2019. Coastal ecosystem model based on environmental suitability and carrying capacity of the fishpond in Banyuwangi Region, East Java, Indonesia. *IOP Conf. Series: Earth and Environmental Science*. 236 (2019) 012045. doi:10.1088/1755-1315/236/1/012045
- Shah, P., Dissanayake, S.T.M., Fujita, Y. and Nunes, P.A.L.D. 2019. Impact of a local, coastal community based management regime when defining marine protected areas: Empirical results from a study in Okinawa, Japan. *PLoS ONE*. 14(3): e0213354. <https://doi.org/10.1371/journal.pone.0213354>
- Suciyono, Azhar, M.A., Ulkhaq, M.F. and Kenconoati, H. 2019. Inventorization of reef fish on Tabuhan Island, Banyuwangi, East Java, Indonesia. *IOP Conf. Series: Earth and Environmental Science*. 236 (2019) 012041. doi:10.1088/1755-1315/236/1/012041.
- Sugiyono. 2017. *Quantitative Research Methods, Qualitative and R & D*. Publishers. CV. Alfabeta, Bandung. [In Indonesian]
- Sulaiman, B., Bambang, A.N., Purnaweni, H., Lutfi, M. and Mohammed, E.M.A. 2019. Coastal community perception of mangroves in Suli Subdistrict, Luwu. *JPII* 8(4) : 561-569. <http://journal.unnes.ac.id/index.php/jpii>
- Suparno and Arlius. 2016. Recruitment Status of Coral Reefs (Scleractinian) after Earthquake and Tsunami



- in North Pagai Island of Mentawai Islands Regency. *ILMUKELAUTAN: Indonesian Journal of Marine Science*. 21 (4) : 161-168 DOI: 10.14710/ik.ijms.21.4.161-168
- Vimal, R., Khalil-Lortie, M. and Gatiso, T. 2018. What does community participation in nature protection mean? The case of tropical national parks in Africa. *Environmental Conservation*. 45(4) : 333-341. doi:10.1017/S0376892917000583
- Visbeck, M., Kronfeld-Goharani, U., Neumann B., Rickels, W., Schmidt, J., van Doorn E, Matz-Luck, N., Ott, K. and Quaas, M.F. 2014. Securing blue wealth: the need for a special sustainable development goal for the ocean and coasts. *Mar. Policy*. 48 : 184-191. doi:10.1016/j.marpol.2014.03.005.