

Conceptual Model Of The Effect Of Environmental Management Policy Implementation On Water Pollution Control To Improve Environmental Quality

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Abstract: This research is aimed at analyzing the effect of environmental management policy implementation on water pollution control to improve the environmental quality. The analytical method used in this study is a literature review that uses effectual causal analysis approach based on literature review, with the object of research conducted in Garut District, Indonesia. The result of discussion shows that the implementation of environmental management policy affects water pollution control to improve the environmental quality.

Index Terms: Policy; Pollution Control; Environmental Quality

1 INTRODUCTION

The concept and indicator of sustainable development are getting clear and sharp, the problem is how environmental management can lead to the establishment of environmental management for sustainable development. Many problems in the development that needs to be noticed by various components particularly the government, is the decrease of environmental quality characterized by the increase of water pollution, soil, air, both household (domestic) waste, and industrial waste containing hazardous and toxic materials. At this time, the problems of research object (Garut District) includes water quantity that has been unable to meet the growing need and water quality for various purposes that has declined in industrial, domestic, and other activities that could have a negative impact on water resources. This condition can cause interference, damage, and danger to those who use the water. Based on the description above, the statement problem in this paper is that the decrease of environmental quality has many factors covering water pollution control not implemented optimally and the implementation of environmental management policy not fully performed. Therefore, this paper discusses the effect of the implementation of environmental management policy on water pollution control in an effort to improve environmental quality.

2 METHODOLOGY

The discussion in this article uses a literature study performed to analyze the relationship between symptoms or phenomena observed. This article intends to reveal the problem, examine, and analyze the variables that the research focuses on. The analysis technique used is effectual causal analysis techniques performed to analyze the relationship between two or more phenomena.

The formulation of research logical framework presented in this article follows the suggestion given by Ramdhani & Ramdhani (2014), and Ramdhani, Ramdhani, & Amin (2014). The object of research defined as the locus of research was established in Garut. The purpose of this study is to obtain a description of systematic and factual information on the facts, properties, logics, and the relationship between the phenomena investigated.

3 RESULT AND DISCUSSION

Environmental issue, particularly global environmental issue is increasingly complex and troubling to the nations of the world. Indonesia as one of the world community members is gives a quite positive respond to environmental management. Many policies, efforts, and actions have been made to address, prevent, and mitigate environmental problems. One of the actions is issuing Act No. 32 in 2009 on the protection and management of the environment in Indonesia. Today's problems of Indonesia are water quantity that has been unable to meet the growing need and water quality for various purposes that has declined in industrial, domestic and other activities that could have a negative impact on water resources. This condition can cause interference, damage, and danger to those who use the water. Rivers in Indonesia have an important role to people's life, namely as a means of irrigation, drinking water, industrial use, and others. But within five years, water quality has declined, because 64 of 470 watersheds in Indonesia are in critical condition through river silting occurring everywhere. In addition, many rivers in Indonesia are contaminated by a variety of waste including:

- a. Domestic waste, household waste such as detergent, feces, and garbage that accidentally thrown into the river.
- b. Industrial wastes of various chemicals and heavy metals that are harmful and poisonous.
- c. Agricultural wastes such as residual pesticides and fertilizers.
- d. Toxin from illegal fishing activities.

Pollution and environmental damage have occurred in the location of research (Garut District). Toni Tisna Somantri, Head of Department of Environment, Health, and Gardening, Garut District, said that contamination level of Cimanuk River in

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Garut District from upstream to downstream be getting worse. Tests were carried out in 6 points of watersheds Cimanuk in 2013. The result showed that the parameters exceed environmental quality standard, such as BOD, COD, cadmium, nitrite, oil and fat, sulfide, phenol, detergent, fecal coli, and total coliform. Based on the laboratory test result performed in the Department of Environment, Health, and Gardening, the status of water quality of the river is very polluted, largely due to the sewage pollution in the leather processing industry center Sukaregang. In addition, the disposal of domestic waste from households, agriculture and farms directly discharged into water channel is regarded to be the main cause of water pollution in Garut. In the following there is a testing of water quality in Cimanuk river Garut District from the upstream, midstream, and downstream of the river.

Table 1: Location of Water Quality Testing in Cimanuk Watershed (2013)

No	Segment	Location	Geographical position
1	Upstream	S. Cimanuk-Patrol	07° 08' 535" S - 107° 53' 486" E
2	Midstream	S. Cimanuk-Bridge of Slamet General Hospital	07° 13' 110" S - 107° 53' 671" E
3	Downstream	S. Cimanuk-Leuwigoong	07° 11' 658" S - 107° 54' 549" E

Source: Environmental Laboratory, Department of Environment, Health, and Gardening Garut (2013)

Water quality at the river upstream (Patrol) requires attention to water using, because at a certain period the water does not meet the requirements of water quality standard criteria of organic material parameter. Cimanuk-Patrol River is indicated to contain high levels of dissolved oxygen that at the particular period does not meet the requirements of water quality standard criteria. In addition to BOD and high count of total coliform bacteria, it also contains relatively high sulphate and ammonia. In Table 2 the water quality parameter can be seen at river upstream (Patrol).

Table 2: Water Quality Parameters of Cimanuk Upstream (Patrol)

Parameter	Measurement Period (August-September, 2013)			Criterion
	1 st	2 nd	3 rd	
	Period	Period	Period	
BOD(mg/l)	2.0	2.3	3.8	≤ 3
Fosfat (mg/l)	0.012	0.015	0.074	0.2
Sulfat (mg/l)	12.4	22.8	26.2	-
Amonia (mg/l)	0.224	0.222	0.245	-
Nitrit (mg/l)	0.007	0.002	0.003	0.05
Total Coliform (Total/100ml)	21000	18000	26000	≤ 5.000*

Source: Environmental Laboratory, Department of Environment, Health, and Gardening Garut District (2013)

Based on data analysis result of water quality, it is known that the water quality at of the bridge of Slamet General Hospital

(midstream) requires attention to water using, due to an increase in level of organic material parameter. Parameters that exceed the requirements of the quality standard criteria in the river midstream are: BOD, phosphate, and total number of coliform bacteria. Table 3 shows the parameter of water quality for river midstream (Bridge of Slamet General Hospital).

Table 3: Parameter of Water Quality in River midstream Cimanuk (Bridge of Slamet General Hospital)

Parameter	Measurement Period (August-September, 2013)			Criterion
	1 st	2 nd	3 rd	
	Period	Period	Period	
BOD (mg/l)	4.1	3.5	3.1	≤ 3
COD (mg/L)	16.2	10.4	9.6	25
Fosfat (mg/l)	0.044	0.212	0.073	0.2
Amonia (mg/l)	0.225	0.225	0.510	-
Sulfat (mg/l)	16.3	24.5	38.2	-
Mangan (mg/l)	0.009	0.007	0.009	-
Ferro (mg/l)	0.029	0.184	0.139	-
Total Coliform (Total/100ml)	14000 0	19800 0	152000	≤ 5.000*

Source: Environmental Laboratory, Department of Environment, Health, and Gardening Garut District (2013)

Water quality in the river downstream located in Garut District (Leuwigoong), and parameter that exceeds the requirements of the standard quality criteria, are BOD, nitrite and bacteria number of total coliform. River downstream in Cimanuk (Leuwigoong) contains sulfate, iron (ferro), manganese, zinc, total ammonia and nitrite are not eligible. In Table 4 there are parameters of river water quality in Cimanuk River.

Table 4: Water Quality of Downstream Cimanuk (Leuwigoong)

Parameter	Measurement Period (August-September, 2013)			Criterion
	1 st	2 nd	3 rd	
	Period	Period	Period	
BOD (mg/l)	3.7	3.8	4.7	≤ 3
COD (mg/L)	11.2	13.8	16.7	25
Sulfat (mg/l)	34.6	48.6	46.7	-
Amonia (mg/l)	0.480	0.322	1.550	-
Nitrit (mg/l)	0.007	< 0.002	0.003	0.05
Ferro (mg/l)	0.007	0.064	0.039	-
Zinc (mg/l)	0.002	< 0.002	0.002	0.05
Oil-Fat (mg/l)	< 0.05	0.001	0.002	1.0
Total Coliform (Total/100ml)	31000	48000	96000	≤ 5.000*

Source: Department of Environment, Health, and Gardening Garut District (2013)

In the course of development implementation, Garut District is required to do some preparations, both in improving the quality of human resource and preparing supporting infrastructure. The on going process development is including the construction of several hotels and industries that will add to the long list of the resulting impact, either positive or negative impacts on the quality of the surrounding environment. In other

words, with the development process in several business sectors, if the government is not ready enough to cope with the negative impacts arising from the development, such as the lack of public attention to the management of both domestic and non-domestic waste water, will result in decreased environmental quality standard. In addition, the government's lack of specificity in the implementation of environmental management policy will result in increased environmental pollution. The relationship between variables discussed in this paper is the implementation of environmental management policy, water pollution control, and environmental quality.

Implementation of public policy

Policy has some definitions. This is due to the reality that policy covers various aspects of life so that there is a tendency of each expert to provide a definition of policy by emphasizing only on one field of policy (Islamy, 2010). Public policy is whatever government chooses to do or not to do. Dealing with the successful implementation of public policy, Edward III (in Iskandar, 2013) stated four factors that influence a policy implementation or success or failure of a policy as follows:

- a. Communication, the indicator consists of policy clarity and accuracy and policy objectives
- b. Resources, the indicator consists of human resource and other material resource
- c. Behavior of apparatus, the indicator consists of an agreement among the implementers to implement policy and implementers' ability
- d. Bureaucratic structure, the indicator consists of the use of attitude and routine procedures, fragmentation in responsibilities among the various organization units.

Fragmentation is responsibility sharing for a policy area among organizational units primarily originated from pressures outside bureaucratic units. The worst consequence of such a fragmentation is an effort to hamper coordination. Due to priority, policy makers often maintain their respective functions and opposed efforts that enable them to coordinate policies with agencies that implement programs related. These differences will affect the implementation of policy in the obstruction of change in policy, causing unwanted action; preclude confusing condition among low level officials that further result in the policy incompatibility with the original purpose and organizational boundaries.

Control of Environmental Pollution

Furthermore, in examining the variables controlling water pollution the writer uses concepts and theories according to management experts. Control is an effort to see everything that is being done according to plan, given command, and established principles so that the functions of object will run in accordance with objectives (Robbins & Coulter, 2010). Water pollution control includes three important dimensions Keraf (2014), namely;

a. Prevention (preventive action)

Prevention is an attempt to hold or eliminate contaminants in development activities. The indicator consists of instruments of environmental study, advance in science, modern technology. The environmental impact assessment is a research activity that examines the environmental feasibility for development

activities analyzed from positive and negative impacts as well as primary and secondary effects.

b. Countermeasures (curative)

Curative action is conducting an effort associated with the process of waste management in overcoming problem by using technology instruments. This is intended to suppress, reduce or eliminate and prevent contaminants entering the environment. The indicator consists of a waste disposal permit, monitoring/ surveillance and law enforcement. There are various rules and regulations that must be followed to reduce the impact maximally.

c. Coaching (promotive action)

Coaching is giving a lesson about environment to community or to initiator. The indicator consists of socialization, education and training as well as environmental seminar. Community should be involved in industrial development where industrial activities are located. Community involvement means asking their participation how they make attitudes and views on the industry. They need to be given a constructive explanation in implementing environmental development.

To obtain a good quality environment, it is necessary to control water pollution by establishing three important dimensions namely prevention, recovery/ curative and coaching/ recovery environment to match the quality standards that have been set.

Environmental Quality

Environmental quality can be measured based on environmental quality standards. According to Ginting (2010), environmental quality standard is a limit/ maximum level of a substance or a component of human activity or natural process allowed to be in an environment that does not have a negative impact. Environmental quality standards are useful instruments for environmental management. The function of environmental quality standards are as follows:

1. An indicator/ guideline which states that an environment is polluted
2. Relation of the environmental quality standard to threshold value limit namely the carrying capacity, tolerance power or of environmental ability.
3. An environment is regarded to be polluted if it passes a threshold value determined.
4. As an evaluator that environmental has been polluted.

Wardhana (2004) stated that the environmental supporting capacity is defined as the ability of nature/ environment to support the environment. Furthermore, Effendi (2012) stated that the environmental supporting and carrying capacity is the environmental ability to accept the burden of pollution without causing environmental degradation so as not to cross the line quality standards that have been set.

Relationship between variables

Government policy plays an important role in the implementation and supervision of all environmental policies in order for the environmental development process to be implemented. This is in line, Manik (2009) stated that environmental development is a response to the demand for the preservation of natural resources because it is a conscious and planned effort to use and manage resources wisely in

sustainable development to improve the quality of life. Therefore, the role of government is very important and substantial in driving awareness and behavior of society in environmental control. In an effort to reduce and overcome environmental pollution, a non-technical overcoming is known; it is an effort to reduce and overcome environmental pollution by creating rules and regulations that can plan, organize, control and supervise all activities so that no environment pollution occurs (Wardhana, 2004). This shows that government policy and its implementation have a positive influence on the environment quality and the environment control. The high level of environmental pollution can be overcome with a good and right water pollution control so that the environmental quality expected can be achieved optimally and can reduce water pollution generated. In this regard, Effendi (2012) stated that control is prevention or mitigation of environmental pollution. Control is one of the managerial functions like planning, organizing and directing. Control has an important function to check error and take corrective action so that standard deviation can be minimized and to state the goals of organization can be gained as expected to achieve efficiency, effectiveness, saving and activities orderliness. Furthermore, Keraf (2014) stated that the presence of water pollution control carried out based on the control function will affect the improvement of environmental quality. This shows that the environmental control affects the environmental quality. With the environmental management policy, the high awareness of the government and community to environment can reduce environmental damage that will result in a good environmental quality. This is in line with Wahab's opinion (2012) which states that the policy implementation is an action carried out either by individuals or officials or government or private groups directed at achieving the objectives outlined in the policy decision so that it can be shown that the implementation of environmental management policy affect the quality of environment. Based on the above discussion, it can be explained that a paradigm of relationship model between variables as follows:

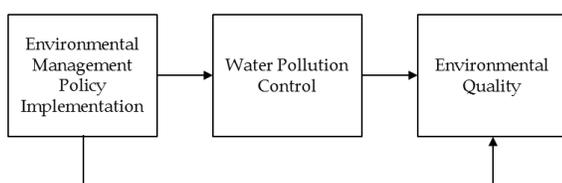


Fig.1: Relationship between variables

4 CONCLUSION

The logical relation between variables of the implementation of environmental management policy, water pollution control, and causal effectual environmental quality, with the formula: if the implementation of environmental management policy and water pollution control is performed with three approaches namely preventive, curative, and promotive actions in accordance with quality standards, the quality of environment can be maintained

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