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Empowerment Strategy for Community Surveillance Groups (POKMASWAS) in Marine and Fisheries Resource Surveillance Activities to Prevent Illegal and Destructive Fishing Activities through Interpretive Structural Modeling (ISM)

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Abstract

Indonesian Ministry of Marine and Fisheries Affairs seeks superveillance system of marine and fisheries resources that includes the community through the formation of Community Surveillance Groups, known as Community Surveillance Group (POKMASWAS). The aim of this study was to develop a strategy for empowering community surveillance groups (POKMASWAS) in marine and fisheries resources surveillance activities in Serang Banten Indonesia. The results showed that there were six elements of the system that must be considered as the empowerment strategy implementation of community surveillance group (POKMASWAS) in marine and fisheries resources at Serang, Banten, namely (1) The need for program implementation; (2) The main obstacles to program development; (3) Possible changes or program objectives; (4) Benchmarks for program success; (5) Activities needed for the program implementation; (6) Institutions involved in program success. Key elements are important factors for the successful implementation of development models for each element, namely institutional and policy support, POKMASWAS understanding towards environmentally friendly fishing gear, alignment of community surveillance groups (POKMASWAS) in the surveillance activities of marine and fisheries resources, group perception/understanding,inactive POKMASWAS training and motivating POKMASWAS in marine and fisheries resources maintaining,

as well as the Ministry of Marine and Fisheries Affairs as the main institution involved.

Keywords: POKMASWAS, Empowerment, key element, ISM

INTRODUCTION

The community surveillance group known in Indonesia as POKMASWAS is a community-based monitoring group at the community level consisting of community leaders, religion leaders, traditional leaders, NGOs, fishermen, fish farmers and other maritime communities. The existence of POKMASWAS provides direct benefits to the sustainability of marine and fishery resources, particularly in preventing and overcoming illegal and destructive fishing. Based on the Decree of the Minister of Marine and Fisheries Affairs KEP. 58/MEN/2001, the form of POKMASWAS participation in the supervision of marine and fisheries resources includes observing and monitoring against fisheries crimes and violations, recording and reporting suspected fisheries crimes and violations to fisheries supervisors or local law enforcement officers, arresting and surrendering the perpetrators of fisheries crimes and violations to fisheries supervisors or local law enforcement officers.

According to Marimin (2004), one of the modeling techniques developed for strategic planning is ISM Modeling Technique. ISM is a group learning process in which structural models are produced to photograph complex subjects of a system, through carefully designed patterns using graphics and sentences. ISM analyzes system elements and solves them in graphical form from direct relationships between elements and hierarchical levels. Related aspects in the model implementation are divided into elements as each element is separated into a number of sub elements.

MATERIAL AND METHOD

Location and Period

The study site was located in Serang Regency, Banten and conducted from February to May 2019. Data was collected using purposive sampling technique which was only limited members of the community surveillance group as survey respondents. Data collected during the study were primary data regarding Empowerment Strategy of Community Surveillance Group (POKMASWAS) in Marine and Fisheries Resource Surveillance Activities obtained through in-depth interviews and focus group discussions with stakeholders consisting of members of the community surveillance group (POKMASWAS, Banten Fisheries Service (DKP), and the Indonesian Ministry of Marine and Fisheries Affairs.

Figure 1. Study site at Serang Regency,Banten

Data analysis

Data collected from the study sites were analyzed using ISM to interpret contextual relationships between elements and sub-elements in the empowerment strategy of community surveillance group (POKMASWAS),containing 10 sub-elements of program implementation needs, 5 sub-elements of program development obstacles, 6 sub-elements of possible change or program objectives, 5 sub-elements of program success benchmarks, 6 sub-elements of activities needed for program implementation, 6 sub-elements of institutions involved in the program success.Kholil & Tagian (2012) showed that ISM is a method that can be used to analyze complex problems in a system. Furthermore, Jayant et al (2015) explained that ISM provides clear and appropriate basic principles for researchers or institutions, thus employing ISM can

help them develop models for each different element and improving the working conditions of each field as all elements in the ISM are integrated. According to Attri et al (2013) and Samantaray (2016), the basic principles of theory, concepts, and calculations are used to achieve efficiency through graphics or network representation among ISM elements.

RESULTS AND DISCUSSION

According to Saxena et al (1992), ISM techniques are related to the interpretation of complete objects or system representatives through systematic and repetitive application. Shahabadkar et al (2012) defined that ISM is a process that changes the unclear explanatory model into visible model which can be clearly defined and useful for various purposes. This model will help find key factors related to the problems. After identifying key factors or elements, strategies can be developed to deal with the problem Attri et al (2013). ISM analyzes system elements and completes them in graphical form, direct relations between elements, and hierarchical levels (Dachyar et al 2014).

Requirements for program implementation. Based on focus group discussions (FGD) results in Serang Regency, Banten, elements needed to achieve of the empowerment activities for POKMASWAS program implementation in the surveillance context of marine and fisheries resources consists of 10 sub elements, including:

1. Alignments of the Directorate General of Marine and Fisheries Resources Surveillance (DG PSDKP)
2. Alignment of the Ministry of Marine and Fisheries Affairs (KKP)
3. Alignment of the technical implementation unit for marine and fisheries resources surveillance (UPT PSDKP)
4. Participation in Coastal Communities
5. Sectors coordination
6. Funding support
7. Policy support
8. Institutional support
9. Alignment of Banten Province Marine and Fisheries Service
10. Community surveillance group (POKMASWAS) active role in surveillance activities

The analysis results using Interpretive Structural Modeling (ISM) method on the elements needed forprogram implementation obtained 5 levels of hierarchy. The key elements needed for program implementation is institutional and policy support found at level 5. The hierarchical structure of the requirement for program implementation is presented in the following figure :

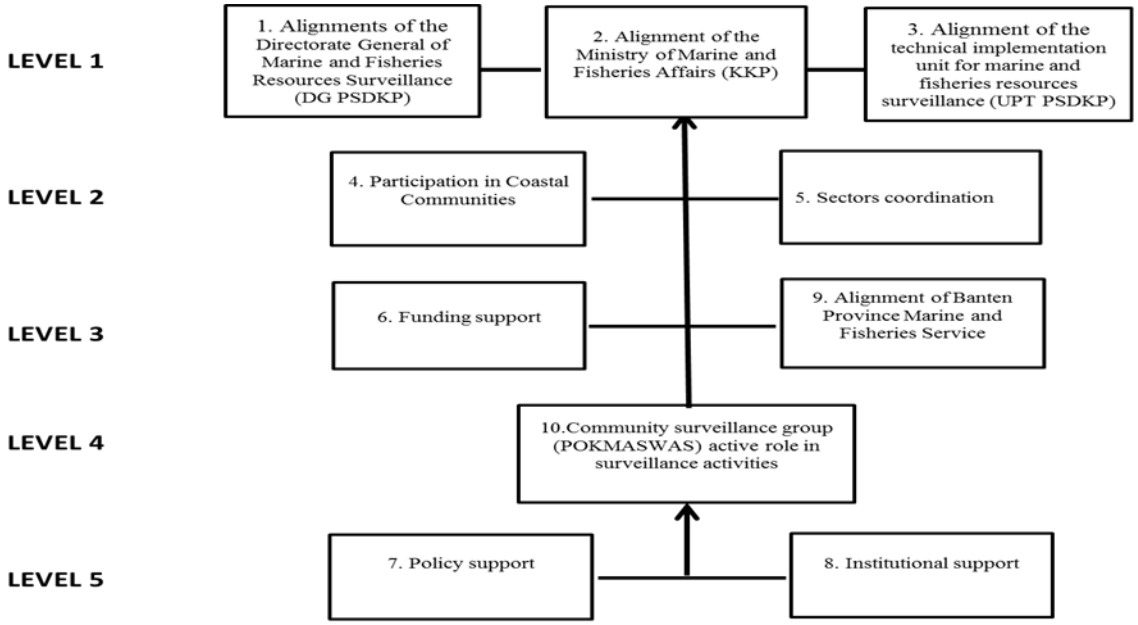

Figure 2. Hierarchical structure diagram of elements needed for program implementation

Driver Power-Dependence (DP-D) matrix maps the institutional development objectives based on dependency along with the driving forces possessed by each proposed sub-element (Figure 3).

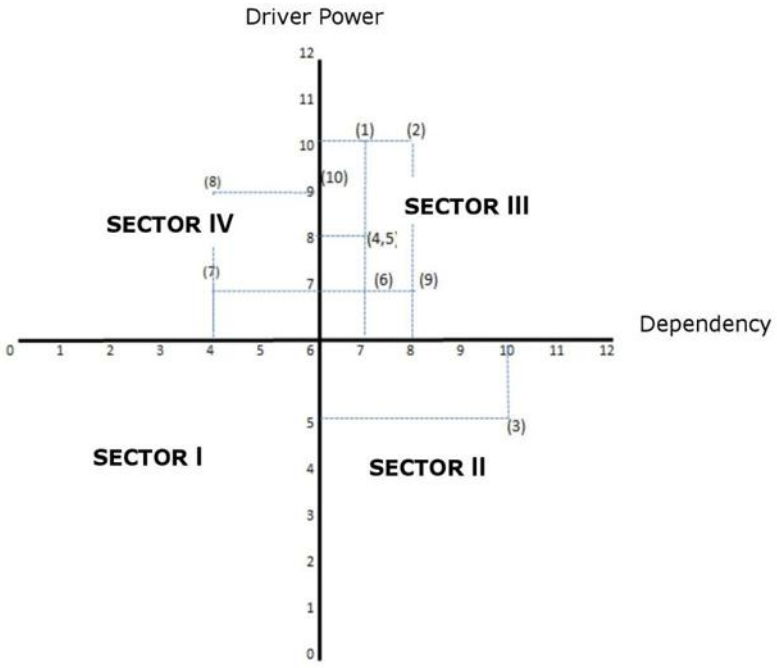

Figure 3. Driver power-dependence matrix of elements needed for program implementation

In the driver power-dependence matrix (Figure 3), sub-elements are distributed in three sectors, namely sector II, sector III and sector IV. Policy and institutional support were in sector IV (independent or free variables), which means that institutional and policy support have large driving forces (driver power), but having little dependence on the system. Alignment of Directorate General of Marine and Fisheries Resource Surveillance (DG PSDKP) sub-element, alignment of Ministry of Marine and Fisheries Affairs (KKP), participation of Coastal Communities, sectors coordination, financial support, alignment of Banten ProvinceMarine and Fisheries Service, and POKMASWAS active role in the surveillance activitieswere in sector III (linkage), which means that they influence each other with other sub-elements. Subdivisions in sector III was labile sub-elements. In sector II, there was an alignment of the technical implementation unit for marine and fisheries resources surveillance (UPT PSDKP), meaning that the alignment of the UPT PSDKP has weak driving force and is influenced by other sub-elements.

Main Obstacles to Program Development. Based on focus group discussions (FGD) results in Serang Regency, Banten. The main obstacle to the development of the POKMASWAS empowerment program consists of 5 sub-elements, including:

1. Conflict of interests across central and regional sectors
2. Inactive POKMASWAS
3. POKMASWAS formation understanding
4. POKMASWAS authority
5. Understanding/perception of environmentally friendly fishing gear

The analysis results using the Interpretive Structural Modeling (ISM) method on the main obstacle elements on empowerment program development for POKMASWAS were obtained by two levels of hierarchy. The key element of the main obstacle in POKMASWAS empowerment is POKMASWAS understanding towards environmentally friendly fishing gear at level 2. The hierarchical structure of the main obstacles to the empowerment programdevelopmentfor POKMASWAS is presented in Figure 4 below:

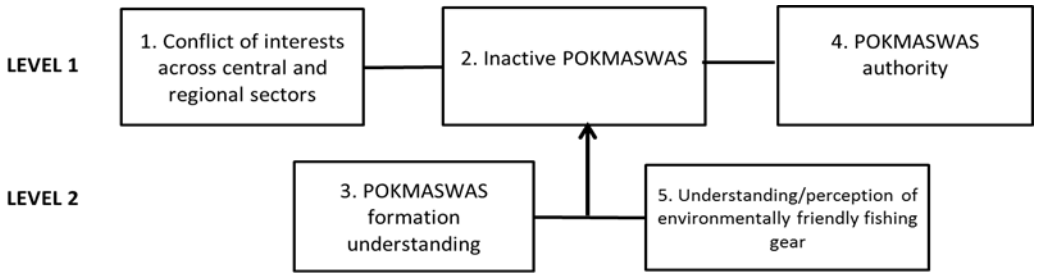

Figure 4. Hierarchical structure diagram of the main constraints to the development of the POKMASWAS empowerment program

Driver Power-Dependence (DP-D) matrix maps the institutional development objectives based on dependency along with the driving forces possessed by each proposed sub-element (Figure 5).

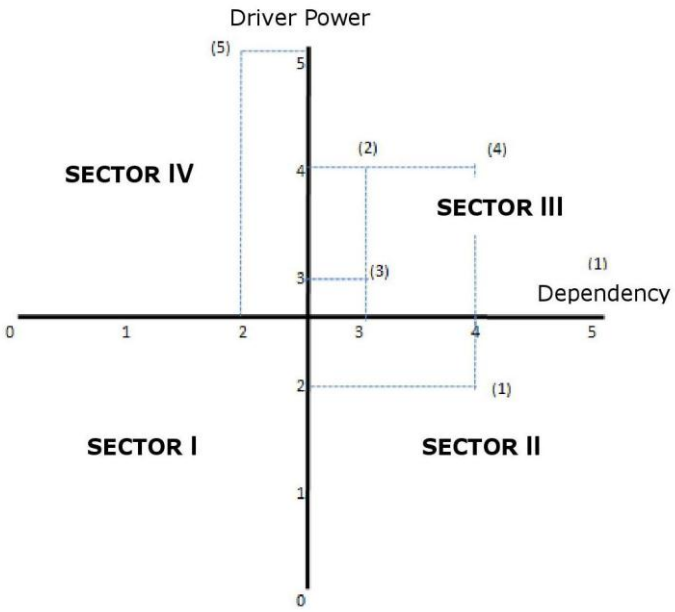

Figure 5. Driver power-dependence matrix for the main obstacle elements of program development

In the driver power dependence matrix (Figure 5), sub-elements are distributed in three sectors, namely sector II, sector III and sector IV. POKMASWAS understanding towards environmentally friendly fishing gear was in sector IV, which means that the POKMASWAS understanding has large driving force and power, but has little dependence on the system. This means that it has mutual influence with other sub-elements. Sub-elements in sector III are labile sub-elements and sub-elements in sector II have weak driving force and are influenced by other sub-elements.

Possible changes or program objectives. Based on focus group discussions (FGD) results in Serang Regency, Banten. The element of possible changes or program objective elements consist of 6 sub-elements including:

1. POKMASWAS active role
2. Controlled sustainability of fisheries resources and environment
3. Participation of POKMASWAS in fisheries and marine resources surveillance
4. The formation of POKMASWAS in the region
5. Integrated training objectives of POKMASWAS between central and regional training
6. Alignment of POKMASWAS in surveillance activities

The analysis results using Interpretive Structural Modeling (ISM) method on possible change or program objective elements of POKMASWAS empowerment program obtained 3 levels of hierarchy. The key element of possible change or program objectives of POKMASWAS empowerment program is the alignment of POKMASWAS in surveillance activities which was in level 3. The hierarchical structure of possible change or program objective elements of POKMASWAS empowerment program is presented in Figure 6 below:

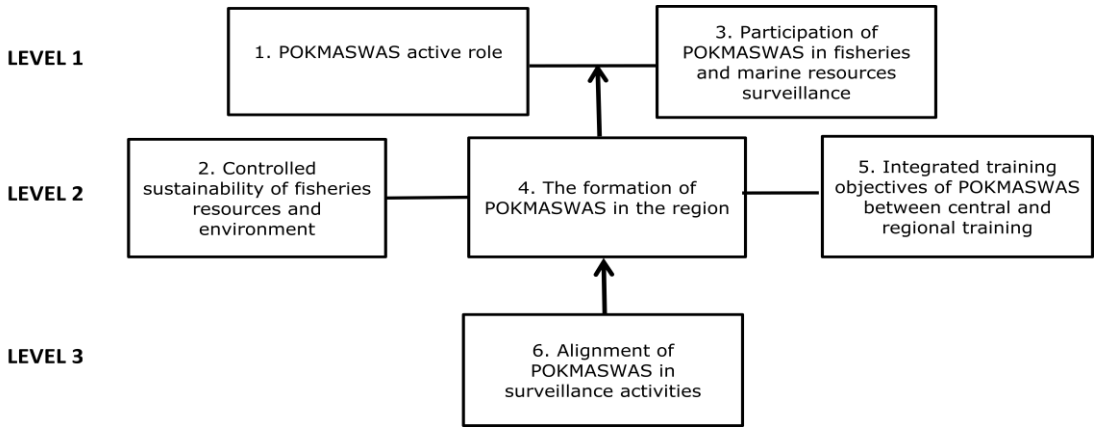

Figure 6. Hierarchical structure diagram of possible changes or program objectives

Driver Power-Dependence (DP-D) matrix maps the institutional development objectives based on dependency along with the driving forces possessed by each proposed sub-element(Figure 7).

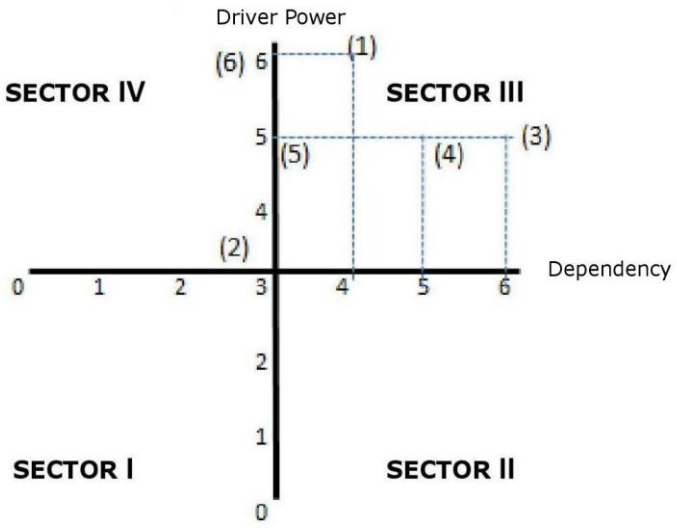

Figure 7. Driver power-dependence matrix of possible changes or program objectives

In the driver power dependence matrix (Figure 7), sub-elements were distributed in two sectors, namely sector III and sector IV. The sustainability of fisheries resources and environment as well as POKMASWAS alignments in the surveillance

activitieswere in sector IV (independent or independent variables), which maintains the sustainability of fisheries resources and environment as well as POKMASWAS alignments in the surveillance activities as it has large driving force or driver power, but has a little dependence on the system. All other sub-elements were in sector III (linkage), which means that they influence each other with other sub-elements. Subdivisions in sector III were labile sub-elements. The lack of attention in the sub-element will be a barrier to the success of the POKMASWAS Empowerment Planning Strategy in the context of marine and fisheries resources surveillance.

Benchmark ofprogram success. Based on focus group discussions (FGD) results in Serang Regency, Banten. The benchmark of POKMASWAS empowerment program success element in marine and fisheries resources surveillance consists of 5 sub elements, including:

1. The implementation of community-based fisheries resource surveillance program
2. Understanding/perception of POKMASWAS institution
3. Efficiency of surveillance budgets
4. Decreasing destructive fishing activities
5. Understanding perceptions in the use of environmentally friendly fishing gear and POKMASWAS participation in surveillance activities

The analysis results using Interpretive Structural Modeling (ISM) method on the POKMASWAS empowerment program success element obtained 3 levels of hierarchy. The key element of the benchmark for program success is understanding/perception of POKMASWAS found at level 3. The hierarchical structure of the elements of the program success is presented in Figure 8 below:

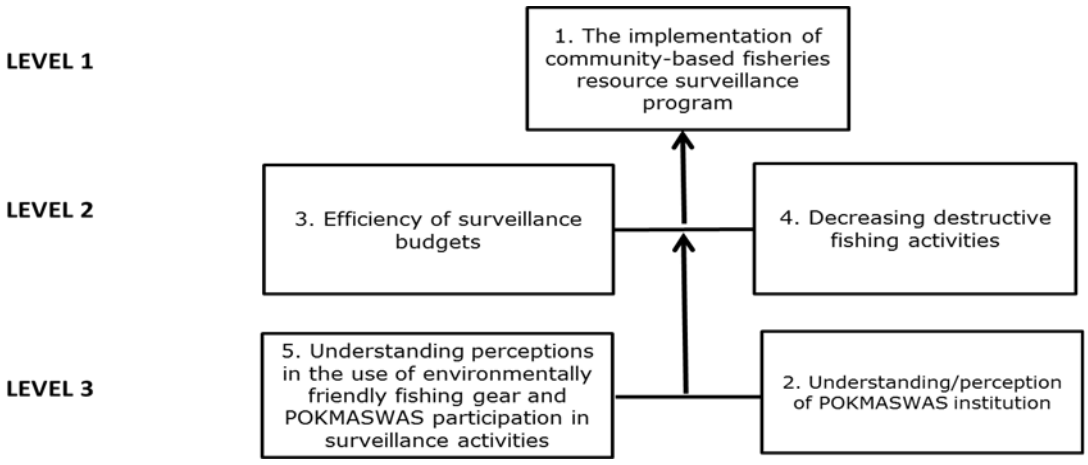

Figure 8. Hierarchical structure diagram of the benchmarkof program success on POKMASWAS empowerment program in the context of marine and fisheries resources surveillance.

Driver Power-Dependence (DP-D) matrix maps the institutional development objectives based on dependency along with the driving forces possessed by each proposed sub-element (Figure 9).

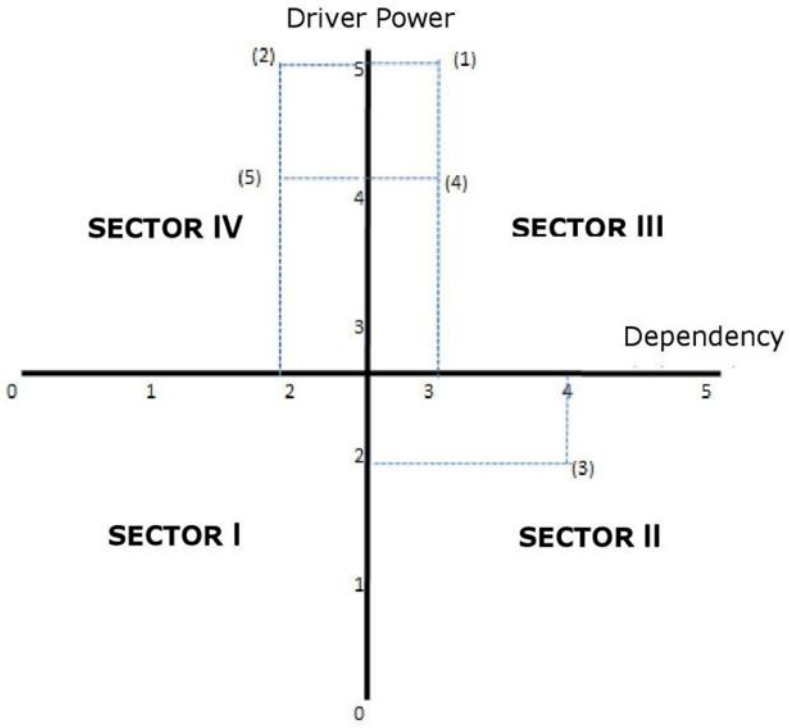

Figure 9. Driver power-dependence matrix benchmark of the program success

In the driver power-dependence matrix (Figure 9), the efficiency of funding sub-element was in sector II, which means that this sub-element has weak driving force and is influenced by other sub-elements. Sub-element of POKMASWAS understanding/perception, and environmentally friendly fishing gear understanding of POKMASWAS participation in the surveillance activities was in sector IV, which means that this sub-element has strong driving force but has little dependency in the system. Other subelements are in sector III (linkage), which means that they have strong influence and are bound to each other.

Activities needed for program implementation. Based on focus group discussions (FGD) results in Serang Regency, Banten. Activity needed for POKMASWAS empowerment program implementation element in the context of marine and fisheries resources surveillance consist of 5 sub-elements, including:

1. Coordination between sectors involved in POKMASWAS training
2. Designing technical Guidelines for POKMASWAS program
3. POKMASWAS technical meeting

4. Provision of facilities and infrastructure
5. Inactive POKMASWAS training
6. Motivating of POKMASWAS in maintaining fisheries activities

The analysis results of using Interpretive Structural Modeling (ISM) method on the activity needed for POKMASWAS empowerment program implementation obtained 4 levels of hierarchy. The key element of the activities needed for program implementation is inactive POKMASWAS training and motivating POKMASWAS in fisheries activities maintaining. The hierarchical structure of the activity elements needed for POKMASWAS empowerment program implementation is presented in Figure 10 below:

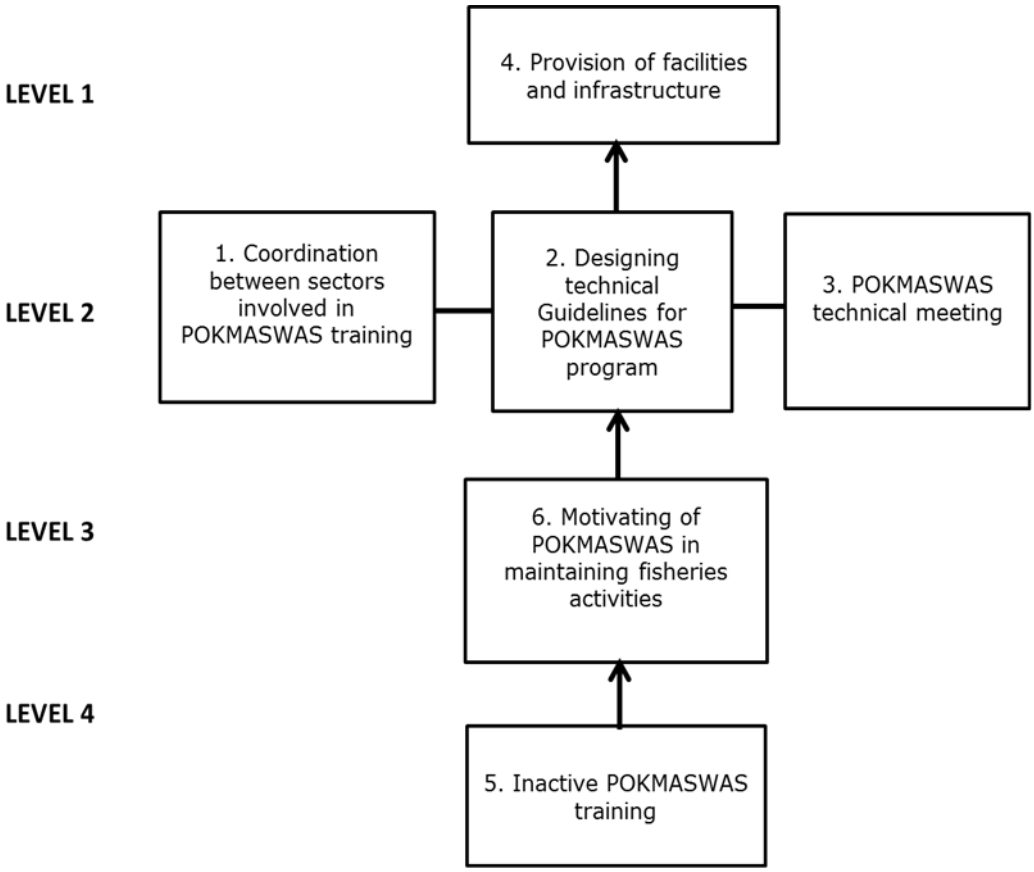

Figure 10. Hierarchical structure diagram of the activity elements needed for the implementation of the POKMASWAS empowerment program.

Driver Power-Dependence (DP-D) matrix maps the institutional development objectives based on dependency along with the driving forces possessed by each proposed sub-element (Figure 11).

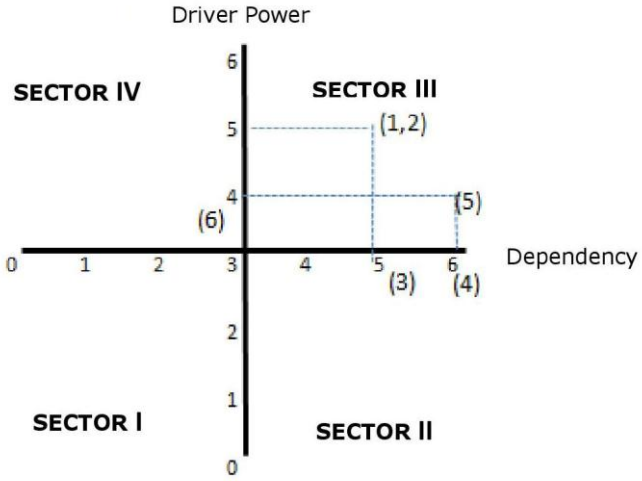

Figure 11. Driver power-dependence matrix of the activity elements needed for program implementation.

In the driver power dependence matrix (Figure 11), sub-elements were distributed in three sectors, namely sector II, sector III and sector IV. POKMASWAS motivation in maintaining fisheries activities was in sector IV (independent or independent variables), which has large driver power, but has little dependence on the system. Other sub-elements were in sector III (linkage), which means that they have a strong influence and are bound to each other. Sub-element in sector II belonged to labile sub-elements. The lack of attention in the sub-element will be an activity that hinders POKMASWAS Empowerment Planning Strategy success in the context of marine and fisheries resources surveillance.

Institutions involved in the program success. Based on focus group discussion (FGD) results in Serang Regency, Banten. The institutional elements involved in POKMASWAS empowerment program success in the context of marine and fisheries resources surveillance consist of 6 sub-elements, including:

1. Directorate General of Marine and Fisheries Resources Surveillance (DG PSDKP)
2. Banten Province Marine and Fisheries Service
3. Community Surveillance Group (POKMASWAS)
4. Ministry of Marine and Fisheries Affairs (KKP)
5. Directorate of Fisheries Resource Management (Dit PPSDP)
6. Technical Implementation Unit of Marine and Fisheries Resources Surveillance (UPT PSDKP)

The analysis results using Interpretive Structural Modeling (ISM) method on the institutional elements involved in POKMASWAS empowerment program success obtained 5 levels of hierarchy. The key element of the institutions involved in program success was located at level 5. The hierarchical structure of the institutional elements involved in POKMASWAS empowerment program success is presented in the following figure 12:

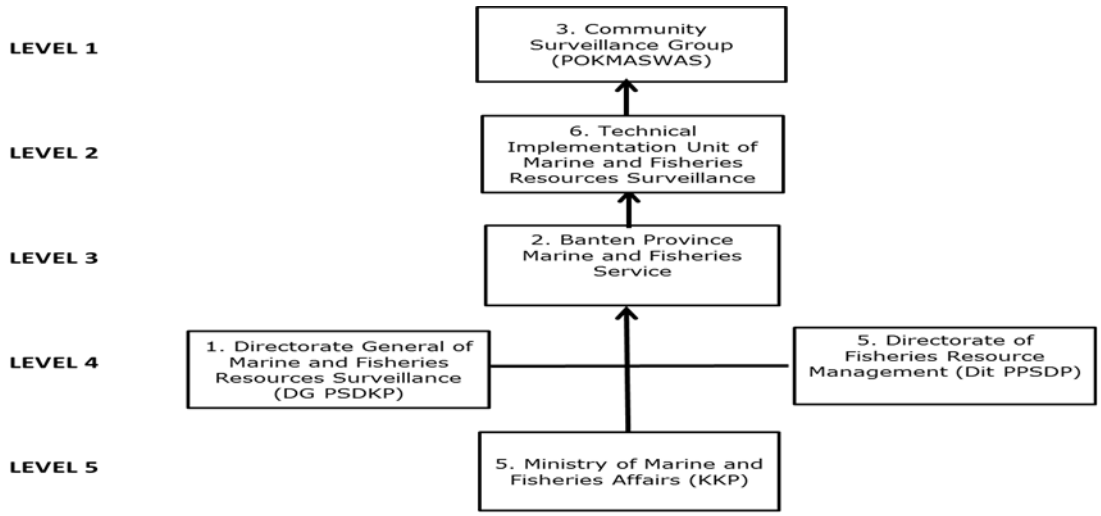

Figure 12. Hierarchical structure diagram of the institutional elements involved in the success of the program

Driver Power-Dependence (DP-D) matrix maps the institutional development objectives based on dependency along with the driving forces possessed by each proposed sub-element (Figure 13).

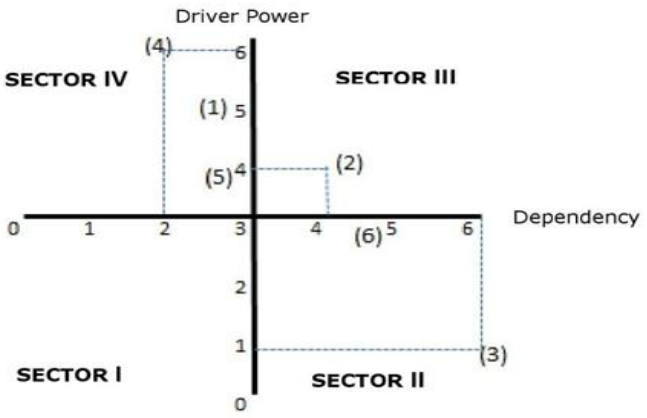

Figure 13. Driver power-dependence matrix of institutions involved in program success element

Further analysis of driver power-dependence matrix as presented in Figure 13 shows the sub-elements of institutions involved in the information system implementation

strategy are divided into three sectors. In sector II, there are POKMASWAS and UPT PSDKP sub-elements, which means that they have weak or small influence, but having strong connection with other sub-elements in the system. In sector III there is Banten Province Marine and Fisheries Service, which means that this sub-element has high influence and strong connection with other sub-elements for system success. In sector VI there are sub-elements of Ministry of Marine and Fisheries Affairs (KKP), DG PSDKP, and Dit. PPSDP, which means that these sub-elements have strong influence for system success, but having little dependence on other sub-elements in the system.

Table 1. Elements and key elements of the POKMASWAS Empowerment Planning Strategy in the context of marine and fisheries resources surveillance

No	System Elements	Key Elements	Elements in Sector III	Elements in Sector IV
1	The need for program implementation	Institutional support, POKMASWAS active rolein the surveillance activities	The aligments of the Directorate General of PSDKP, KKP alignments, alignments of UPT PSDKP, participation of Coastal Communities, inter-sectoral coordination, financial support, Alignment of Banten KP Office, POKMASWAS active rolein surveillance	policy support, institutional support
2	The main obstacle of program development	POKWASMAS understamding in environmentally friendly fishing gear.	POKMASWAS is inactive, POKMASWAS formation understanding, the authority of POKMASWAS.	POKWASMASunderstanding of environmentally friendly fishing gear.
3	Possible changes or program objectives	POKMASWAS role in surveillance	POKMASWAS active role, participation of POKMASWAS in surveillance of SDKP and the establishment of POKMASWAS in the region	Maintaining the sustainability of fisheries resources and environment and POKMASWAS alignments in the surveillance activities
4	Benchmark of program success	POKMASWAS understanding/ perception,	Implementation of surveillance community-based fisheries resource monitoring programs, Decreasing destructive fishing activities	Understanding / perception of POKMASWAS, Understanding perceptions of environmentally friendly fishing gear use, POKMASWAS participation in surveillance activities

5	Activities needed for program implementation	inactive POKMASWAS training, motivationg POKMASWAS in maintaining fisheries activities	coordination between sectors involved in POKMASWAS development, Designing Technical Guidance of POKMASWAS, providing infrastructure,	inactive POKMASWAS training, POKMASWAS motivation in maintaining fisheries activities
6	Institutions involved in program success	Ministry of Marine and Fisheries Affairs	Banten Province Marine and Fisheries Service	Directorate General of PSDKP, KKP, Dit PPSDP

The needed strategy for program implementation is policy and institutional support. For policy support, the Director General of PSDKP issues a decree from the Director General such as general directorate policy and Technical Guidelines on the formation and establishment of POKMASWAS in community-based surveillance on fisheries and marine resources. The policies and instructions of the Director General of PSDKP must then be conducted by the units under and other units that support the POKMASWAS empowerment program for encouraging other POKMASWAS to grow and develop and assist in the surveillance of fisheries and marine resources. The Director General of PSDKP as the policy maker is channeled to the lower structure as the organizer and implementer of the policy. In the context of policy there must be full legitimate power, hence it can change the conditions before and after policy results been decided. Institutional support namely institutional support as the main actor in the formulation and implementation of policies. The strategy, namely in the development of information technology, is the existence of an institution that functions as an information technology manager, both in the form of information infrastructure, information technology and network infrastructure at the Center and the UPT/Satker PSDKP and institutional capacity building, including: legal status, authority, duties principal and function, organizational structure and further empowerment of said institution.

The key sub-element of main obstacle for empowering POKMASWAS is POKMASWAS understanding of environmentally friendly fishing gear. The main problem of managing coastal and marine resources are inseparable from the low understanding of the community about the value and benefits of long-term natural resources. So far the public's understanding of the value of coastal resources such as fisheries, coral reefs is more to the assessment of these resources for direct consumption. It is only minority of coastal communities understand the use of natural resources, especially fisheries and marine resources. Towards the ignorance of the community that occurs can be interpreted that the perception and attitude of the whole community towards fisheries and marine resources is still low. By empowering POKMASWAS in this understanding it is expected that coastal communities will be encouraged to protect fisheries and marine resources and assist the Ministry of Maritime Affairs and Fisheries in the task of carrying out surveillance of fisheries and marine resources. After the main obstacle in the POKMASWAS empowerment

planning strategy was successfully eradicated, changes could be made possible, while the sustainability of fisheries resources and the environment as well as POKMASWAS alignments could be maintained.

Activities required for the program implementation are inactive POKMASWAS training and motivating POKMASWAS in maintaining fisheries activities. The implementation of guidance and training will convert inactive POMASWAS into active again and assist in surveillanceof fisheries and marine affairs task. Due to the process of the POKMASWAS development, fisheries and maritime regulations and procedures for conducting community-based surveillanceare provided. After the training was held, POKMASWAS will be provided with increasedmotivation, affecting POKMASWAS active role.

Key elements of institutions involved in the program success are KKP. In the context of policy, KKP as a policy maker such as Ministerial Regulation and Ministerial Decree above echelon I, must have fully legitimate power, which will be able to change the conditions before and after policy has been decided. The empowerment planning strategy for POKMASWAS in the context of marine and fisheries resources surveillance must be supported by the Ministry of Marine and Fisheries Affairs (KKP) in terms of policy. The empowerment planning strategy for POKMASWAS in the context of surveillance and monitoring marine and fisheries resources is said to be successful seen from the benchmark elements of program success, namely POKMASWAS understanding/perception, increased understanding/perception of environmentally friendly fishing gear use and POKMASWAS participation in surveillance activities.

CONCLUSIONS

There are six elements of the system that must be considered as the empowerment strategy implementation of community surveillance group (POKMASWAS) in marine and fisheries resources at Serang, Banten, namely (1) The need for program implementation; (2) The main obstacles to program development; (3) Possible changes or program objectives; (4) Benchmarks for program success; (5) Activities needed for the program implementation; (6) Institutions involved in program success. Key elements are important factors for the successful implementation of development models for each element, namely institutional and policy support, POKMASWAS understanding towards environmentally friendly fishing gear, alignment of community surveillance groups (POKMASWAS) in the surveillance activities of marine and fisheries resources, group perception/understanding, inactive POKMASWAS training and motivating POKMASWAS in marine and fisheries resources maintaining, as well as the Ministry of Marine and Fisheries Affairs as the main institution involved.

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