



## SDI FINAL EVALUATION FORM 1.1

### PART 1:

Journal Name:	<a href="#">Asian Journal of Biology</a>
Manuscript Number:	Ms_AJOB_36619
Title of the Manuscript:	WATER QUALITY STATUS OF RIVER DONAN DUE TO OPERATIONAL REFINERY PERTAMINA UNIT IV CILACAP-CENTRAL JAVA-INDONESIA
Type of Article:	Case study

### PART 2:

FINAL EVALUATOR'S comments on revised paper (if any)	Authors' response to final evaluator's comments																																																																																																																																																																																																																
<p>Major revisions are necessary</p> <p>Asian Journal of Biology – Ms_AJOB_36619</p> <p>The title of the manuscript is "Water quality status of river Donan due to operational Refinery PERTAMINA Unit IV Cilacap Central Java-Indonesia".</p> <p>I have read with interest this manuscript after very little revisions. However, there are lot of spaces for improvement. No correlation index was used to determine the relations of detected data (still need to be done). In the river ecosystems, the main factor controlling the quantity of phytoplankton is the water discharge. Please refer to the water discharge of Donan River and try to find out if there is any correlation with phytoplankton. The manuscript still seems to be incomplete. Hence, in the current form the manuscript cannot be accepted.</p> <p>In the "Abstract" section: Please try to modify as follows:</p> <ul style="list-style-type: none"><li>The sub-section of Objective: would be rewritten to be: This study aims to analyze the water quality of Donan River due to the waste discharged from the installation of waste water treatment plant unit IV of the State Oil Company of Indonesia.</li><li>The sub-section of Methodology:</li></ul> <p>In line 22: would be rewritten to be: Water sampling was done at two sampling points.</p> <ul style="list-style-type: none"><li>The sub-section of Results:</li></ul> <p>In line 24: would be rewritten using (.) instead of (,) and releasing (mg/L) after BOD or COD in line25. Also, after DO in line26 should be done.</p> <p>-Rewritten of keywords is still necessary.</p> <p>-The "Introduction" section also would be reconstructed to cover a wide part of literature which has been carried out on the same or on any other related subject either in this country or any other part of asia. Better if the description of the study area could be moved to a separate section.</p> <p>-Page 2: In line 50: Please rewrite the sentence to be: Refinery Unit (IV) Cilacap is located on .....</p> <p>-Page 3: In line 57 Please change which to be which allows.....</p> <p>-Page 3: In line 61: Please put (.) at the end of this line.</p> <p>-Page 3: In line 62-63: please rewrite this sentence to be: The environmental aquatic components are expected to be affected by the development of the Wax Unit.</p> <p>-Page 3: In line 65: please delete (in) and write: The water in.....</p> <p>-Page 3: In line 69: please delete (the) between (of) and (sea).</p> <p>-Page 3: In line 70: please write (and) before (addition) and release (rivers) between (river) and (Donan).</p> <p>-Page 3: In line 70: please site reference(s) at the end of the first sentence.</p> <p>-Page 3: In line 77: please write (.) after utilization and start the second sentence with (It).</p> <p>-Page 3: Please cite reference(s) in line 80: please site reference(s) after plankton-benthos. Please start the next sentence with (Dissolved) and release (oxygen) oxygen.</p> <p>-Page 3 in line 83: Please cite reference(s) after NH<sub>4</sub>, also, please write (T)he and delete (BODBOD).</p> <p>-Page 3 in line 84: please delete (Aero Bik), and write (w)hile instead of (W)hile. Also, write (the) instead of (a).</p> <p>-Page 3 in line 85: Please write (r)equired instead of (R)equired.</p> <p>-Page 3 in line 87: Please cite reference(s) after degraded.</p> <p>-Page 4 in line 91: please use (was) instead of (is).</p> <p>-Page 4 in line 93: please delete (that) between (indicate) and (the) and cite reference(s) after pollution levels.</p> <p>-Page 4 in line 94: please delete (in ecological).</p> <p>-Page 4 in line 95: please change (planton) to be (plankton).</p> <p>-Page 4 in line 96: please cite reference(s) after environmental changes and change (sapometry) to (saprobic).</p> <p>-Page 4 in line 99: please cite reference(s) after (water). Also, change (oligosaprobik) to (oligosaprobic).</p> <p>-Page 4 in line 101: please cite reference(s) after (multiply well).</p> <p>-Page 4 in line 102: please rewrite this sentence to be: ...chlorophyceae such as.... and please write the names of algae in italic.</p> <p>-Page 4 in line 101-108: please rewrite this paragraph writing the</p>	<p>Revisi besar diperlukan</p> <p>this study aims to analyze the quality of donan streams based on water chemical - physical quality, and the plankton and benthos diversity conditions, due to the impact of waste discharged from the installation of wastewater treatment units from cilacap state oil companies</p> <p>Water sampling is carried out at two sampling points, at the point of sampling (A) near the North Holding Basin outlet and at sample point B near Unit 49 and 66 Holding Basin outlets. The exact location is shown in Figure 1.</p> <p><b>I. PHYSICS</b></p> <table><tr><td>Temperature</td><td>°C</td><td>31.7<sup>0</sup></td><td>31.9<sup>0</sup></td><td>Deviation +/- 3</td><td>Deviation +/- 3</td><td>Deviation +/- 3</td><td>Deviation +/- 3</td></tr><tr><td>Dissolved Residue</td><td>mg/L</td><td>15,752</td><td>11,916</td><td>1,000</td><td>1,000</td><td>1,000</td><td>1,000</td></tr><tr><td>Suspended Residue</td><td>mg/L</td><td>22</td><td>32</td><td>50</td><td>50</td><td>400</td><td>400</td></tr></table> <p><b>II. CHEMICAL</b></p> <table><tr><td>pH</td><td>-</td><td>7.9</td><td>7.8</td><td>6 - 9</td><td>6 - 9</td><td>6 - 9</td><td>6 - 9</td></tr><tr><td>BOD</td><td>mg/L</td><td>5.5</td><td>7.2</td><td>2</td><td>3</td><td>6</td><td>12</td></tr><tr><td>COD</td><td>mg/L</td><td>33.7</td><td>33.7</td><td>10</td><td>25</td><td>50</td><td>100</td></tr><tr><td>DO</td><td>mg/L</td><td>6.0</td><td>5.9</td><td>6</td><td>4</td><td>3</td><td>0</td></tr><tr><td>Total Phosphate as P</td><td>mg/L</td><td>&lt; 0.001</td><td>&lt; 0.001</td><td>0.2</td><td>0.2</td><td>1</td><td>5</td></tr><tr><td>NO3 as N</td><td>mg/L</td><td>0.018</td><td>0.161</td><td>10</td><td>10</td><td>20</td><td>20</td></tr><tr><td>Arsenic (As)</td><td>mg/L</td><td>&lt; 0.003</td><td>&lt; 0.003</td><td>0.05</td><td>1</td><td>1</td><td>1</td></tr><tr><td>Cadmium (Cd)</td><td>mg/L</td><td>&lt; 0.010</td><td>&lt; 0.010</td><td>0.01</td><td>0.01</td><td>0.01</td><td>0.01</td></tr><tr><td>Chromium (Cr +6)</td><td>mg/L</td><td>0.004</td><td>0.005</td><td>0.05</td><td>0.05</td><td>0.05</td><td>1</td></tr><tr><td>Copper (Cu)</td><td>mg/L</td><td>&lt; 0.010</td><td>&lt; 0.010</td><td>0.2</td><td>0.2</td><td>0.2</td><td>0.2</td></tr><tr><td>Lead (Pb)</td><td>mg/L</td><td>&lt; 0.030</td><td>&lt; 0.030</td><td>0.3</td><td>0.3</td><td>0.3</td><td>1</td></tr><tr><td>Mercury (Hg)</td><td>mg/L</td><td>&lt; 0.001</td><td>&lt; 0.001</td><td>0.001</td><td>0.002</td><td>0.002</td><td>0.005</td></tr><tr><td>Zinc (Zn)</td><td>mg/L</td><td>&lt; 0.001</td><td>&lt; 0.001</td><td>0.05</td><td>0.05</td><td>0.05</td><td>2</td></tr><tr><td>Cyanide (CN)</td><td>mg/L</td><td>&lt; 0.002</td><td>&lt; 0.002</td><td>0.02</td><td>0.02</td><td>0.02</td><td>-</td></tr><tr><td>Fluoride (F)</td><td>mg/L</td><td>0.88</td><td>1.01</td><td>0.5</td><td>1.5</td><td>1.5</td><td>-</td></tr><tr><td>Nitrit as N (NO<sub>2</sub>)</td><td>mg/L</td><td>&lt; 0.001</td><td>&lt; 0.001</td><td>0.06</td><td>0.06</td><td>0.06</td><td>-</td></tr><tr><td>Free chlorine</td><td>mg/L</td><td>0.02</td><td>0.02</td><td>0.03</td><td>0.03</td><td>0.03</td><td>-</td></tr><tr><td>Sulfur as H<sub>2</sub>S</td><td>mg/L</td><td>&lt; 0.002</td><td>0.002</td><td>0.002</td><td>0.002</td><td>0.002</td><td>-</td></tr></table> <p><b>III. ORGANIC CHEMICALS</b></p> <table><tr><td>Oil and fat</td><td>µg/L</td><td>250</td><td>500</td><td>1000</td><td>1000</td><td>1000</td><td>-</td></tr><tr><td>Detergent as MBAS</td><td>µg/L</td><td>12</td><td>21</td><td>200</td><td>200</td><td>200</td><td>-</td></tr><tr><td>Phenol compounds as Phenol</td><td>µg/L</td><td>&lt; 1</td><td>&lt; 1</td><td>1</td><td>1</td><td>1</td><td>-</td></tr></table> <p><b>IV. MICROBIOLOGY</b></p> <table><tr><td>Faecal Coliform</td><td>Jml/100 mL</td><td>330</td><td>270</td><td>100</td><td>1,000</td><td>2,000</td><td>2,000</td></tr><tr><td>Total Coliform</td><td>Jml/100 mL</td><td>330</td><td>270</td><td>1,000</td><td>3,000</td><td>10,000</td><td>10,000</td></tr></table> <p>Oil and Gas Refinery Unit is an Indonesian owned company located in cilacap city. the company is processing crude oil into petroleum and petrochemical fuel. In the process would produce waste that could disrupt the ecological balance to the surrounding environment, especially the donan river (Directorate General of Water Resources 2015). The entry of the remaining</p>	Temperature	°C	31.7 <sup>0</sup>	31.9 <sup>0</sup>	Deviation +/- 3	Deviation +/- 3	Deviation +/- 3	Deviation +/- 3	Dissolved Residue	mg/L	15,752	11,916	1,000	1,000	1,000	1,000	Suspended Residue	mg/L	22	32	50	50	400	400	pH	-	7.9	7.8	6 - 9	6 - 9	6 - 9	6 - 9	BOD	mg/L	5.5	7.2	2	3	6	12	COD	mg/L	33.7	33.7	10	25	50	100	DO	mg/L	6.0	5.9	6	4	3	0	Total Phosphate as P	mg/L	< 0.001	< 0.001	0.2	0.2	1	5	NO3 as N	mg/L	0.018	0.161	10	10	20	20	Arsenic (As)	mg/L	< 0.003	< 0.003	0.05	1	1	1	Cadmium (Cd)	mg/L	< 0.010	< 0.010	0.01	0.01	0.01	0.01	Chromium (Cr +6)	mg/L	0.004	0.005	0.05	0.05	0.05	1	Copper (Cu)	mg/L	< 0.010	< 0.010	0.2	0.2	0.2	0.2	Lead (Pb)	mg/L	< 0.030	< 0.030	0.3	0.3	0.3	1	Mercury (Hg)	mg/L	< 0.001	< 0.001	0.001	0.002	0.002	0.005	Zinc (Zn)	mg/L	< 0.001	< 0.001	0.05	0.05	0.05	2	Cyanide (CN)	mg/L	< 0.002	< 0.002	0.02	0.02	0.02	-	Fluoride (F)	mg/L	0.88	1.01	0.5	1.5	1.5	-	Nitrit as N (NO <sub>2</sub> )	mg/L	< 0.001	< 0.001	0.06	0.06	0.06	-	Free chlorine	mg/L	0.02	0.02	0.03	0.03	0.03	-	Sulfur as H <sub>2</sub> S	mg/L	< 0.002	0.002	0.002	0.002	0.002	-	Oil and fat	µg/L	250	500	1000	1000	1000	-	Detergent as MBAS	µg/L	12	21	200	200	200	-	Phenol compounds as Phenol	µg/L	< 1	< 1	1	1	1	-	Faecal Coliform	Jml/100 mL	330	270	100	1,000	2,000	2,000	Total Coliform	Jml/100 mL	330	270	1,000	3,000	10,000	10,000
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names of algae in italic and cite suitable and new references.

-In the "Material and Method" section, the study area has to be described in a separate paragraph (this was mentioned before in the first revision) and still needed to be addressed.

-The map still far from clear. Please try to provide a clear one for showing the investigated sites in the river.

-The section of "Material and Method" has to be reconstructed to describe in more details the date of sampling, how did the samples were collected for phytoplankton and zoobenthos determinations, what was the size of each collected sample, the preservation methods and treatments for further laboratory and microscopic examinations. For the biological parameters (phytoplankton or zoobenthos), please show the keys used for identification and describe how quantitative determinations were carried out.

-It is also necessary to rewrite the section of material and methods with a special reference to the methods used in data analysis (for instance diversity index).

- In the "Results and Discussion" section:

-Page 6: lines 145-150: please move this paragraph to the section of study area.

-Page 6: table 1

Please reconstruct this table with some corrections and use (.) instead of (,) for numerical data.

- As it is clearly known by the scientific community, one of the most important parts of a manuscript is "discussion" section. The discussion section of this manuscript seems to be not in good level but it would be better to make some comparisons of detected data with national and international similar studies with citing appropriate references.

-Page 9: table 2 also should be reconstructed and please use genera instead of species or type. Don't use (,) in numerical data, please use (.).

-Page 9: lines 228 -236: please move to the section of material and methods or to a subsection of data analyses.

-Page 9: In the paragraph (line 238-245), please rewrite and cite appropriate references. Also use genera or genus instead of type for plankton or benthic organisms in page 9 and 10. The last paragraph pages (9-10) should be reconstructed using appropriate references.

-Page 10: table 3 should be reconstructed taking in account the noticeable modifications that were mentioned for table2.

Page 11. The section of conclusion would be rewritten considering only the most concluding remarks in a well-constructed small paragraph. A good sentence recommending further investigations on the same area and the whole river would be added.

-The "Reference" section still has to be rewritten following the traditional methods in listing literatures.

- The scientific English of the manuscript is still quite weak but it needs major revisions and the vast majority of sentences in the text have to be re-written again. English revision is necessary. The presentation and discussion of the study is still in a weak scientific level. But the manuscript needs much more effort for improvement to make the article more powerful and more meaningful. The references in the manuscript did not cover the new and modern literatures.

Generally, this manuscript would potentially interest for the readers of Asian Journal of biology. So I think that the manuscript should be returned back to the author for major revisions. Afterwards it may be considered again for Asian Journal of Biology.

production can cause disturbance to the ecological balance. in this case the reduced oxygen content in the donan river water body, the dissolved oxygen content and the amount of oxygen required to oxidize the organik substances, this causes an ecological imbalance in the river body. (Directorate General of Water Resources 2015). Water pollution is the entry or inclusion of living things, substances, energy or other components into the water by human activities, resulting in quality waters down to a certain extent that cause water can not function in accordance with its designation. From the formula can be it is said that water pollution is the decrease of water quality due to its entry pollutant components of human activities or natural processes, so the water is not eligible or even disturbing utilization. (Government of the Republic of Indonesia, 2001)

Oil and Gas Refinery Unit is an Indonesian owned company in accordance with the EPA Standard Industry Classification can be defined as a company engaged in producing gasoline, kerosene, distillate fuel oil, spent fuel oil, and lubricants, by fractionation, crude oil refining, unfinished petroleum derivatives redistillation.

Dissolved Oxygen is needed by the organism in the process of metabolism absence of oxygen in water causes metabolic process is interrupted, so that the organic solute is not degraded completely, this causes metabolic processes become anaerobic and produce toxic compounds such as  $H_2S$  and  $NH_4$ . The need for oxygen ( $BOD_5$ ) is the amount of oxygen required by organisms in the Aerobic metabolic process, while COD is the chemical oxygen content, required in degradation of organic material by chemical reaction. COD can also be defined as a parameter to estimate the amount of organic material present in water or water, which is degraded and difficult to degrade. Based on the UNESCO / WHO / UNEP, The content of  $BOD_5$  maximum allowed for drinking water and maintenance of aquatic organisms life was 3.0 to 6.0 mg/L, (UNESCO/WHO/UNEP. 1992). While based on ministerial ministerial decree number 51 / Ministry of Environment and Forestry / 10/1995 that the  $BOD_5$  value for Quality Raw wastewater for industrial purposes Group I is 50 mg / L and Group II was 150 mg / L and COD values for non-contaminated waters have a value of < 20 mg / L.

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Oligo saprobic bio-indicator water is a classification of waters that have not been contaminated or contaminated lightly, class chlorophage is generally into bioindicator waters with the category oligo saprobic . (Trishala K. Parmar, Deepak Rawtani & Y. K. Agrawal, 2016) -

### Genera of the Chlorophyceae

Oligo saprobic bio-indicator water is a classification of waters that have not been contaminated or contaminated lightly, class chlorophage is generally into bioindicator waters with the category oligo saprobic . (Trishala K. Parmar, Deepak Rawtani & Y. K. Agrawal, 2016) Genera of the chlorophyceae such as class of the Spirogyra and Desmidium genera commonly used as water bioindicators are the Spirogyra and Desmidium genera. The  $\alpha$ -mesosaprobic is waters with mild to moderate contamination levels. Bioindicators that can develop are divisions of Algae Melosira sp, Spyrogira sp, Rhizosolenia sp., Nitzschia sp., Oscillatoria sp. Nitzschia actinastroides and Spirulina sp. The  $\alpha$ -mesosaprobic water is characterized by the development of algae from the Bacillariophyceae class, especially Nitzschia sp and Rhizosolenia sp and from the Polysaprobic waters dominated by the Chrysophyceae class, in particular Spirulina sp (Onyema, I.C 2013 and Edward G. Bellinger and David C 2010)

### APPLICATION METHODS IN SAMPLE

1. The sampling has been done on December, 2017. The onsite temperature were 28°C, with air pressure 765 mmHg, humidity 74.4 % – 78.8%. The wind speed were 0.4 – 1.3 m/s with northwest to southwest direction.



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	<p>2. Water sampling is carried out at two sampling points, at the point of sampling (A) near the North Holding Basin outlet and at sample point B near Unit 49 and 66 Holding Basin outlets. The exact location is shown in Figure 1. The sampling methods for surface water quality were based on Indonesian National Standard (SNI) No. 06-6989.57:2008 of The Methods of Surface Water Sampling. The analysis of heavy metal content was used AAS - Atomic Absorption Spectrophotometry (Varian, 2015) and while the Total Suspended Solid (TSS) analysis was used gravimetric method (Indonesian National Standard. 2017, Letter J., A.M. Teeter, B.P. Donnel. 2003 )</p> <p>3. Sampling of plankton and benthos is done at the same point. The fitoplankton and zooplankton sample were taken using plankton net with mesh size of 30-50 <math>\mu</math>m for fitoplankton and 0.2 mm for zooplankton. Then, the sampel were preserved with 4-5% formalin solution (Goswami, S.C., 2004). The identification of plankton were used identification key such as Bold &amp; Wynne (1978) and APHA (1992) and the benthos sample were taken by grab sampler. The sediment that had been taken were sifted in the water by 5 mesh sieve (254 <math>\mu</math>m). The filtered material then preserved by 10% formalin solution that had been added with coloring solution. Then, the sample were identified by identification key. The plankton and benthos that had been identified then analyzed with standard Shanon-Wiener diversity index.</p> <p>Figure 1. below shows the sampling points of surface water, plankton and benthos, as follows: (clear)</p> <p>already explained 1. The sampling has been done on December, 2017. The onsite temperature were 28°C, with air pressure 765 mmHg, humidity 74.4 % – 78.8%. The wind speed were 0.4 – 1.3 m/s with northwest to southwest direction</p> <p>already explained 3. Sampling of plankton and benthos is done at the same point. The fitoplankton and zooplankton.....</p> <p><b>CONCLUSION</b>  <b>Conclusion Of Research I Shows That The Operational Activity Of Pertamina Iv Cilacap Refinery Does Not Have A Significant Impact On Water Quality Of Donan River Between Chemical Equipment, Physics And Biology So River Donan Still In Light Category Light</b></p>
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