

Assistance for the Improvement of Water Quality Status and Fertility Level of Water Situ Patok, Mundu District, Cirebon District

Muktar^{1*}, Agus Sugiarto²

Universitas Nahdlatul Ulama Cirebon

Corresponding Author: Muktar muktar.unucirebon@gmail.com

ARTICLE INFO

Keywords: Assistance, Situ Patok, Water Quality Status, Water Fertility Level

Received : 09 October

Revised : 03 November

Accepted: 25 November

©2022 Muktar, Sugiarto: This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

Utilization of Situ Patok in Cirebon Regency has a strategic function in meeting the needs of people's lives, including in the fields of fisheries, agriculture, and household needs such as washing and bathing. The status of water quality and the level of fertility of the waters in Bengawan Jero need to be known so that the management of the waters in the area is sustainable and sustainable in order to create community welfare. This research was conducted in July 2017 in Turi District. The method used is a logical descriptive method with analysis of water quality status data using the STORET method based on the Minister of Environment Decree No. 115 of 2003 and the Carlson Trophic State Index (TSI) to determine the level of water fertility. Based on the results of the study, the quality status of Situ Patok was in poor condition (heavy polluted) in Class I and II, while in class III it was in moderate condition (moderately polluted). The level of fertility of the waters in the Situ Patok Bendungan has been in a hypereutrophic condition or a condition where the nutrients are very high. So it is necessary to overcome eutrophication by one way of spreading plankton-feeding fish (plankton feeders).

INTRODUCTION

Assistance is an effort to assist, direct and support individuals/ groups through problem formulation, planning, implementing and evaluating in the development of Aquatic Research. The mentoring program aims to provide knowledge and development assistance in the process of water quality status and water fertility levels. Assistance activities are carried out using various approaches, one of which is with the motivation of Aquatic Research, Research strategies both in person and *online*.

To carry out the mentoring program, it is necessary to prepare several material patterns that are in accordance with national standards, among the materials in the mentoring program are 1) Aquatic Research mindset, 2) Making clear Aquatic Research plans, 3) Aquatic Research concepts, 4) digital marketing strategies (digital marketing), 5) productivity improvement strategy 6) preparation of financial reports, 7) compiling Aquatic Research, 8) understanding the principles of occupational health and safety in the practice of Aquatic Research. In the mentoring process there are several steps that need to be considered, including; 1) identification and analysis of assistance needs, 2) assistance planning, 3) assistance implementation, 4) monitoring and evaluation and 5) reporting of assistance results.

Cirebon Regency is district which is the upstream of the Situ Patok Dam flow . The topography of Cirebon Regency has several regions which is above ground level lower than the height of the Situ Patok Dam . This is what cause the area to be subscription floods every year.. This area called Situ Patok . Situ Patok waters are an expanse of land area located in 2 sub-districts namely Mundu , Greged , is a source of life for communities in the two districts.

The use of Situ Patok in Mundu District has a function strategy in meeting the needs of life community, including in the field of fisheries, agriculture and household needs such as washing and bathing. Water utilization for household needs the water quality status is known so that it can be avoid, prevent and overcome result of water pollution disease. According to the Ministerial Decree LH No. 115 of 2003, Status of water quality is the water quality condition level denotes a polluted condition or condition both at a water source in time by comparing quality standards set water. According to Walukow (2010), the consequences caused by water pollution, among others: a). Disturbed the life of aquatic organisms because decrease oxygen content; b). There was an explosion in the algae population and aquatic plants (eutrophication); and c). Silting of the bottom of the waters.

In the utilization of waters in the field fisheries need to know the level water fertility as a determinant selection of fishery development appropriate, namely capture fisheries or cultivation. Fishing in Situ Patok , Mundu District , was carried out without knowing it water fertility level, so aquaculture often experience failure and catch fishery results a little. Therefore a study is needed regarding water quality status and levels fertility of the waters in the Situ Patok Dam in Mundu District, Cirebon Regency.

Accompaniment

Efforts in developing human resources is a process in the form of mentoring. The meaning of accompaniment is an effort to provide assistance in the form of directions, support to individuals/groups in carrying out an Aquatic Research process . Assistance efforts provide knowledge and motivation in the process of implementing individual/group Aquatic Research to become even better. According to the Ministry of Water Affairs, (2005, h. 7) mentoring is the process of guiding or providing opportunities to the community, especially the community, which is carried out by companions or facilitators through a series of activities that enable the community to have the ability and confidence in dealing with problems around their lives. Apart from that, the meaning of mentoring is to provide individual assistance to develop their solutions and train thought processes which can then be applied independently for future developments. In terms of language, the term accompaniment comes from the verb "accompany", which is an activity of helping someone who for some reason needs to be accompanied. According to the Ministry of Agriculture (2004), mentoring is an activity in community empowerment by placing assistants who act as facilitators, communicators, and dynamicators.

In the process, the implementation of mentoring aims to develop superior human resources in dealing with various problems in society. The context that mentoring is generally an effort to develop communities in various potentials allows for the development that is owned by each community itself. It aims to show a better and decent life. In addition, mentoring means assistance from other parties who are voluntary to assist a person or even in a group to meet the needs and solve problems of each individual or group. Thus that the concept of assistance includes efforts to improve the quality of life of the people as measured by increasing economic welfare, participation.

Mentoring activities are a continuous development program in an effort to improve the quality and quality of human resources as a whole. The objective is that mentoring is a process of empowerment. Empowerment means developing the strength or ability (power) of effort, potential, human resources that exist in humans so that they are able to defend themselves. In mentoring activities it is necessary to have clear goals and objectives and can be seen from the results. This mentoring method is in the form of activities 1) consultation, 2) learning and 3) counseling. Consultation is an effort of assistance provided by a companion to the community by providing answers, solutions and solving problems needed by the community. b) Learning Learning is the transfer of knowledge and value systems owned by companions to the community in a deliberate process. c) Counseling Counseling is to help explore all the problems and potential they have and open up alternative solutions to encourage people to make decisions based on existing considerations and have the courage to be responsible for people's lives. (Bintan, 2010)

The meaning of assistance is that it can contribute to the achievement of planned programs. The benefits of mentoring according to Bintan (Rudi Prihartono, 2010: 57) are: 1) Creating community self-reliance, so that they can

plan, implement and preserve programs. 2) Empowering the community to face business challenges and opportunities (by creating micro business units to be self-sufficient) 3) Improving community capacity building by providing knowledge, expertise and access to information 4) Developing social supervision community control over development programs by improving the transparent management of funds.

Assistance with principles that can be used as a guide in community empowerment efforts through mentoring programs, namely 1) The principle of community self-sufficiency Namely by providing motivation and encouraging them to do business on the basis of their own will and ability and not always dependent on outside assistance. 2) The principle of grouping. This means that the group grows out of, by and for the benefit of society. Through work done in groups, what is desired will be easier to realize. In addition, a group can become a power base (bargaining position), both for building networks, and for negotiating and 3) Principles of sustainability Initiative growth activities, development are oriented towards creating systems and mechanisms that will support community empowerment in a sustainable manner. Various activities carried out are activities that have the potential to continue in the future.

Research on Water Quality Status and Water Fertility Level According to Minister of Environment Decree No. 115/2003, the STORET method is a method for determining water quality status that is commonly used. With this method it can be seen the level of classification of quality parameters that have met or exceeded water quality standards. Determination of water quality using the STORET method is as follows:

- a. Comparing the measurement data for each of the physical, chemical and biological parameters tested with the quality standard values according to the water class. If the measurement results meet the quality standard, a score of 0 is given, if it does not meet the quality standard, a score is given based on the provisions of table 1.
- b. Determination of water quality status is obtained from the sum of scores and classified according to table 2.

Table 1. Determination of the STORET method value system

Number of Pilots	Score	Parameter		
		Physics	Chemical	Biology
less 10	Maximum -1 -2 -3	-1	-2	-3
	Minimum -1 -2 -3	-1	-2	-3
	Average -3 -6 -9	-3	-6	-9
More than 10	Maximum -2 -4 -6	-2	-4	-6
	Minimum -2 -4 -6	-2	-4	-6
	Average -6 -12 -12	-6	-12	-12

Table 2. Classification of Water Quality Status based on the Storet Method Assessment

Class	Status	Score
A	Very well	Score = 0
B	Well	Score -1 to -10
C	Currently	Score -11 to -30
D	Bad	Score over -30

The level of water fertility can known through the Carlson Trophic State Index (TSI), with the parameters measured namely brightness, total phosphorus and chlorophyll-a Situ Patok Research Location (Shaleh et al., 2014). Measurement results these three parameters are entered in the Carlson TSI formula as follows:
 $TSI_{\text{Brightness (SD)}} = 60 - 14.41 \ln SD$
 $TSI_{\text{Chlorophyll (CHL)}} = 30.6 + 9.81 \ln CHL$
 $TSI_{\text{Total Phosphorus (TP)}} = 4.15 + 14.2 \ln TP$
 $Average\ TSI = \frac{TSI_{SD} + TSI_{CHL} + TSI_{TP}}{3}$

Based on the TSI results obtained, water fertility levels are grouped according to Carlson (1977) to be: Ultra oligotrophic (<30), Oligotrophic (30-40), mesotrophic (40-50), mild eutrophic (50-60), moderate eutrophic (60-70), eutrophic severe (70-80), hypereutrophic (>80).

IMPLEMENTATION AND METHODS

Supporting the *Participatory Action Research* (PAR) method in this mentoring activity takes the following steps:

1. Aquatic Research Mindset
Providing knowledge material on how to think about Aquatic Research which is oriented towards the development of the business world.
2. Make a clear business plan
Provide a clear and programmed conception of planning in the development of Aquatic Research based on needs analysis.
3. Business strategy marketing concept
Providing knowledge about marketing strategies that are more leveraged with a digital marketing approach.
4. Digital marketing strategy (digital marketing),
Assistance efforts to expand production marketing and provide efforts to increase sales even more.
5. Productivity improvement strategy
Provide knowledge about strategies to increase business productivity by adjusting to sales needs.
6. preparation of financial reports,
Provide assistance in the process of preparing financial reports in an orderly manner following standard rules.
7. Compile a business profile and complete business legality,
Directing to compile and complete business legality as a small business legal entity with due observance of completeness according to the rules.

8. Understand the principles of occupational health and safety in its business practices.

Providing knowledge that the importance of paying attention to safety and work and the need for clear rules in the production process.

RESULT AND DISCUSSION

Water Quality Status

Situ Patok waters is reflected by several concentration values water quality parameters both physical parameters as well as chemistry. Characteristics of physical parameters and chemistry in Situ Patok , Mundu District.

Assessment of water quality conditions is carried out by comparing water quality figures research results with water quality standards in accordance with its provisions in the Regulations Government Year 82 of 2001 with STORET method. Utilization of water in Situ Patok includes domestic needs stairs such as cooking, washing and bathing; as well as in fisheries and agriculture. By because it is the water quality standard used for the determination of water quality according to PP No. 82 In 2001 in class I, II, and III. Status water quality in Situ Patok is presented in the following table: heavily polluted waters on class I and II . Class I classification is a designated water can used for drinking water and household while class II designation can be used for Water recreation facilities/facilities include: shower and swim. If you look at the status poor water quality (heavily polluted) then there is no water in Situ Patok directly used by the community treatment or recovery is required. Water quality that does not comply with the standard drinking water quality and household needs any other ladder will cause illness can even cause death. According to Walukow (2010), around 3-4 million souls of the world's population die every year caused by waterborne disease disease, including more than 2 Millions of children die from diarrhea.

In class III, the designation is in the field of fisheries and livestock, status water quality in Situ Patok is in good condition bad (heavily polluted) in Situ Patok Village while Pen Pen and Mundu Villages are in moderate condition (moderately polluted). The condition of the water quality heavily polluted and is affecting failure or decreased aquaculture production fish. Dissolved oxygen (DO) content low, ranging from 2.2 mg/l - 3.4 mg/l with an average of 2.88 mg/l causing does not support cultivation optimum fish. Oxygen availability dissolved in water bodies as a deep factor support growth and development and fish life (Sahrijanna & Sahabuddin, 2014). According to Efendi (2003), optimal dissolved oxygen for aquaculture fish ranges from 4-6 mg/l.

sources of water pollution in Situ Patok household waste and agricultural waste and fishing that causes the high content of nitrogen and phosphorus nutrients. Giving chemical fertilizer when doing Improper rice cultivation have a bad impact on increase in nitrate content. Sofyan et al ., (2011) explained that concentration high nitrate levels or exceeding 10 mg/l often shows influence nitrogen content in the fertilizer if NO₃ ions are not completely absorbed by soil. This is what causes the height Nitrate content in Situ Patok ranges from 8.63 mg/l -10.3 mg/l. Likewise with Phosphate content in Bengawa Jero ranges from

0.726mg/l - 0.857 mg/l. Phosphorus content which usually comes from household waste ladder. Pollution caused by domestic waste (household, market) reflected by high levels of nitrate and phosphate (Walukow, 2010).

Aquatic Fertility Level

In general, the fertility rate waters in Setu Patok by value Carlson Trophic State Index (TSI) included in the hypereutrophic state with a range of numbers 81-100. According to Minister of Environment No. 28 of 2009 in Shaleh et al., (2014), conditions Hypereutrophic is the trophic state of water containing trace elements very high. This status indicates water been heavily polluted by increased levels N and P. A hypereutrophic condition water will cause it water quality degradation and algal blooms and aquatic plants such as water hyacinth (Ocean et al., 2013). water surface will be filled with water plants that causing a reduction in light intensity sunlight and poor in dissolved oxygen so the fish life requirements are very small or the fish will die easily. With hypereutrophic conditions in Bengawan Jero like this then development Fish farming will be difficult. Development of more suitable fisheries with this condition namely capture fisheries naturally regulated according to power support. One way recovery Bengawan Jero, namely stocking plankton-eating fish or fish restocking to reduce and tackling eutrophication in water.

CONCLUSION AND RECOMENDATION

Status of water quality in Situ Patok based on the STORET method in conditions bad (heavily polluted) in Class I and II, while in class III in condition medium (moderate polluted). Fertility rate waters in Situ Patok based Carlson Trophic State Index (TSI) has in a hypereutrophic state or condition where the nutrients are very high. The quality of water quality that exceeds the limit water quality standards need to be treated or filter before use both for household use and fishery. The need for utilization evaluation agricultural land in a sustainable manner with excessive fertilizer application as well do pre and post production ones Correct.

ACKNOWLEDGEMENT

We express our thanks to:

- 1) The Chancellor of the Nahdlatul Ulama University Cirebon and all the Leaders of the Institute for Research and Community Service (LPPM) who have given assignments to carry out these activities.
- 2) The Head of Situ Patok Village, Sinarancang Village, Pen Pen Village and their staff who have granted location permits for this activity to be carried out. I thank you for your support and guidance.

REFERENCES

- Adi, I. R. (2013). *Intervensi Komunitas dan Pengembangan Masyarakat sebagai Upaya Pemberdayaan Masyarakat*. Jakarta: Rajawali Press.

- Alwasilah, Chaedar.A. (2000). *Pokoknya Kualitatif : Dasar-dasar Merancang dan Melakukan Penelitian Kualitatif*. Bandung : Pustaka Jaya.
- Beveridge M. 2004. *Cage Aquaculture*. Oxford : Blackwell Publishing Ltd. USA
- Carlson, R.E. 1977. A trophic state index for lakes. *Limnology and Oceanography*. 22 (2): 361-369
- Djamaludin, D., Aviasti, A., & Rukmana, O. (2016). Peningkatan Kemampuan Usaha Kecil Menengah Di Wilayah Bandung Raya Dalam Pemanfaatan Internet Sebagai Sarana Pemasaran Dan Perluasan Jangkauan Pasar. *ETHOS (Jurnal Penelitian Dan Pengabdian)*, 5, 125. <https://doi.org/10.29313/ethos.v0i0.1682>
- Efendi, Hefni. 2003. *Telaah Kualitas Air bagi Pengelolaan Sumberdaya dan Lingkungan Perairan*. Penerbit Kanisius : Yogyakarta.
- Hamid, Hendrawati. (2018). *Manajemen Pemberdayaan Masyarakat*. Makasar : De La Macca.
- Keputusan Menteri Lingkunga Hidup Nomor 115 Tahun 2003 tentang Penentuan Status Mutu Air
- Komposisi, Kelimpahan, dan Keanekaragaman Fitoplankton Danau Rawa Pening Kabupaten Semarang. *BIOMA*. Vol 15 (1) :6-13
- Peraturan Pemerintah Republik Indonesia No. 82 Tahun 2001 tentang Pengelolaan Kualitas Air dan Pengendalian Pencemaran Air
- Prihantoro, Rudy. (2012). *Pengendalian Mutu*. Bandung: PT Remaja Rosda Karya
- Sahrijanna , Andi dan Sahabuddin. 2014. *Kajian Kualitas Air Pada Budidaya Udang Vannamei (Litopenaeus Vanammei) Dengan Sistem Pergiliran Pakan Di Tambak Intensif*. Prosiding Forum Inovasi Teknologi Akuakulture: 313-319
- Samudra, Sesilia Rani. Tri Retnaningsih Soeprbowati dan Munifatul Izzati. 2013.
- Setyawati NW, Woelandari PG. DS (2019). *Pemberdayaan Masyarakat Melalui Pendampingan Program Kerja Berbasis Manajemen Lingkungan*. *JMM (Jurnal Masyarakat Mandiri)*, 3 (2), 73.
- Shaleh, Fuquh Rahmat . Kadarwan Soewardi dan Sigid Hariyadi. 2014. *Kualitas Air dan Status Kesuburan Perairan Waduk Sempor, Kebumen*. *Jurnal Ilmu Pertanian Indonesia (JIPI)*. Vol 19(3): 169-173
- Sofyan Irwandy, Usman dan Polaris Nasution. 2011. *Studi Kualitas Air Untuk Kesehatan Ikan Dalam Budidaya Perikanan Pada Aliran Sungai Kampar Kiri*. *Jurnal Perikanan dan Kelautan*. Vol 16 (1) : 64 -70
- Walukow, Auldry F. 2010. *Penentuan Status Mutu Air Dengan Metode STORET di Danau Sentani Jayapura Propinsi Papua*. *Berita Biologi*. Vol 10(3) :277-281