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Research Article

EDIBLE JELLYFISH RESOURCE: A MODEL OF COMMUNITY-BASED COASTAL FISHERIES MANAGEMENT

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ABSTRACT

Fisheries resources management of a single species is planned and approached holistically and sustainably. Similarly, edible jellyfish (scyphozoan) resource management is undergoing a period of blooming every year. Scyphozoan is one of fishery resources that lives in the Indonesia coastal waters and has an important value (economic value). Studies on the edible jellyfish fishery resources management aims to (a) improve the sustainability status and (b) formulate a strategy (management model, operational policies, direction of action). The research activities carried out at Saleh Bay (Sumbawa Island, Indonesia) covering an area of 2,123 km^2, and the authors visited four times. This research method is a survey method and the method of data collection by sampling method (simple random sampling). Data processed by RAPJELLYFISH method which is a modification of RAPFISH. RAPJELLYFISH analysis results showed that the status of edible jellyfish fishery resources management is "Quite Sustainable" (54.00) and there are 15 sensitive attributes that affect sustainability status. After the intervention of all sensitive attributes, and then re-analyzed by method RAPJELLYFISH, and the status of sustainability increased to "Sustainable" (79.37). Educational Level and Ratio of Quota is the sensitive attributes that most influences of sustainability management status. The most important policy recommendation is the Increase of Management Institution Capacity. Recommended co-management model namely Community-Based Small Scale Coastal Fisheries Management (CBSSCFM) and five operational policies. While the most important recommendation is immediately establishes the independent Authority for managing of Saleh Bay area.

INTRODUCTION

Background

Edible jellyfish is one of fishery resources that lives in the Indonesia coastal waters and has an important value (economic value). Generally, edible jellyfish is not sufficiently widely known by most people in Indonesia. This is indicated by the absence of the type of cuisine that is the main raw material from edible jellyfish. Only little the Moluccas people especially those living around Ambon Island who have made use of edible jellyfish as the main ingredient of as their traditional food namely *papeda* (pers. comm. Maureen). That food is a type of cuisine that characterizes of the Moluccas people, which is famous in Indonesia.

Many Indonesian marine coastal waters are suitable habitat for edible jellyfish. Fishing ground of edible jellyfish scattered throughout the Indonesian coastal waters from the waters of Malacca Straits, Karimata Straits, Semangka Bay (Sunda Straits), Java Sea, Indian Ocean, Flores Sea (Saleh Bay), and Bacan Island. Meanwhile, the activities of edible jellyfish fisheries in Indonesia did not take place in all of marine coastal waters. There are only a few places as the jellyfish fisheries centers namely Semangka Bay (Lampung), Cilacap (Central Java), Prigi and Muncar (Eastern Java), Kota Baru (Southern Borneo), Sumbawa (West Nusa-Tenggara), and Bacan Island (Northern Moluccas).

Edible jellyfish fisheries resource management activities in the waters of Saleh Bay in the form of utilization of edible jellyfish resources have been taking place since 2003, but in very small quantities and no commercial (Asrial *et al*., 2015a). Commercial fishing activities of edible jellyfish resource began since 2006, conducted by Saleh Bay fishermen from Sumbawa Regency. Whereas Saleh Bay fishermen derived from Dompu Regency catch edible jellyfish began in 2009.

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Its activity consists of fishing and processing of edible jellyfish resources, and trading of edible jellyfish product. The utilization activities consist of edible jellyfish fishing by small scale fishermen, processing by investors and trading of the products by the exporters. Edible jellyfish fishing activities carried out in the coastal waters of the bay, fresh edible jellyfish processing carried out in mainland coastal bays, and exports of edible jellyfish product abroad from Surabaya (East Java).

Many experts agree that the management of fishery resources is sustainable management based on holistic approach inter-alia aspects of ecological, economic, social, technological, and/or legal (Pitcher *et al*., 1998a; Dagnbol, 2001; Charles, 2001; Dahuri, 2002; Fauzi, 2006; Saenz-Arroyo and Roberts 2006; Nuitja, 2010; Tuwo, 2011; Sulaiman, 2011). They require a holistic approach to the management of fisheries resources so that resources are not collapse. From the foregoing description it appears that the process of sustainable management of fishery resources involving aspects of fish (resources), water (ecosystem), and humans (beneficiary/user).

So far there has been no evaluation of the management (utilization) of edible jellyfish resources in Indonesia, including in Saleh Bay. Asrial *et al*. (2015b) reported that the rate of exploitation of the edible jellyfish resources in the waters of the Saleh Bay has reached 92.65% or "fully exploited", and the sustainability status of management at the level of "quite sustainable". At the management level like this, it's time to do sustainable management for security and safety of edible jellyfish resource stocks. The aim is for the sustainability of fishing activity and stability of edible jellyfish edible jellyfish fishermen's income. This is in accordance with the opinion of Garcia *et al*. (1999) namely if the rate of exploitation of fishery resources has reached a "fully exploited" then it should be applied to a model of sustainable management.

Issues relating to edible jellyfish fishery resources management namely each country of edible jellyfish producer has not had a model of sustainable management of edible jellyfish fisheries resources. The model must provide security for resources stocks, decent income for fishermen, a reasonable profit (for fishing vessel owners and investors of edible jellyfish business), and sufficient income for other needs of stakeholders, which always increase over time. Croatia have applied the model of edible jellyfish resource management with the ecosystem approach (single aspect), but not a holistic approach (Graham *et al*., 2009)

MATERIALS AND METHODS

Location, Materials, Equipment, and Data

Area of study is focused in the Saleh Bay (2,123 km^2) which is a suitable waters for the edible jellyfish. Saleh Bay area located in two administrative region namely Sumbawa Regency (western the bay) and Dompu Regency (eastern the bay). Until the writing of the manuscripts is completed, edible jellyfish fishery centers throughout the Lesser Sunda region is only found in the Bay of Saleh.

During the study, the authors visited four times to collect data and to know the phenomenon and activities of edible jellyfish fishery. Research activities take place during the period on 3.5 month (1st September to 15th December 2014) to collect cross section data (primary) and time series data (secondary), and also interviews with fishermen. Primary data are 104 individuals of edible jellyfish which used as the sample. Those samples were captured by local fishermen from the waters of the waters of Saleh Bay. The time series data are production of edible jellyfish and the number of scoop-net that used to catch edible jellyfish. The scoop-net (fishing gear), the light (attractor), the wooden boat (fishing vessel) and the basket (40 kg/basket) are the equipment to catch the jellyfish sample. The equipment that are used to identify the edible jellyfish consist of the digital scales, the rulers, and stationery, each as much as a set.

In this study we focus just on the type of edible jellyfish in the Saleh Bay. The aims of this study are as follows: (a) improve the status of plan sustainability (future) for sustainable management of edible jellyfish fishery resources in the Saleh Bay and (b) develop and formulate a strategy of sustainable management of the edible jellyfish fishery resource in the Bay of Saleh.

The research method is a survey method which aims to describe the phenomenon that occurs at the location of study related to the management of edible jellyfish fishery resources. Primary data compilation method is simple random sampling. While secondary data are the time series data that collected by the method of documentation. Secondary data collected consist of edible jellyfish production volume and number of scoop-net fishing gear.

Rapfish and Rapjellyfish Analysis

This study is the first complete research that discusses the sustainable management of edible jellyfish holistically. Therefore, it takes an approach to and assessment of some aspects that are considered to give effect to sustainability management. The method chosen in this study to assess the sustainability status of fisheries resources management is Rapid Appraisal for Fisheries (RAPFISH) were first developed and published by Fisheries Center, University of Columbia in 1999. RAPFISH analysis has been applied to evaluate the sustainability status of fisheries in many countries. RAPFISH analysis was used to evaluate the sustainability of commercial fisheries management in 26 countries in the world that consists of commercial-scale fisheries, subsistence, artisanal, and industrial (Pitcher *et al*., 1998b). RAPFISH analysis has also been applied to fisheries based on the type of waters include fishing lakes in Africa (Preikshot *et al*., 1998), a small scale tropical waters fisheries (Preikshot and Pauly, 1998), and the Atlantic and Pacific ocean fisheries (Pitcher and Power, 2000). RAPFISH analysis is used to evaluate and determine the level of sustainability of fisheries resource management (fishing) through the attributes contained in the dimensions of sustainability is manifested as the value of each of the attributes that have been given a score. RAPFISH methods are not rigid in its definition with regard to the definition of fisheries that are included in the analysis (Pitcher and Preikshot, 2001). RAPFISH analysis uses algorithms ALSCAL (Fauzi and Anna, 2002) which in principle is to make the smallest error value in the iteration process. The process of iteration is the repetition of the calculation to see the effect of errors in making a score on each attribute. Whereas according to Hartono *et al.* (2005), RAPFISH method is a fast and accurate method of assessment

which resulted in the description of the condition of the management of fisheries resources in a region.

In RAPFISH, fisheries can be defined as an entity which is broad in scope, such as fishing in the region of West Nusa-Tenggara Province, or in a more limited scope, for example in a region of jurisdiction (Saleh Bay), target species (edible jellyfish), the type of fishing gear (scoop-net) or vessel (wooden boat). All attributes in each dimension of sustainability that will be evaluated interchangeable chosen to reflect the status of sustainability, and can also be replaced and/or repaired when it obtained the latest information.

In this study, the basic analysis is the dimensions and attributes that used in research on the sustainable management of resources jellyfish in Saleh Bay in 2014. Analysis of the sustainability of edible jellyfish fisheries resource management was applying RAPJELLYFISH method that is modified and developed from RAPFISH method.

Multi-Dimensional Scaling (MDS)

RAPFISH based on the ordination technique (putting something on the order of attributes measured) using Multi-Dimensional Scaling (MDS). MDS itself is basically a statistical technique that tries to perform of multidimensional transformation into a lower dimension. According to Pitcher and Preikshot (2001), MDS is used for the ordination of a set/series of attributes that are followed by the scale and rotation. The survival of fish resources in the period of view is influenced by five aspects which are regarded as a critical area that is ecological, economic, ethical, social and technological (Alder *et al*., 2000; Pitcher and Preikshot, 2001)

MDS is multivariate statistical technique that is determine the positions of the object is studied that described through the ordinate point under the attributes that have assigned a score in RAPFISH. Through the ordination result obtained are these conditions will studied is on sustainable status or not.

Ordination is a process plotting (point) along axes prepared, in this case is 'GOOD' and 'BAD' axes. The horizontal axis shows difference of object that studied which in this case is the management of edible jellyfish fishery resources that descried in 'GOOD' and 'BAD', and expressed in percent (%) between 0 - 100%. The vertical axis shows the difference of the combined / mixed scores of each attribute in every dimension of the object being studied.

MDS method has the following stages: (Fauzi and Anna, 2005)

1. Standardization (normalization): Variables that have different units and magnitude should be standardized beforehand in order to be analyzed.
2. Multidimensional distance measurement: In this study, the distance between the gear on the origin can be seen.
3. Dimension reduction analysis: This analysis was also performed ALSCAL algorithms with excel template. The position of objects in multidimensional space above is plotted back to the two-dimensional space.
4. Measurement of the stress value: Stress is a 'value of standard deviation' of the MDS method. The smaller of the stress value is the better. The biggest stress value is still acceptable is 25%.

Dimensions and Attributes

The term of RAPJELLYFISH is pinned because for the first time this method is applied in evaluating of the sustainability of edible jellyfish fishery resources management. Total dimensions of sustainability agat the RAPJELLYFISH are five dimensions. There are slight differences between RAPJELLYFISH with RAPFISH namely in naming of sustainability dimension. In RAPFISH called ecological dimension and ethical dimension, while at RAPJELLYFISH called bio-ecological dimension and legal and institutional dimension.

On every dimension of sustainability consists of a number of attributes that may vary. Overall attributes in RAPJELLYFISH amounted to 47 attributes with details of each dimension is bio-ecology 11 attributes, economy 10 attributes, social 6 attributes, technology 9 attributes, and legal & institutional 11 attributes. All attributes have a scale according to the provisions of the Food and Agriculture Organization namely the Code of Conduct for Responsible Fisheries (FAO CCRF).

RAP Analysis

RAP analysis is a picture of the sustainability analysis result of each dimension is expressed in the form of ordination (the process of plotting / dot) on the space which describe the sustainability status of the object being studied. The results of the analysis of RAP are the values of determination (R square) and standard deviation (stress) of each dimension of management. From the results of this analysis can be seen also the value of the correlation (Multiple R) is by rooting the value of determination (R square). So that can know the strength / tightness / closeness of the relationship between attributes and dimensions.

Monte Carlo Analysis

Monte Carlo analysis is a statistical simulation method to evaluate the effect of errors on the ordination results in all dimensions. If the point in the scatter plot is in a position to accumulate, this means that the results ordination point used in determining the sustainability status is quite stable, so that errors or disruption can be overcome. Conversely, if a point in the scatter plot spread with stress value more than 0.25 (> 25%) can be said study area experiencing problems. Monte Carlo re-sampling was used to analyze in uncertainty condition.

Leverage Analysis

Leverage analysis examined the sensitivity of status results to each attribute in the each dimension. Leverage analysis or sensitivity analysis is used to view the attributes that have a very big influence in supporting the sustainability of any dimension. The attributes of each dimension that has a very large value indicates a very low role of these attributes against the value of management sustainability status. And in general, an attribute with a value that is very large leverage are at scale 'BAD'. Attributes with a very large value is referred to as ‘sensitive attribute’. Improvisation performed on sensitive attributes in this study was taken as many as three attributes for each dimension that aims to raise the value of sustainability dimension.

RESULT AND DISCUSSION

Management Sustainability Status (Current)

RAPJELLYFISH Analysis Results

RAP analysis results on RAPJELLYFISH method shows that all of the attributes that were examined for the sustainability status of edible jellyfish resource management by fishermen with scoop-net is quite accurate. This is indicated by the small value of stress (13.00% -16.89%), the correlation value (Multiple R) is very high (92.33% -97.65%) and the degree value of the determination coefficient (R^2) is very high (90.08% -94.70%). (Asrial *et.al.*, 2015b)

The R-square values of all the attributes of all sustainability dimensions have the value of the relatively high (>90%). The values mean that all of the attributes provide a very high determination in the formation of the index values of sustainability in all dimensions of management. R-square value (94.71%) implies that almost all of the data can explain the equation. The equation is qualified to perform forecasting because the value of determination coefficient of more than 60% means that the models can be used for forecasting (pers. Comm. Sri Mulyono, 2001). While the value Multiple R (97.04%) means among all the attributes of the five dimensions of sustainability occurs very close or very strong correlation (Multiple R = >80% -100%). (Table 1)

Results of Monte Carlo analysis on the level of 95% shows an index value of sustainability of edible jellyfish resource management in the research sites more dimensions that value is not much different from the results of RAP analysis. Only the Social Dimension of the difference is quite large. This means that the error analysis can be minimized in terms of the weight of each attribute, giving weight variation due to the relatively small differences in opinion, the process of data analysis that is performed repeatedly in a stable state, and errors in data entry and data is lost already capable or can be pressed (minimized). (Table 1)

Analysis results of MDS with RAPJELLYFISH method against five dimensions that affect the sustainability management of edible jellyfish resource in the Saleh Bay generate value and sustainability categories different. The Bio-ecological Dimension (73.210), the Economic Dimension (70.44), and the Social Dimension (53.79) are in the category of "Quite Sustainable". While the Technologies Dimension (39.52) and the Legal and Institutional Dimensions (33.04) status "Less Sustainable". (Table 1)

Table shows that there are still gaps among the five dimensions of management that can affect to the sustainability status of edible jellyfish resource management. The most important imbalance occurs in the Legal and Institutional Dimensions. If the value of the five dimensions of sustainability is done averaging the value of 54.00. The average value indicates that the status of sustainability management of edible jellyfish in the Saleh Bay namely Less Sustainable category.

The low index value of the Technology Dimension means technology that is applied by fishermen to extract the edible jellyfish resource basically does not interfere with the stock of edible jellyfish that lives at the sites. The use of tools such catch as an attractor lights and wooden boats with in-board engine will not interfere with the stock of edible jellyfish because of fishing gear (scoop) that is used very selectively and unproductive.

The use of lights and scoop-net should be maintained as it is today so sustainability of the Technology Dimension can be maintained and remain stable. It has been proven also that the use of technology (inputs) to produce output that has been able to invite buyers/ processors of edible jellyfish postscript potential source of absorbing the labor force.

The value and benefits of extraction of edible jellyfish resource is high, but not so with the Legal and Institutional Dimensions of low value (Less Sustainable category).

The low value will have a negative impact on the sustainability of edible jellyfish fisheries and sustainability of management of edible jellyfish resource in the Saleh Bay.

Table 1 RAPJellyfish analysis value of edible jellyfish fisheries resources management in the Saleh Bay, 2014

No.	Sustainability Dimension	Analysis Result (%)		Sustainability Status	Stress (%)	R^2 (%)	Multiple R (%)
		RAP	Monte Carlo				
1	Bio-ecological	73.21	70.75	Quite Sustainable	13.06	94.62	97.28
2	Economic	70.44	68.87	Quite Sustainable	13.07	95.35	97.65
3	Social	53.79	58.12	Quite Sustainable	14.43	92.80	96.33
4	Technology	39.52	40.37	Less Sustainable	13.35	94.14	97.02
5	Legal & Institutional	33.04	34.23	Less Sustainable	13.23	93.94	96.92

Thus, the equation or model generated can be used to predict the sustainability of edible jellyfish resource management in the Saleh Bay region. In addition, the model can also be used for forecasting the sustainability of edible jellyfish resource management in the Saleh Bay region.

Pair-Wise Comparison (PWC) Test

Justification to sustain or whether the five dimensions can not be seen from the average of each dimension, but should be tested with pair-wise comparison (PWC) obtained from the needs assessment. For these needs, an evaluation of the five dimensions is done by three people that need assessment namely Mr. Junaedi (Head of Sumbawa Regency Fisheries and Marine Affairs), Mr. Sunardi (Lecturer at the Faculty of Fisheries, University of 45 Mataram), and Mr. Marzuki (Lecturer at the Department of Aquaculture, University of Mataram). They are considered to be very aware of and understand the conditions of management of fisheries resources in the Saleh Bay. Thus, each index has been verified by the needs assessment, the obtained weighted weight. (Table 2)

After weighted by assessment in the management of fisheries resources and fishing, the importance of the multidimensional sustainability index value is 57.235.

Table 2 The multidimensional sustainability index value of sustainable management of the edible jellyfish resource of in the Saleh Bay, 2014

No.	Sustainability Dimension	Combined Weight Rating Assessment (n=3)	Weights Weighted	Sustainability Value	
				RAP	Weighted
1	Bio-ecological	0.16	0.18	73.21	13,06
2	Economic	0.29	0.32	70.44	22,54
3	Social	0.16	0.18	53.79	9,48
4	Legal & Institutional	0.10	0.11	33.04	3,60
5	Technology	0.20	0.22	39.52	8,56
	Multidimensional	0,90	1.00	54.00	57.24

This means that the management of edible jellyfish by the fishermen in the Saleh Bay, according to the assessment was still "Quite Sustainable".

Leverage Analysis

Leverage analysis of all attributes on all dimensions of sustainability derived attributes sensitive to the status of sustainability management. Selection of sensitive attributes is based on the index of the smallest value of each dimension of sustainability. Based on the sequence of the dimensions of sustainability indices edible jellyfish resource management activities in the Gulf of Saleh in this study was obtained that sustainability index value should be prioritized based on the order value of its sustainability dimension.

A total of 15 attributes of all attributes which amounts to 47 attributes, classified as sensitive attributes. Legal and Institutional dimension has attributes most sensitive i.e. 7 attributes. Lever value of Status of Growth Pattern attribute is the lowest value (3.16). While the highest lever value is Education Level attribute (13.92). Sequence sensitive attributes are as follows: Education Level (13.92), Buyer/Processing Unit (9.78), Fishing Port Institution (9.27), Fisherman Experience (9.27), Limited Entry (Quota Distribution) (8.95), Handling on Board (8.79), Environmental Understanding (8.33), Banking Insitution (7.16), Contribution in GRDP (7.49), Catch-ability of Fishing Gear (6.60), Pre-sale Processing (6.47), Price (6.41), Fisherman Influence (4.35), Trend Biomass (CpUE) (4.27), and Status of Growth Pattern (3.16). (Fig. 1)

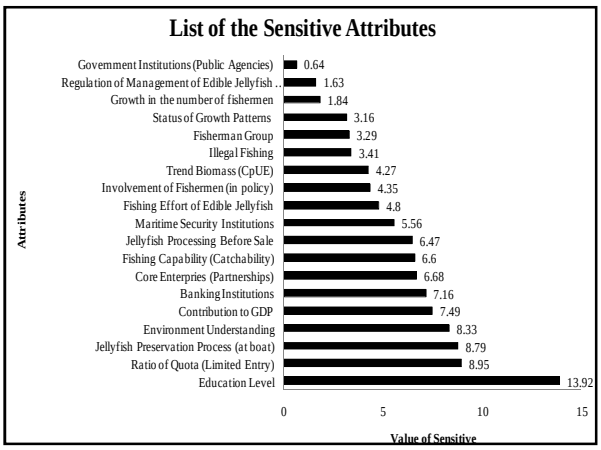

Fig. 1 List of sensitive attributes of edible jellyfish resource management in Saleh Bay, 2014

Management Sustainability Status (Improve)

Leverage analysis results are used to increase the level of sustainability management status by intervening to all sensitive attributes.

Intervention is only done on sensitive attributes, and analyzed by the RAP method. The target is to improve the sustainability index value. The aim is to increase the level of sustainability status.

The result of analysis showed an increase in the value and status of sustainability for each dimension and multidimensional. Multidimensional sustainability of the results of the intervention increased from value of 54.00 with status "Quite Sustainable" (present status) to the value of 79.37 with a status is "Sustainable" (post intervention). Status of "Less Sustainable" on the Legal and Institutional Dimensions and the Dimension of Technologies increased to "Quite Sustainable". Social Dimension, Economic Dimension, and Dimension Bio-ecology increased status of "Quite Sustainable" to "Sustainable". (Fig. 2)

Legal and Institutional Dimensions value increased the most, namely 40.54 points (122.70%) and the Social Dimension whose value increased by 39.91 (66.76%).

While the multidimensional value increased by 25.37 (46.99%). The value of the highest dimension of sustainability post-intervention is Bio-ecological Dimension even if its value increases only 22.45 (30.67%). At the same time, the reduced value of Stress (from 13.43% to 13.38%), and increase the index value of determinant coefficient (R^2) from 94.17% to 95.11%) and correlation coefficient (R) which its value rose to 97.52% from 97.04%.

Intervention of sensitive attributes which in essence is an improvement value of sustainability index. The result has been shown to increase the sustainability value of edible jellyfish resource management in the Saleh Bay by increasing the values of sustainability index, coefficient of determination, and correlation coefficients, and declining value of Stress coefficient.

Sustainable Management Strategy of Edible Jellyfish Resources

Strategy of sustainable management of edible jellyfish resource in the Saleh Bay is the embodiment of the intervention results of sensitive attributes and operational policies. Thus, the contents of the direction of action for the improvement of the management sustainability values of each sensitive attribute impact on management dimension.

Formulation of sustainable management strategies of edible jellyfish resource in the Saleh Bay includes measures or steps that must be taken. So, that such a strategy can provide more confidence will be able to solve (decomposition) problems in sustainability of the dimensions of bio-ecological, economic, technological, social, and legal and institutional.

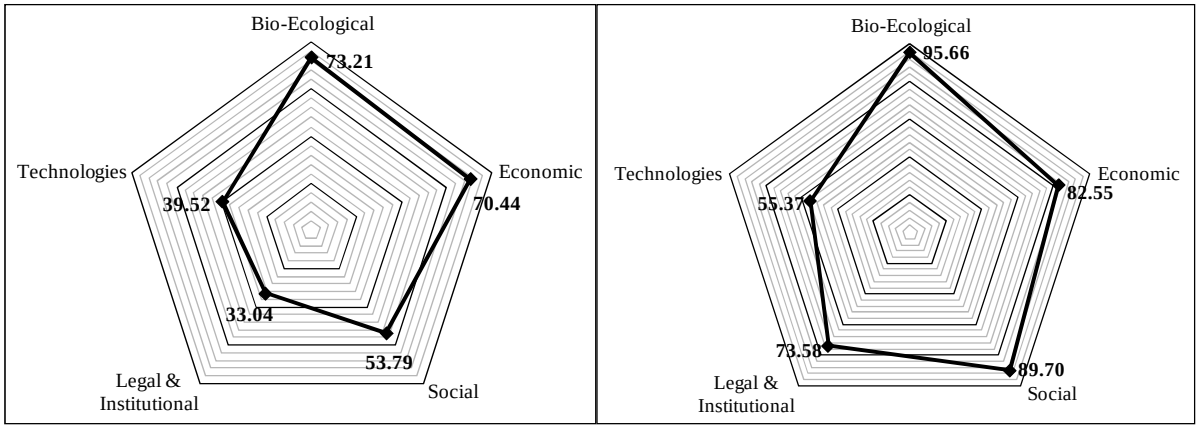

Fig. 2 Kite diagram of the sustainability index value of edible jellyfish resource management in Saleh Bay, 2014 (Left = Current Status; Right = Post-intervention Status)

This strategy was conceived to realize a sustainable management of edible jellyfish resource.

Sustainable edible jellyfish resource management is taken by fishermen's participation as the main actor and other stakeholders related directly or indirectly to the preservation and the abundance of edible jellyfish resource. The concept of sustainability containing at least two dimensions: First, is the dimension of time because no other sustainability concerns what will happen in the future. Second, is the dimension of the interaction between economic systems, natural resources and the environment (Heal, 1998 *in* Fauzi, 2006). In preparing such management strategies, to obtain optimal results must consider the complexity of management.

The strategy of sustainable edible jellyfish resource management is the policy of increasing the income of fishermen. The operational policies of each dimension as well as the operational policy and the direction of action plan are as follows:

Security of edible jellyfish resource reserve/stock

Increase in the intensity of a routine patrol (jointly, solitary) by the Institute of Marine Security, the socialization of the important value of coral reefs and fish resources to humans and marine life to the fishermen group by Department of Marine Affairs and Fisheries (province, regency), and enforcement and prosecution for fishermen as perpetrators of illegal fishing activities (with bombs and poison) by the Marine Security Institutions.

Increase of yield capacity (edible jellyfish)

Limiting the volume of jellyfish yield less than the fish catches allowed (<80% of the MSY), smearing part mouth-arms with salt, socialization and counseling to fishermen about the importance of processing before sale jellyfish, coral reef rehabilitation, reforestation of mangrove forests, reorientation of shrimp farm productivity based environmental carrying capacity, regulatory publishing Governor of West Nusa-Tenggara on the use and lease rates the infrastructures and facilities in the Santong Bay Fishing Port, and assessment of candidates to the local fishery companies (limited partnership) inter alia Baura limited partnership (East Lombok Regency) and Bintang Jaya limited partnership (Sumbawa Regency) to be as the core enterprise (partners to fishermen in the partnership program).

Increase of fishermen capacity

Increasing the level of education (fishermen and their families) through Study Group (Package A, B, and C) for fishermen and provide access scholarships for the children of fishermen, provide an understanding of the environment through awareness and education about conservation, and increase the involvement of fishermen (in policy) to include in seminars and workshops.

Income generation (fishermen and the government)

The quota share (limited entry) through the restricted volume of catches edible jellyfish of less than the number of catches allowed, pickling process jellyfish (in a boat) by way of smearing mouth-arm with salt, jellyfish processing before being sold to the socialization and guidance, status growth pattern (jellyfish consumption) improved through (1) Rehabilitation/reclamation of coral reefs, (2) the reforestation of mangrove forests, and (3) Reorientation productivity of shrimp farms based on carrying capacity, the contribution of fisheries to GDP is legalized by Regulation of Governor NTB on rental rates and the use of facilities and land in the Fishing Port of Santong Bay, and the company's core through the core to the assessment of candidates Baura Ltd. Part. and Bintang Jaya Ltd. Part..

Increase of management institution capacity

Regulations of Edible Jellyfish Resource Management by issuing a Provincial Regulation of West Nusa Tenggara Province on (a) Formation of the Authority Board for Development of Saleh Bay Region and (b) Resources Management of Marine, Fisheries and Aquatic/Waters of Saleh Bay Region, and Government Agencies by means involving the fishermen and fishing groups in the planning process.

CONCLUTION

Results of analysis of the five dimensions of managing RAPJELLYFISH shows the status of sustainability is "Quite Sustainable", and as many as 15 attributes of the five dimensions is the "sensitive attribute". After did intervention against sensitive attribute and then processed with RAPJELYFISH analysis, has changed the status of the sustainability from "Quite Sustainable" increased to "Sustainable". Management strategies that needed to achieve the sustainability status is a co-management model namely

Community-Based Small Scale Coastal Fisheries Management (CBSSCFM) and five operational policies. Management is delegated to the Authority as a management institution that is established by the central government to be free of interest and intervention of the local authorities and local officials.

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