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Formulation of Sustainable Management Policy Direction for Turtle Conservation Area of Pangumbahan Beach in Sukabumi Regency

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Abstract
Nowaday, the management of the turtle conservation area of Pangumbahan Beach in Sukabumi is not optimally practiced yet, either from the points of ecological, social or economic dimensions. In connection with that, the research is conducted with the aim to formulate the policy of the sustainable turtle conservation area management. This study uses the interpretation structural modeling techniques (interpretative structural modeling / ism). The results of the research are the strategic policies such as follows: (1) to improve the coordination among the stakeholders; 2) the synchronization of legislation, the establishment of minimum sanctions, and to increase the role of the stakeholders; 3) the increase in funding; (4) the capacity building and the procurement for managers; and (5) the improvement of knowledge and skills of the communities, the infrastructure, the planting vegetation, and the reduction of lighting in the conservation area.
Keywords: Interpretative structural modeling, Pangumbahan Beach, conservation area, sustainable management, stakeholders.

1.0 Introduction

1.1 Background

Pangumbahan Beach is the turtle conservation area consisting of the land of 115 ha with the coastline along ± 2,300 m and the width ashore of 500 m as well as the width to the direction of the sea of 4 miles measured from the shoreline (Decree of the Regent Number 523/Kep.639-Dislutkan/2008). The conservation area of Pangumbahan Beach has the tourism potential which can become the tourist attraction in the country and abroad. The main tourism of Pangumbahan Beach is the turtle tourism. The activities of the turtle tourism provided by the manager of Pangumbahan Beacth are the film screening on turtle, the release of hatchling, and to watch the turtle nesting. The types of turtles that are nesting in Pangumbahan Beach consist of olive ridley turtle, loggerhead turtle, hawksbill turtle, leatherback turtle, and green turtle. It makes Pangumbahan Beach as one of the areas having the potential of high and productive sea. Other than that, it also indicates that Pangumbahan Beach is a suitable habitat for several species of the turtles.

The potential of the natural resources owned by Pangumbahan Beach, on the other hand it can threaten the existence of the habitat and the turtle which activities are around the area. This is because the excessive exploitation of coastal resources. Based on WWF-Indonesia (2009), the sale of turtle is still a lot going on around the area of Pangumbahan Beach. When this has been a lot of policies issued by the government, but its implementation is not optimal yet. As one way to help the turtle conservation area management of Pangumbahan Beach is by formulating the policy direction to support the management of the area sustainably.

1.2 Problem Formulation

Pangumbahan Beach has the potential of the high coastal natural resources. Sobari *et al.* (2006) found that the potential of the natural resource of marine and coastal areas in Indonesia could be made the touring objects which attract the tourists to visit. Pangumbahan Beach has the beautiful natural landscape, the waves that are suitable for the surfing activities, the sprawling white sand, the state of the crystal clear waters, and the activities of landing and nesting of the turtles which can be the attraction for tourism. However, the turtle conservation area management system in Pangumbahan Beach is still less than optimal. It is characterized by the environmental management of the coast which is inadequate. Although it has been built the turtle center, the number and the skill level of human resources are still lacking, as well as the levels of education and knowledge of the clerk about the turtle are still low. Other than that, still low firmness in giving the sanction and enforcing the rules on the villa owners and the takers of the turtle eggs illegally results in the increase of the number of villa building established around the beach, and it occurs the damage in the coastal vegetation.

The tourism development in the turtle conservation area of Pangumbahan Beach is considered to be very risky. This is due to the law enforcement which remains very weak, added with the supervision of the

development in the conservation area which is not in accordance with the vision and mission of the sustainable development (Benyamin 1997; Mulyaningrum 2004; Safri 2003). As for tackling some of the threats to the existence and the habitat of the turtle, the local government of Sukabumi then issues the local regulation (PERDA) Number 5 in the Year of 2009 about the Turtle Preservation in Sukabumi District. In connection with these descriptions, the question that will be answered in this research is: How to formulate the turtle conservation area management policy of Pangumbahan Beach sustainably?

1.3 Aim of Research

The aim of research is to formulate the policy direction of the management of the turtle conservation area of Pangumbahan Beach in Sukabumi sustainably.

2.0 Methodology

2.1 Time and Place

This research was implemented in the turtle conservation area of Pangumbahan Beach, Ciracap Subdistrict, Sukabumi District, West Java. The research was conducted in March – August 2015. The area was in form of the land of 115 ha consisting of the coastline of ± 2,300 m with the width to the landward of 500 m measured from the shoreline of ± 2,300 m and the width to the seaward of 4 miles measured from the shoreline (Decree of the Regent Number 523/Kep.639-Dislutkan/2008). Administratively, Pangumbahan Beach was bordering with the Nature Reserve (BKSDA Cikepuh) and Gunung Batu Village, the east was bordering with Gunung Batu Village and Ujung Genteng Village, and the south was bordering with Indonesian Ocean (Figure 1), the distance from Bogor City was 195 km reached by 4 hours of the journey. The research was conducted on March – August 2015.

Ujung Genteng – Pangumbahan Area
Zone 1. Natural Reserve Area.
Zone 2. General Recreation Area.
Zone 3. Green Belt Area.
Zone 4. Conservation Area.
Zone 5. Natural Reserve Area.

Figure 1. Research Location (Turtle Conservation of Pangumbahan Beach)

2.2 Data Collection Method

The primary data collection to build the structure of the ecotourism program is derived from the opinions of the experts about the contextual relationship between one sub-element with another sub-element (the interview technique). Furthermore, the data collection of the condition of the environmental biophysical is conducted by the observation technique. As for the secondary data only consist of the digital map, the document, and the general condition of the research location.

2.3 Procedure of Reseach

One of the modeling techniques developed for the strategic policy planning is the Interpretative Structural Modeling (ISM) Technique**.** ISM can be used for developing some types of the structures, including the effect structure (for example: support or waiver), the priority structure (for example: 'more important than', or 'should be studied before'), and the idea category (for example: 'included in the same category with') (Broome *in* Kanungo and Bhatnagar 2002).

The steps taken in the ISM method according to Marimin (2009), are: (1) to identify and register the

elements, (2) to make the contextual relationship, (3) to make the Structural Self Interaction Matrix (SSIM), (4) to make the Reachability Matrix (RM), (5) to analyze the level of participation for clarifying the elements in the different level from the structure of ISM, (6) to make the Canonical Matrix, (7) to compile the Diagraph, and (8) to awaken the ISM.

The program being examined the leveling of its structure is divided into elements. According to Saxena (1992), the program can be divided into nine elements, i.e.: (1) the community sector which is affected, (2) the need from the program, (3) the main constraint, (4) the possible changes, (5) the purpose of the program, (6) the benchmark to assess the purpose, (7) the activities that are necessary in order to plan the action, (8) the size of the activity in order to evaluate the results achieved by each activity, and (9) the institution involved in the implementation of the program.

Furthermore, every element of the program assessed is translated into a number of sub elements. After that, it is defined the contextual relationship between the sub element contained a direction in the terminology of subordinate heading in the pairwise comparison, such as "Is the A goal more important than the destination of B?". The pairwise comparison illustrated the interconnectedness among sub elements or the absence of the contextual relationship conducted by the expert. If the number of expert is more than one, then it is performed the grading.

Then the methodology and the technique of ISM are divided into two parts, i.e. the preparation of the hierarchy and the classification of sub element. The classification of sub element refers to the processed result from RM (Eriyatno 2003) which has met the transivity rules, so that it gets the value of Driver-Power (DP) and the value of Dependence (D), namely:

a. Sector I: Weak driver - weak dependent variabels (Autonomus) is the sub element with the value of DP $\leq$ 0.5 X and D $\leq$ 0.5 X, with X of the number of sub element. The sub element entering in the sector generally is not related to the system, and it may be having a little relationship, although the relationship can be strong.
b. Sector II: Weak driver - strongly dependent variabels (Dependent) is the sub element with the value of DP $\leq$ 0.5 X and D > 0.5 X. In general, the sub element entering into this sector is the sub element which is not free.
c. Sector III: Strong driver - strongly dependent variabels (Linkage) is the sub element with the value of DP > 0.5 X and D > 0.5 X. The sub element entering into this sector must be studied carefully, because the relationship between the sub-elements is not stable. Any action on the sub elements will give an effect to other sub-elements and the good feedback effect can magnify the impact.
d. Sector IV: Strong driver - weak dependent variabels (Independent), is the sub element with the value of DP > 0.5 X and D $\leq$ 0.5 X. The sub element entering into this sector is the remaining part of the system and so-called the independent variable.

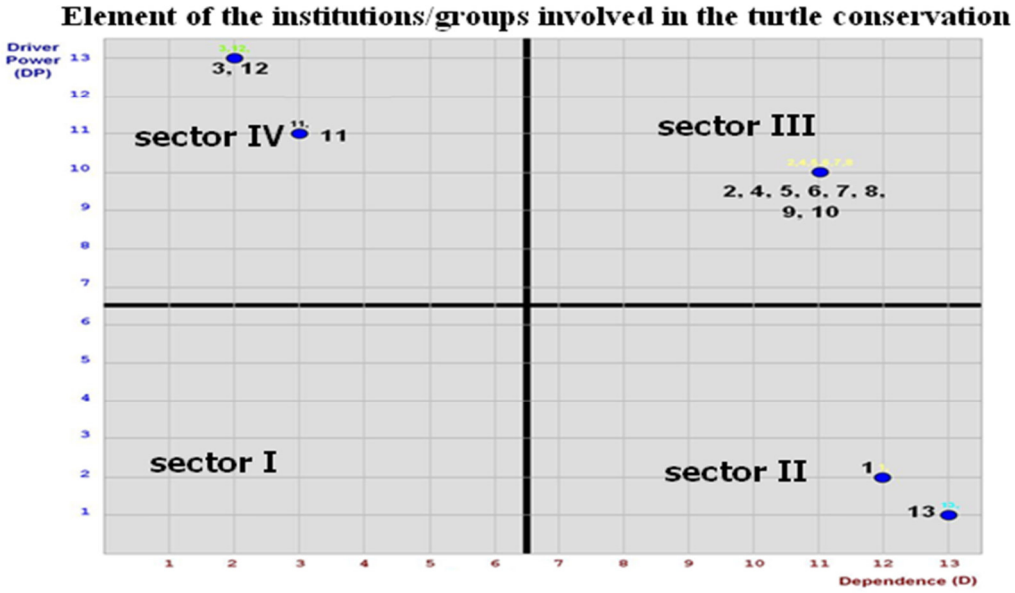
3.0 Result and Discussion

3.1 Structuring of Elements

The result of the interview with the expert is obtained five main elements which must be considered in the policy making, i.e.: 1) the institutions/groups involved in the turtle conservation, 2) the needs of the program of the turtle conservation, 3) the purposes of the turtle conservation, 4) the main constraints of the turtle conservation, and 5) the activities needed in the turtle conservation.

3.2 Element of the institutions involved in the turtle conservation

The contextual relationships used to analyze the interconnectedness among the stakeholders are the role relationship and the involvement. The verification in the element of the institutions involved in the turtle conservation consists of 3 quadrants i.e. independent, linkage, and dependent. The matrix of the driver power - dependence sub element for the element of the institutions/groups involved in the turtle conservation can be seen in Figure 2.

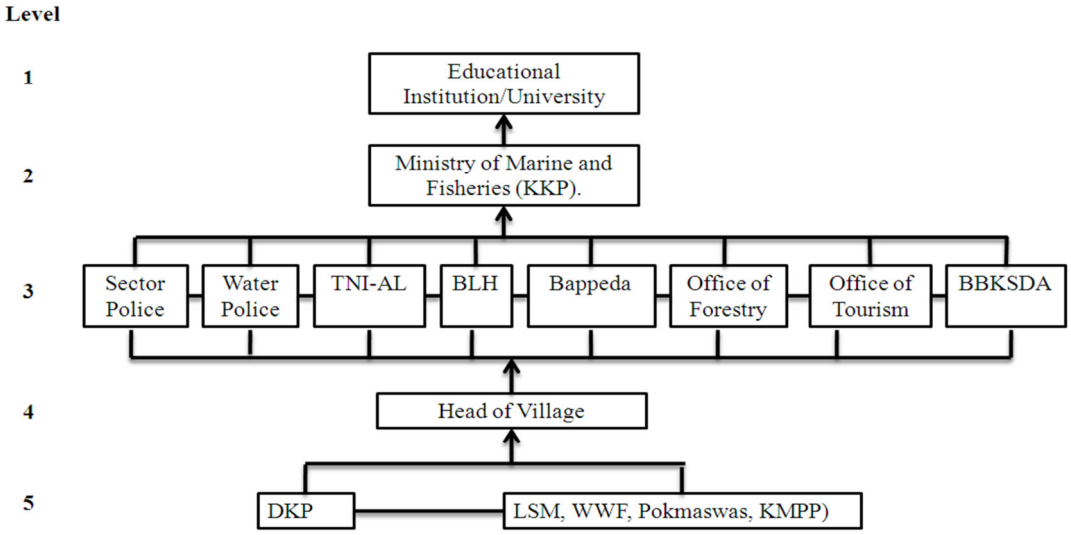


Notes:

1 Ministry of Marine and Fisheries (KKP)
2 Center for Natural Resource Conservation of West Java (BBKSDA)
3 Office of Marine and Fisheries of Sukabumi District (DKP)
4 Office of Tourism, Culture, Youth and Sport of Sukabumi District (*Dispar*)
5 Office of Forestry and Plantation of Sukabumi District (*Dishutbun*)
6 Environmental Agency of Sukabumi District (BLH)
7 *Bappeda* of Sukabumi District (BLH)
8 TNI Navy (TNI-AL)
9 Sector Police of Ciracap Subdistrict (*Polsek*)
10 Water Police (*Polair*)
11 Head of Village / *Lurah*
12 Non-Governmental Organization (LSM, WWF, *Pokmaswas*, KMPP) and so on
13 Educational Institution / University

Figure 2. Matrix of the driver power-dependence of the sub-elements on the element of the institutions/groups involved in the turtle conservation

As for the structure of the system of the element / institution involved in the turtle conservation can be seen in Figure 3, it shows that DKP and LSM, WWF, *Pokmaswas*, and KMPP are in the fifth level, and they are the key sub elements in the turtle conservation. Meaning, the slight change of this institution will result in the large changes in other institutions because the big changes toward other institutions. In the fourth level, the institution involved is the Head of Village / *Lurah*. The role of the Head of Village / *Lurah* is very important in the effort of the socialization of the regulation of the turtle conservation through the activities of the extension and the community development and to develop the potential of the turtle tourism. The sub elements/institutions involved in the third level are *Polsek*, *Polair*, TNI-AL, BLH, *Bappeda*, *Dishutbun*, *Dispar*, and BBKSDA. The role and the involvement of each institution can be considered as equivalent, although each has the different role and function. In the second level, the institution involved is the Ministry of Marine and Fisheries (KKP), the role of KKP in supporting the implementation of the turtle conservation in *Taman Pesisir Pantai Penyu Pangumbahan* (TP_4) is closely connected with the provision of the financial support, the coaching, and the monitoring and evaluation (monev). The last level is the Educational Institution/University having the role in the research activity which results can be made the recommendation in the management of the turtle conservation in TP_4.



Level

1. *Educational Institution/University.*
2. *Ministry of Marine and Fisheries (KKP).*
3. *Sector Police - Water Police - TNI-AL – BLH – Bappeda - Office of Forestry - Office of Tourism - BBKSDA.*
4. *Head of Village / Lurah.*
5. *DKP.*
   LSM, WWF, Pokmaswas, KMPP.

Figure 3. Structure of the element system of the institution/group involved in the turtle conservation

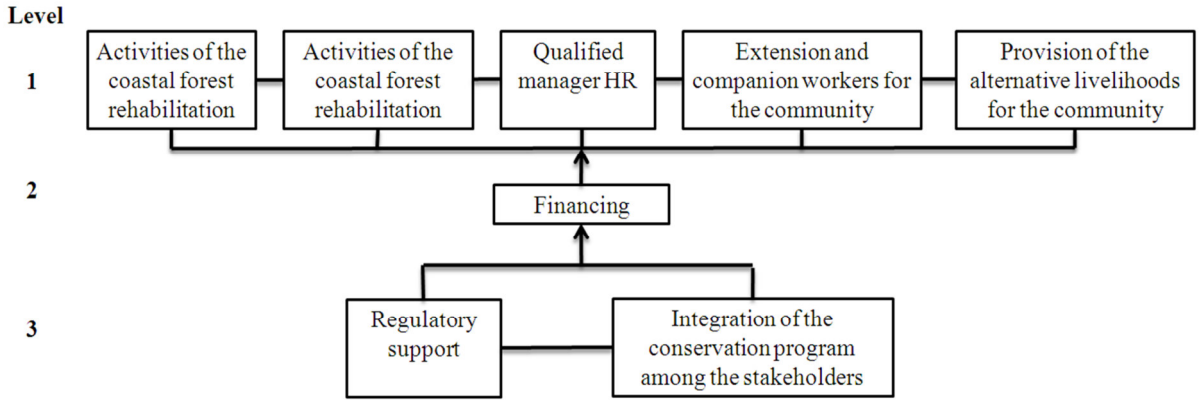
3.3 Element of the needs of the turtle conservation program

The element of the need shows the programs needed by the stakeholder to conserve the turtle. Based on the analysis result, there are 8 sub elements of the needs of the turtle conservation program of Table 1. The contextual relationship used to analyze the need of the turtle conservation is the effect relationship, i.e. a need will help the other fulfillment.

Table 1. Elements of the need of the program in the turtle conservation.

No	Sub element
1	Regulatory Support
2	Qualified Manager of Human Resources
3	Facilities and Infrastructure of the waters area management
4	Financing
5	Activities of the coastal forest rehabilitation
6	Integration of the conservation program among stakeholders
7	Extension and companion workers for the community
8	Provision of the alternative livelihoods for the community

The structure of the system of the element of the need of the turtle conservation program can be seen in Figure 4, it shows that the regulatory support and the integration of the conservation program among stakeholders are in the third level and it is the key sub element in the turtle conservation. Both sub elements become the major driver and influence the sub element of the provision of financing. The fulfillment of the need of the provision of financing will push the fulfillment of the provision of the qualified manager HR, the facilities and infrastructure of the waters area management, the activities of the coastal forest rehabilitation, the extension and companion workers for the community, and the provision of the alternative livelihoods for the community.



Level

1. Activities of the coastal forest rehabilitation.
   Facilities and infrastructure of the waters area management.
   Qualified manager HR.
   Extension and companion workers for the community.
   Provision of the alternative livelihoods for the community.
2. Financing.
3. Regulatory support.
   Integration of the conservation program among the stakeholders.

Figure 4. Structure of the element system of the need of the program of the turtle conservation.

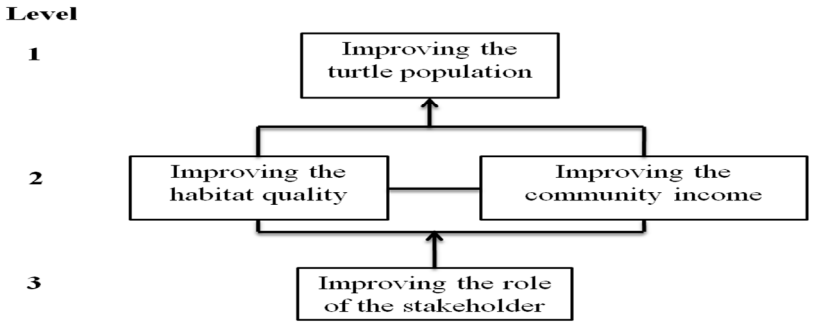
3.4 Aim of the turtle conservation

The element of the aim of the conservation program is to improve the performance of the turtle conservation. Based on the analysis result, there are 4 sub elements of the aim of the turtle conservation program (Table 2). The contextual relationship used to analyze the interconnectedness among the sub elements is the effect relationship, i.e. the purpose will reach another purpose.

Table 2. Elements of the aims of the program in the turtle conservation.

No	Sub element
1	Improving the turtle population
2	Improving the habitat quality
3	Improving the community income
4	Improving the role of the stakeholders

The structure of the system of the element of the aim of the turtle conservation can be seen in Figure 5, consisting of 3 levels, i.e. to improve the role of stakeholder which is in the level three and it is the key sub element in the aim of the turtle conservation. To improve the role of the stakeholders of the management, both of DKP, LSM, *Pokmaswas*, KMPP, Local Government, Village, Community, Security forces, BBKSDA, KKP and others can influence the aim of the improvement of the habitat quality and the community income, and at last it will push the achievement of the increase of the turtle population.



Level

1. Improving the turtle population.
2. Improving the habitat quality.
   Improving the community income.
3. Improving the role of the stakeholder.

Figure 5. Structure of the element system of the objectives of the turtle conservation

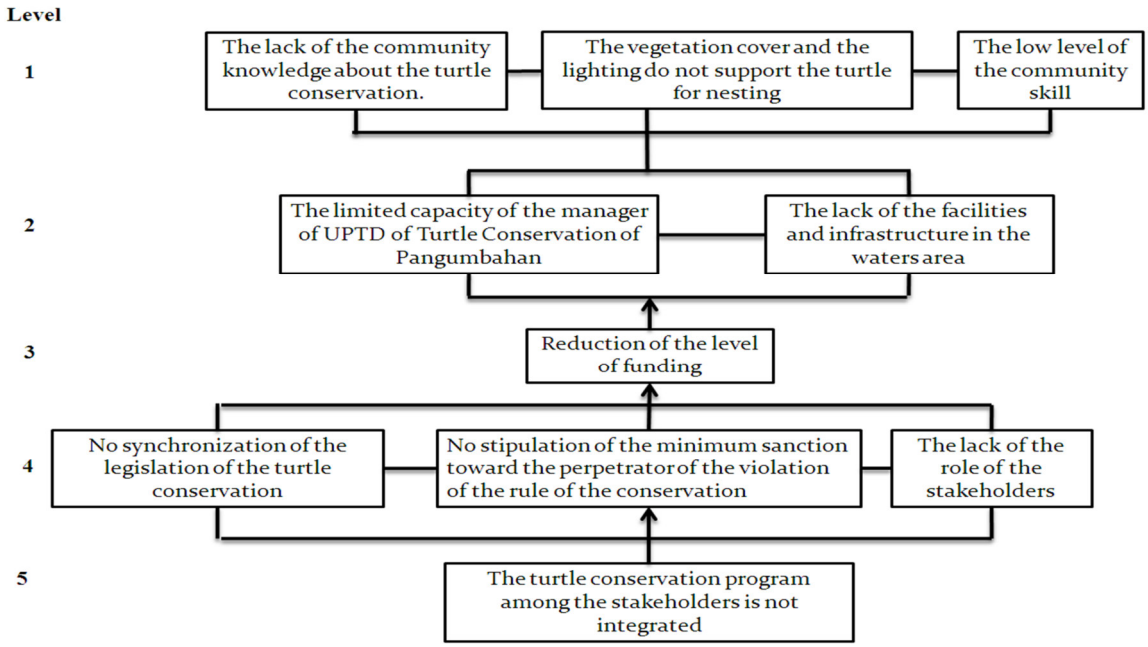
3.5 Element of the main constraints of the turtle conservation

In achieving the aim of the turtle conservation, there are 10 main constraints which should be completed (Table 3). The contextual relationship used is the effect relationship, namely to reduce the main constraints will help to reduce the next constraints.

Table 3. Elements of the main constraints of the turtle conservation.

No	Sub element
1	No synchronization of the legislation of the turtle conservation
2	Turtle conservation program among the stakeholders is not integrated
3	No stipulation of minimum sanction toward the perpetrator of the violation of the rule of the conservation
4	The limited capacity of the manager of UPTD of the turtle conservation of Pangumbahan Beach
5	Reduction of the level of funding
6	Lack of the facilities and infrastructure in the water area
7	Lack of the role of the stakeholders
8	Vegetation cover and the lighting do not support the turtle for nesting
9	Lack of the commuity knowledge about the turtle conservation
10	Low level of the community skill

The structure of the system of the element of the main constraints of the turtle conservation caan be seen in Figure 6, consisting of 5 levels. The hierarchical structure shows that the turtle conservation program among the stakeholders is not integrated. Meaning, to reduce the constraints which are not integrated, the conservation program among the stakeholders can reduce the constraints in the fourth, third, second, and first levels.



Level

1. The lack of the community knowledge about the turtle conservation.
   The vegetation cover and the lighting do not support the turtle for nesting.
   The low level of the community skill.
2. The limited capacity of the manager of UPTD of Turtle Conservation of Pangumbahan.
   The lack of the facilities and infrastructure in the waters area.
3. Reduction of the level of funding.
4. No synchronization of the legislation of the turtle conservation.
   No stipulation of the minimum sanction toward the perpetrator of the violation of the rule of the conservation.
   The lack of the role of the stakeholders.
5. The turtle conservation program among the stakeholders is not integrated.

Figure 6. Structure of the system of the element of the main constraints of the turtle conservation

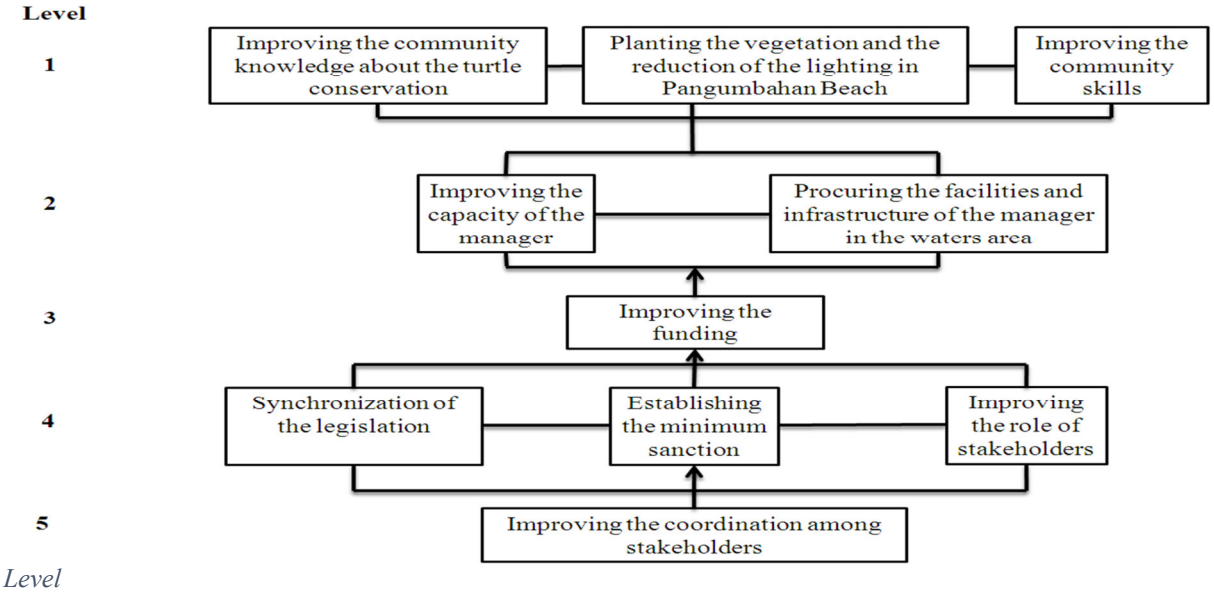
3.6 Element of the activities needed

The activities needed in the turtle conservation are the results of the element of the need of the turtle conservation program, the conservation purpose, and the main constraint of the turtle conservation. The sub element activities needed consist of 10 sub elements (Table 4). The activities are the programs needed to be done, in order that the performance of the turtle conservation improves.

Table 4. Elements of the activities needed in the turtle conservation

No	Sub element
1	Synchronization of the legislation
2	Improving the coordination among the stakeholders
3	Establishing the minimum sanction
4	Improving the capacity of the manager
5	Improving the funding
6	Procurement of the facilities and infrastructure in the waters area management
7	Improving the role of the stakeholders
8	Vegetation planting and the reduction of the lighting in Pangumbahan Beach
9	Improving the community knowledge about the turtle conservation
10	Improving the community skill

As for the structure of the element system of the activities needed in the turtle conservation can be seen in Figure 7 consisting of 5 levels. The sub element becoming the key activity is the improvement of the coordination among the stakeholders. The turtle conservation needs the integration concept namely the integrated (mutual support) among stakeholders, and each stakeholder conducts the activity in accordance with the plan which has been set. The key sub element is the major drive and it influences the sub element in the next level, namely the improvement of the role of the stakeholders, the synchronization of the legislation, and the establishing of the minimum sanction. The three sub elements will push the achievement of the activities of the improvement of the funding. The suitable funding will push the achievement of the improvement of the capacity of the manager and the procurement of the facilities and infrastructure of the waters area management. Furthermore, the activities of the improvement of the community knowledge, the improvement of the community skill, the vegetation planting, and the lighting will be achieved.



Level

1. Improving the community knowledge about the turtle conservation.
   Planting the vegetation and the reduction of the lighting in Pangumbahan Beach.
   Improving the community skills.
2. Improving the capacity of the manager.
   Procuring the facilities and infrastructure of the manager in the waters area.
3. Improving the funding.
4. Synchronization of the legislation.
   Establishing the minimum sanction.
   Improving the role of stakeholders.
5. Improving the coordination among stakeholders.

Figure 7. Structure of the system of elements of the required activities in the turtle conservation.

Conclusion and Suggestion

Conclusion

The strategic policies for the management of the turtle conservation area in Pangumbahan Beach are: (1) to improve the coordination among stakeholders; 2) 2) the synchronization of legislation, the establishment of minimum sanctions, and to increase the role of the stakeholders; 3) the increase in funding; (4) the capacity building and the procurement of the facilities and the infrastructure for managers; and (5) the improvement of knowledge and skills of the communities, the planting vegetation, and the reduction of lighting in the conservation area of Pangumbahan Beach.

Suggestion

In order to realize the management of the turtle conservation area of Pangumbahan Beach sustainably, it is delivered some things as follows: the improvement of the system and the organizational structure of area manager, the addition of the personnel in the effort to secure the turtle, the renewal of the existing regulations, and the planting of vegetation in accordance with the turtle habitat during the nesting.

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