

Development of Community Model of Marine Resources Conservation for Sustainable Development: Case Study of Blue Swimming Crab Bank in the Eastern Region

Pacharapat Nuntaborwornpon¹, Wanchai Panjan², Orathai Chuacharoen³, Nounlaor Saengsook⁴

¹ Student from Doctor of Philosophy Program in Human Resource Development, Ramkamhaeng University

² Faculty of Human Resource Development, Ramkamhaeng University

³ Department of Statistics, Faculty of Science, Ramkamhaeng University

⁴ Faculty of Human Resource Development, Ramkamhaeng University

ABSTRACT

This research aims to (1) study important components of community of practice of marine conservation model for sustainable development, (2) develop community of practice of marine conservation model for sustainable development, and (3) evaluate community of practice of marine conservation model for sustainable development by using Mix Methods Research which consists of In-depth interview of 13 informants, Sampling Survey of 328 members' opinions of blue swimming crab bank in the studied area, consideration of model draft by 6 experts and model evaluation by 15 focus-group participants. Contents were analyzed and synthesized with data-analysis statistics which are Exploratory Factor Analysis (EFA) and Descriptive Statistics; frequency, percentage, mean (), Standard Deviation (SD). Research results show that

1. Results of important components of community of practice of marine conservation model for sustainable development: 10 components and 39 variables were found by using Exploratory Factor Analysis.

2. Results of the development of community model: According to the expert's consideration, consistency evaluation and suitability of model draft, the model draft was overall in the highest level. The suggestions were applied to adjust the model which finally consisted of 6 major components; (1) Learning, (2) Establishment, (3) Social network, (4) Leader, (5) Social capital, and (6) administration.

3. Results of model evaluation from focus group: The participants adjusted the names of major components and identified sub components. Results of model suitability and possibility evaluation was overall in the highest level giving the final model which consisted of 6 major components; (1) Leader, (2) Establishment, (3) Learning, (4) Community capital, (5) Community network, and (6) administration.

Keywords

Community of Practice, Marine Resources Conservation, Sustainable Development

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Introduction

Marine and coastal resources are considered as regional and global vital economic capital bases which are always changing and greatly sensitive to such changes. According to environmental operation report, it was found that global coastal and marine resources had been highly affected due to climate change, pollution, and human's marine resources utilization which is over than capacity of the ecosystem. This significantly effects on the reduction of marine resources, food security, and marine biological diversity. (Office of Natural Resources and Environmental Policy and Planning, 2017 : 7) Thailand is now facing the same situation like other countries around the world. It is found that the situation of marine resources effects on Thai fishery nowadays as the number of aquatic animals decreases causing

resource seizure, area invasion, over fishing and over sea capacity. (Department of Natural Resources and Environment, 2018 : 49, 98)

Global marine resources situation causes international cooperation. The United Nation has determined sustainable development goals during 2016 – 2030 as global new development agenda which is pressure force in future production chain emphasizing on the connection in economic, social, and environmental dimensions. The marine and coastal resources-related goal is the 14 goal: Life below water, i.e., conservation and utilization of ocean, sea and marine resources for sustainable development (Department of Marine and Coastal Resources, 2018 : 68). Environment issue is raised in the 20-Year National Strategy (2017 – 2036) as an essential content in the Twelfth National Economic and Social Development Plan (2017-2021). It is stated that the government must

protect and maintain environmental natural resources and biological diversity by cooperating with people, community, and local administration organizations in order to provide sustainable utility and carefully cause the least effect on people, community, environment and biological diversity (The Twelfth National Economic and Social Development Plan (2017-2021), 2016). The issue is transferred to the 20-year strategy plan of Ministry of Natural Resources and Environment (2017 – 2036) and emphasized on vision of conservation and utilization of natural resources and environment to be the basis of balanced development in the next 20 years. (Office of Natural Resources and Environmental Policy and Planning, 2017 : 54)

“Blue swimming crab resource” is considered as a marine resource which is economic-valued, domestically and internationally highly demanded, and more expensive than other sea animals. According to the studies, it is found that the blue swimming crab is used 10% over the carrying capacity and 40% higher than the maximum value. Moreover, a number of premature blue swimming crabs are caught while the ones with eggs are popularly consumed. These cause a great reduction of breeders. (Greenet, 2019 : 1). The beginning of blue swimming crab was started by Mr. Jang Funfuang, a philosopher of the land and a fisherman in Patiew district, Chumporn province, had recognized the sea crisis due to non-conscience fishery. In order to conserve the crab, he cooperated with the members and experimented on breeding the blue swimming crabs. He also consulted with relating public agencies. Role model of blue swimming crab bank was established in 2001 and provided a higher number of the crab’s babies within 2 years. This idea was widespread in coastal communities nationwide. (Local’s technology, 2016 : 126) The government has realized the achievement of the crab bank which can be considered as the beginning of fisherman’s marine resource conservation. The bank provides higher number of crabs which results in not only national economic, society, and food security but also marine resources conservation and the increase of other sea animals effecting on social, economic and environmental sustainability. Therefore, the blue swimming crab bank has been appointed in role model fishery community management development project since 2007. On 6th March

2018, the cabinet approved on the extension of blue swimming crab bank project to 500 other coastal communities in order to return the blue swimming crabs to Thai seas within 2 years. This is the cooperation among the public agencies, private sectors and fishermen in 191 areas in Thai gulf and Andaman coastal provinces by using the principle of sustainable development. (Cabinet resolution handouts, 2018 : 3-4)

The establishment of blue swimming crab was started from the cooperation within the community who had clear mutual inspiration and goals. The point of their participation was identified by knowledge instead of the work and occurred in real situation leading to the connection of knowledge with daily-life usage under values and culture in the society. This is the development of participation competency in social context. This attribute is so called “Community of Practice – COPs” (Wenger 1998 : 6-7) which is an accepted tool in the world of modern knowledge management originated from the failure of knowledge management in the early age as values, human behavior and culture were turned into attention on learning and knowledge sharing though interaction caused by practices leading to expertise and personal continuous experiences. It is the most used and useful knowledge basis. (Nonaka & Takeuchi, 1995 : 71-72; Ribeiro, 2011 : 29) In addition, cohabitation must be voluntariness, trust, desire, commitment, ownership, engagement and social capital-based community success whose practical guidelines must be specifically specified for clarity (Wenger, McDermott & Snyder, 2002 : 8-12) by using participation or agreement of cooperation to act on something. Every action relies on social process from the beginning until it is permanently and perfectly completed. (Gherardi, Nicolini & Odella, 1998 : 279)

Marine resource conservation effecting on ecosystem and leading to food, economic, social and environmental security therefore studies on developing community of practice of marine conservation model for sustainable development by using blue swimming crab bank in the eastern region as a case study which were Chonburi, Chanthaburi, Rayong and Trad province because such area was given the ASEAN role model of blue swimming crab bank award which can be applied with the enhancement and strengthening of the bank. Moreover, it enables marine resource

conservation projects in different areas to succeed and acquire sustainable development accordingly.

Research Objectives

1. To study important components of community of practice of marine conservation model for sustainable development: case study of blue swimming crab bank in the eastern region.
2. To develop community of practice of marine conservation model for sustainable development: case study of blue swimming crab bank in the eastern region.
3. To evaluate community of practice of marine conservation model for sustainable development: case study of blue swimming crab bank in the eastern region.

Concept, Theory, and Relating Researches

Concepts and theories of community of practice (Lave & Wenger, 1991; Wenger, 1998; Wenger, McDermott & Snyder, 2002; Al-Shahrani & Heba, 2014; Lohitwiset S., 2016; Puangsamlee A., 2007), leader (Northouse, 2016; Dessler, 2004; Timm & Peterson, 200; Greenberg & Baron, 2003), administration (Suksriwong S., 2017; Wirachnipawan W., 2016; Srinual S., 2015), learning (Garvey & Williamson, 2002; Van Rossum & Hamer, 2010; Nonaka & Takeuchi, 2000; Warne et al., 2006; Ribeiro, 2011; Wijarn B., 2009), social capital (Putnum, 2002; Erasmus, Rene, 2005; Lesser & Prusak, 1999, Wanthanang K., 2010), social network (Putnum & Goss, 2002; Wasserman & Faust, 2005; Lin, 1999; Hanneman

& Riddle, 2011; Birk, 2005) including relating researches were studied as follows:

1. The study of Jeawkok J. (2015) on learning management guidelines to community development: case study of Thakam subdistrict, Hat-yai district, Songkhla province shows that (1) the community’s potential can be administrated for knowledge management and sharing among people in the community leading to the establishment of different strong groups, (2) knowledge sharing among people in the community with different ages is different, and (3) government support strengthens their groups.

2. The study of Fatimah Al-Shahrani, & Heba Mohammad (2014) on conceptual model of successful educational online community of practice for Kingdom of Saudi Arabia is found that there are 7 factors for successful community of practice; (1) crowded networks, (2) culture recognition, (3) product distribution, (4) good and thorough knowledge acquired from researches, social news, presentation, or explanation, (5) support of relating agencies, (6) technology, and (7) roles of leader.

3. The study of Firdaus et.al., (2012) on knowledge sharing model development in community of practice among doctors was found that there are 9 factors for successful community of practice; (1) attitude, (2) organizational structure, (3) personal motivation, acceptance, and assistance, (4) roles of coordinator, (5) trust, (6) mutual goal determination, (7) mutual use recognition, (8) community leader, and (9) suitable administration and management.

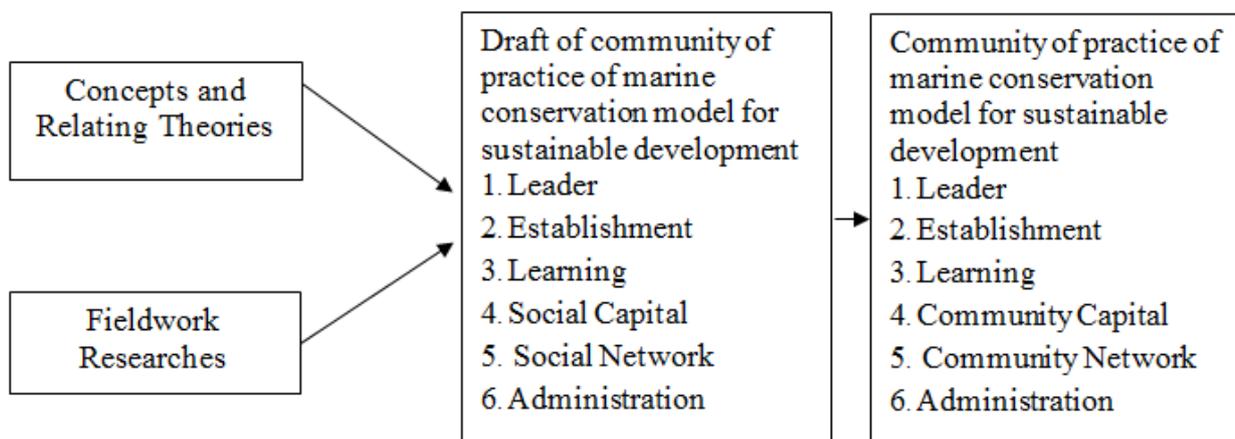


Fig. 1 Conceptual Framework

Research Methodology

1. Study of important components from quantitative and qualitative researches is as follows:

1.1 In-depth interview by using semi-structured interview was carried out with 13 informants whose duties are to supervise, advise, coordinate, and transfer technology and information for the blue swimming crab bank.

1.2 Surveying opinions about important components leading to sustainable development of community of practice of marine resource conservation from 497 total bank's members of 10 good representative banks covering the area of case study was carried out by using table of sample size determination of Krejcie & Mrogan (1986 : 345). It was found that there was 95% of reliability and 5% of allowable error which were 217 samplings and Snowball selection can be used. There were 328 respondents.

2. Model development was carried out by having the 6 experts who are the chairman of the blue swimming crab banks from good representative banks and staffs who supervise, advise, coordinate, transfer technology and information to the bank, consider the model draft originated from analysis results of surveyed components from the first step.

3. Model evaluation was carried out by adjusting it following to the experts' suggestions. The model was then brought into focus group with 15 participants by using criterion based selected and adhering to the principle of focus group by the

chairman and members of the banks from good representative banks.

4. Content analysis, statistical values; frequency, percentage, mean (\bar{X}), Standard Deviation (SD) were used for data analysis. Exploratory Factor Analysis (EFA) was used by considering the number of more-than-1 Eigen Values, more-than-0.5 Factor Loading of each variable in the components and more than 50% of cumulative variance.

Research Results

Research results from the study of developing community of practice of marine conservation model for sustainable development: case study of blue swimming crab bank in the eastern region are concluded according to the objectives as follows:

1. Study results of important components of community of practice of marine conservation model for sustainable development: case study of blue swimming crab bank in the eastern region showed that Kaiser-Meyer-Olkin Test value was 0.8216. When statistical significance was tested by using Bartlett's Test of Sphericity, 95% of reliability level was found which means that the information was related and suitable for analyzing the components and gave more than 1.5 of Eigenvalues. 52.63% of them can be used in the explanation as shown below (Table 1).

Table 1 Initial Eigen Values for Factor Consideration

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Square Loadings		
	Total	% of Variance	%Cumulative	Total	% of Variance	%Cumulative	Total	% of Variance	%Cumulative
1	15.235	22.738	22.738	15.235	22.738	22.738	7.314	10.916	10.916
2	3.812	5.689	28.427	3.812	5.689	28.427	5.625	8.395	19.311
3	2.622	3.913	32.340	2.622	3.913	32.340	4.452	6.645	25.955
4	2.454	3.662	36.002	2.454	3.662	36.002	3.237	4.832	30.787
5	2.297	3.429	39.431	2.297	3.429	39.431	3.163	4.721	35.508
6	1.988	2.967	42.398	1.988	2.967	42.398	2.861	4.270	39.778
7	1.872	2.794	45.192	1.872	2.794	45.192	2.226	3.322	43.100
8	1.745	2.604	47.796	1.745	2.604	47.796	2.209	3.297	46.397
9	1.689	2.522	50.318	1.689	2.522	50.318	2.177	3.249	49.646
10	1.578	2.356	52.673	1.578	2.356	52.673	2.028	3.028	52.673

According to Table 1, factors of each components were extracted by Principle Component technique and rotated by Varimax and more-than-0.5 Factor Loading consideration methods in order to arrange suitable factors for each components (10 components 39 variables).

2. For results of model development from 10 components in the first step, the important and relating components of community of practice of marine conservation model for sustainable

development were considered and filtered by the experts drafting the model with the 6 following main components; (1) Leader, (2) Establishment, (3) Learning, (4) Social capital, (5) Social network, and (6) administration and 47 sub components. Results of consistency evaluation and overall suitability of the model, main and sub components are in the highest level as shown in Table 2.

Table 2

Mean and Standard Deviation of Consistency and Overall Suitability of the Model, Main and Sub Components (n = 6)

Community of practice of marine conservation model for sustainable development in the eastern region	Consistency of model			Suitability of model		
	\bar{X}	SD	Meaning	\bar{X} □	SD	Meaning
Model overview	4.78	0.36	highest	4.64	0.46	highest
Main components	4.76	0.36	highest	4.69	0.47	highest
Sub components	4.77	0.48	highest	4.75	0.48	highest

The results of community of practice of marine conservation model drafting for sustainable development in the eastern region were brought into focus group. The model was called MARINE 6 Model by focus-group

participants. Names of main and sub components are shown in Fig.2.

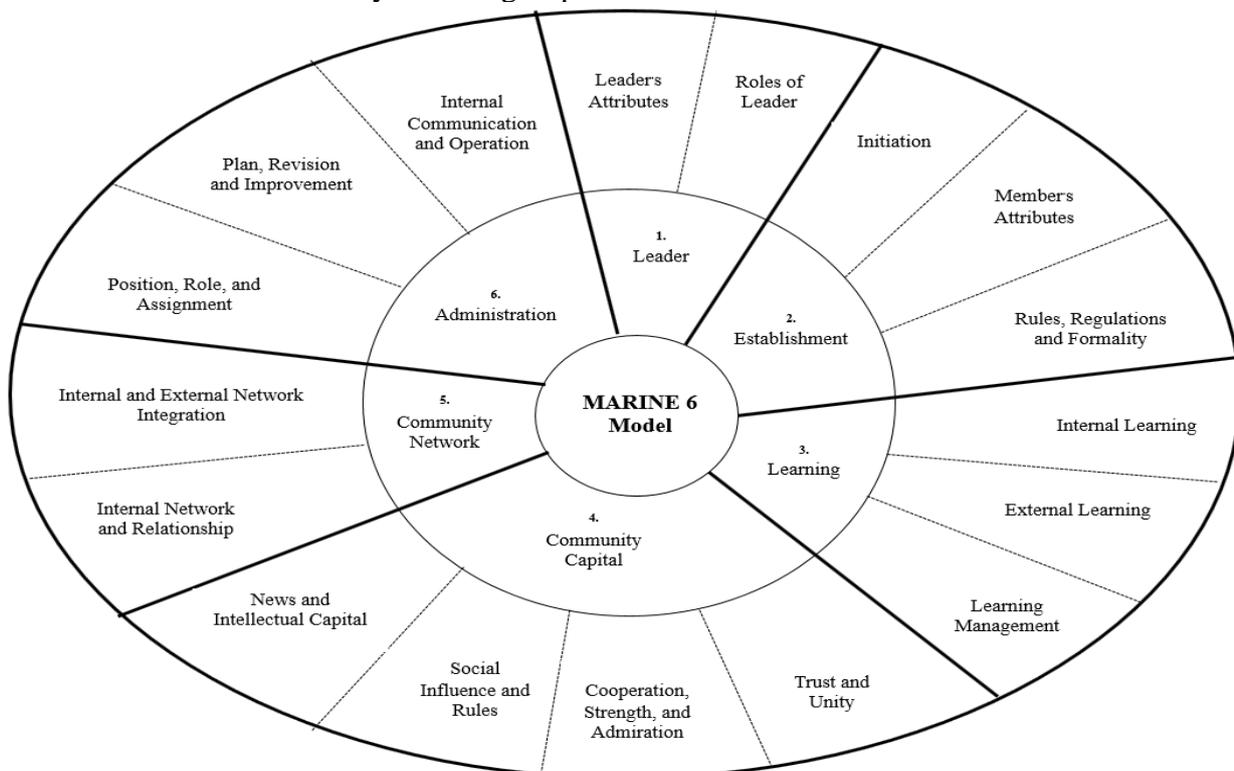


Fig. 2 Community of Practice of Marine Conservation Model for Sustainable Development in The Eastern Region

3. For results of model evaluation of developing community of practice of marine conservation model for sustainable development, the focus-

group participants agreed on the model suggested by the experts and prioritized and named the components. The final model consisted of 6 and 47 main and sub components respectively. Results

of suitability evaluation and usage possibility are shown in Table 3.

Table 3
Mean of Suitability and Usage Possibility Levels from Focus-Group Participants' Evaluation

Main Components	Level of Suitability			Level of Possibility		
	\bar{x}	SD	Meaning	\bar{x}	SD	Meaning
Leader	5.00	0.00	highest	4.95	0.13	highest
Establishment	4.95	0.15	highest	4.90	0.24	highest
Learning	4.93	0.14	highest	4.87	0.33	highest
Community Capital	4.90	0.23	highest	4.79	0.39	highest
Community Network	4.79	0.39	highest	4.75	0.43	highest
Administration	4.77	0.41	highest	4.73	0.14	highest
Total	4.87	0.22	highest	4.83	0.32	highest

According to Table 3, it was found that mean of suitability and usage possibility levels of overall model and each-aspect component of every components were in the highest level (\bar{x} = 4.87, 4.83) and sort by the following scores; (1) Leader (\bar{x} = 5.00, 4.95), (2) Establishment (\bar{x} = 4.95, 4.90), (3) Learning (\bar{x} = 4.93, 4.87), (4) Community capital (\bar{x} = 4.90, 4.79), (5) Social network (\bar{x} = 4.79, 4.75), and (6) Administration (\bar{x} = 4.77, 4.73).

Discussion

Overall discussion of community of practice of marine conservation model for sustainable development in the eastern region is corresponding to concepts of Wenger, McDermott & Snyder (2002 : 51-60) mentioning about 7 designs of community of practice for sustainable development; (1) combination of physical and social structures with organization relying on community contexts, (2) combination of internal and external aspects by bringing news and knowledge into the community in order to better understand self-potential and other communities' aspects, (3) persuasion and attraction to take part as a member, (4) connection with external networks to exchange information and interact, (5) support opportunities for members to present or act on worthy things, (6) motivation of members' new feelings by using different activities, and (7) motivation of members' enthusiasm and initiation by using the operations according to community events and contexts.

Discussing main components can be prioritized following to the focus group as follows:

1. Leader means an attribute of natural leadership and roles of the leader. This is in accordance with the study of Greenberg & Baron (2003 : 473) which stated that a leader must have vision, cooperate with workers to lead the team to achieve goals, and know well about what he is doing. The leader is an initiator of new things for work. In addition, the study of Northouse (2016 : 20-24) is found connected as it stated that a leader must play a role in consultation and assignment to motivate and give opportunities to the members to suggest, participate, and decide including allow them to have duties of important jobs and complicated problem solving.
2. Establishment means initiation, member's attributes, rules and regulations, and formality. This is in accordance with the studies of Wenger, McDermott & Wenger (2002 : 39-42) and Zanjanai & Alami (2009 : 4) which stated that the establishment of community of practice is a part of natural occurrence or formation. The members must pay attention, have mutual objectives, problems and desires including participation. One important indicator is that they must have engagement, ownership, determination, imagination, mutual expectation, knowledge sharing, and norm specification for cohabitation.
3. Learning means internal and external learning including learning management. This is in accordance with the study of Ribeiro (2009 : 29-30) which stated that knowledge comes from individuals and visualization of social status such as meeting, having conversation, and talking. They effect on transferring various existing points

of view which are tacit knowledge as needed knowledge in always-rotating cycle resulting in the expansion of job-training scopes and generating expertise. In addition, the study of Scarso, Bolisani, & Salvador (2009 : 444) was found related as it stated that the determination of learned topics or issues must be specific about community including an interaction among external specialists in different aspects is a key success factor of learning in community of practice.

4. Community capital means trust, unity, cooperation, strength, admiration, power, social rules, news, and intellectual capital. This is in accordance with the study of Putnum (2002 : 15) which stated that strong and powerful community organizations are originated from norm and trust among members which effect on contacting, sharing, cooperating, having fast and convenient local news system and intellectual capital. In addition, the study of All-Shahrani & Heba (2014) was found related as it stated that components of successful community of practice are fair product distribution, rewarding and admiration.

5. Community network means internal networks, relationship within the networks, and the integration between internal and external networks. This is in accordance with the study of Polsri S. (2007, pp. 264-265) which stated that good network must have good relationship among internal and external members so that sufficient sharing is achieved and activities can be efficiently carried out. Moreover, the members are also informed with modern and useful news and information. This is also corresponding to the study of Puangsamlee A. (2007 : 4-6) which stated about member's relationship system such as engagement, consistency, tools and communicative channels that helps maintain the group. Relationship model connecting to the outside world can also cause good development of community of practice.

6. Administration means position, role, assignment, plan, revision, improvement, operational method, and internal communication. This is in accordance with the study of Lohitwiset S. (2016 : 26-27) which stated that giving opportunity to have people participate in thinking, prioritization, analysis for causes, solving problems, planning, operation towards the plans and evaluation including appointing duties, assignment, decentralization, coordination and

suitable resource allocation enables sustainable development of community of practice.

Conclusion

Community of practice of marine conservation model for sustainable development case study in the eastern region from this research is carried out by Mix Methods Research which shows 6 important components enabling marine resource conservation for sustainable development; they are (1) leader, (2) establishment, (3) learning, (4) community capital, (5) community network, and (6) administration. The acquired model can be used or applied as guidelines for establishment or operation of marine resource conservation groups in order to return, maintain, and expand the marine resource conservation. The basis of such establishment is the local's conscience of marine resource conservation connecting to relating environmental conservation, continuous learning effecting on better development of conservation and the expansion of participation leading to the cooperation that strengthens the community to be able to stand by itself under the leader's guide by utilizing community capital and an interaction between internal and external networks including using the administration as a tool to connect other duties. These will enhance marine resource conservation and other by-products in Thai seas and lead to sustainable development of national society, economy and environment accordingly.

Research Suggestions

1. Marine resource conservation should be raised in provincial policies by setting a province as a center of planning, budget allocation and evaluation follow-up system. Local administration mechanism is used by having the establishing community participate in every procedure.
2. Government agencies relating to the establishment or operation should consider socio-geographic factors such as the local's demand, community strength, conscience, and participation etc. Such factors should then be integrated together.
3. Conscience implantation, transferring knowledge about marine resource conservation to the youth, and building the local's participation should be carried out by cooperating with education institutes to set such issues as one of subjects about community.

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