Surya Hermawan <shermawan@petra.ac.id> Sun, Aug 27, 2:12 PM

to office, bangguna, edwin.mihardja, b11190014, b11190072

Dear Office of the Civil Engineering Journal,

We would like to inform you that we have already made modifications to some queries as you requested. These modifications include Figure 4, Figure 9, and author contributions.

Thank you for your cooperation.

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
Petra Christian University
Jln. Siwalankerto No. 121 – 131 (60236) Surabaya Indonesia
HP: +62 82169944888
Email: shermawan@petra.ac.id

office@civilejournal.org Sat, Aug 26, 10:23 PM

to me, bangguna, edwin.mihardja, b11190014, b11190072

Dear Dr. Hermawan,

I would ask you to check the pre-publication format of your article in Civil Engineering Journal and modify some queries, which have been asked by comments.

You have 24 hours to send back the final version. You should highlight or use track-changes to show the modification.

Regards,
Office C.E.J
Civil Engineering Journal

Surya Hermawan <shermawan@petra.ac.id> Thu, Aug 3, 10:5 Input tools on/off

to office

Dear the Office Civil Engineering Journal

Regarding your last email, I would like to request an official letter of acceptance.

Thanks for your corroboration.

Awaiting your reply

Best Wishes
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Civil Engineering Department
Petra Christian University
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HP: +62 82169944888
Email: shermawan@petra.ac.id

office@civilejournal.org Sun, Jul 30, 2:12 PM
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Dear Dr. Hermawan,

Thank you for the email.
As we have informed you before, your manuscript assigned to Volume 9, Issue 09. But, because of your request, it has been assigned to Volume 9, Issue 08. So, please wait to receive the pre-publication of your manuscript.

It is also possible to request an official letter of acceptance.

Regards,
Office C.E.J
Civil Engineering Journal

Surya Hermawan <shermawan@petra.ac.id> Jul 27, 2023, 4:24 AM
to office

Dear the Office Civil Engineering Journal

After the APC payment of CEJ for article 2023-4196 which is entitled The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Area Conducted,

I wish the article is able to be published as soon as possible.

Thanks for your corroboration.

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
Petra Christian University
Jln. Siwalankerto No. 121 – 131 (60236) Surabaya Indonesia
HP: +62 82169944888
Email: shermawan@petra.ac.id

Surya Hermawan <shermawan@petra.ac.id> Tue, Jun 27, 10:34 AM
to office

Dear the Office Civil Engineering Journal

I would like to inform you that the revised paper, entitled The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Areas, has been submitted on June 2(2023.

Regarding the last correspondence, some requirements are attached, including a revised paper, proofread certificate, and reviewer's comment (file attached).

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
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Jln. Siwalankerto No. 121 – 131 (60236) Surabaya Indonesia
HP: +62 82169944888
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4 Attachments • Scanned by Gmail

Surya Hermawan <shermawan@petra.ac.id> Thu, Jul 27, 4:24 AM

to office

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After the APC payment of CEJ for article 2023-4196 which is entitled The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Area Conducted,

I wish the article is able to be published as soon as possible.

Thanks for your corroboration.

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
Petra Christian University
Jln. Siwalankerto No. 121 – 131 (60236) Surabaya Indonesia
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Surya Hermawan <shermawan@petra.ac.id> Fri, Jul 14, 6:27 AM

to office

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Coastal Zone Development in Remote Area Conducted,

I wish the article is able to be published as soon as possible.

Thanks for your corroboration.

Awaiting your reply

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O

office@civilejournal.org Tue, Jul 4, 5:55 PM

to me

Dear Dr. Hermawan,

Thank you for the email.
We would like to confirm that we have received the payment successfully.

You can request an official letter of acceptance.

•••

Surya Hermawan <shermawan@petra.ac.id> Jul 4, 2023, 11:18 PM
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Dear the Office Civil Engineering Journal

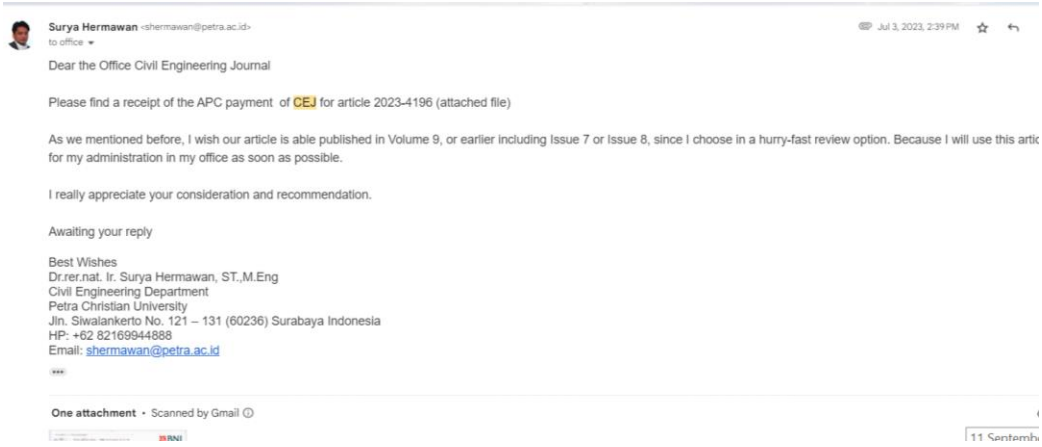
Thanks for your information.
Due to the letter of acceptance, you have sent us by email.

I wish our paper will be published as soon as possible.

Regarding, our previous experience after the payment confirmation the published paper deliver in 1 day (Q1 Scopus).

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng



Surya Hermawan <shermawan@petra.ac.id> Jul 3, 2023, 2:39 PM
to office

Dear the Office Civil Engineering Journal

Please find a receipt of the APC payment of CEJ for article 2023-4196 (attached file)

As we mentioned before, I wish our article is able published in Volume 9, or earlier including Issue 7 or Issue 8, since I choose in a hurry-fast review option. Because I will use this artic
for my administration in my office as soon as possible.

I really appreciate your consideration and recommendation.

Awaiting your reply

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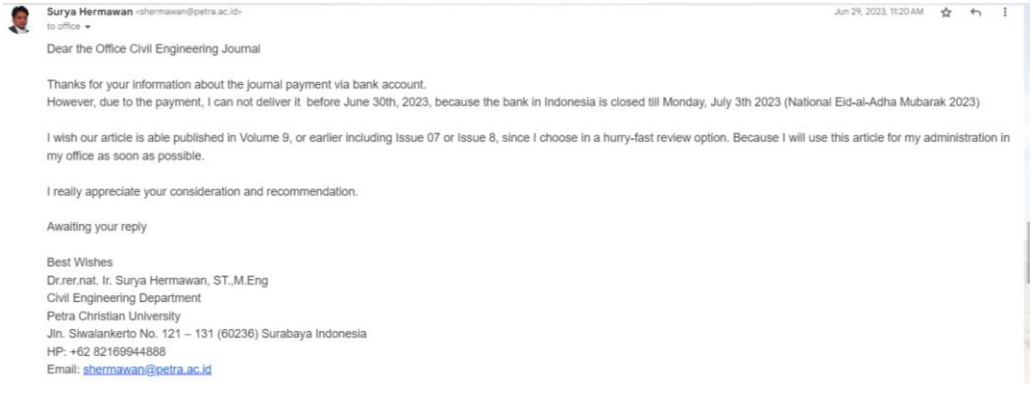

Surya Hermawan <shermawan@petra.ac.id> Jun 29, 2023, 11:20 AM
to office

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Thanks for your information about the journal payment via bank account.
However, due to the payment, I can not deliver it before June 30th, 2023, because the bank in Indonesia is closed till Monday, July 3th 2023 (National Eid-al-Adha Mubarak 2023)

I wish our article is able published in Volume 9, or earlier including Issue 07 or Issue 8, since I choose in a hurry-fast review option. Because I will use this article for my administration in my office as soon as possible.

I really appreciate your consideration and recommendation.

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
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HP: +62 82169944888
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office@civilejournal.org
to me

Wed, Jun 28, 5:40 PM

Dear Dr. Hermawan,

Thank you for the email.
You can cover the journal payment via the following bank account:

Account holder: Lotus Market Ltd
SWIFT/BIC: TRWIBEB1XXX
IBAN: BE85 9672 2191 0906
Wise's address: Avenue Louise 54, Room S52, Brussels 1050, Belgium.
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Company Address: 3000 Aviator Way, Manchester Business Park, Manchester, M22 5TG, UK.

Amount: 1823.90 Euro

**NOTE 1: Payment description: "Article #2023-4196"
**NOTE 2: Please send us a receipt after payment.

Regards,
Office C.E.J
Civil Engineering Journal

Surya Hermawan <shermawan@petra.ac.id> Jun 27, 2023, 9:02 PM

to office

Dear the Office Civil Engineering Journal

Thanks for your information about the accepted paper entitled The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Areas.

Regarding the APC payment method, I would like to request by Wire Transfer in Euro (Invoice), including:

IBAN:

Beneficiary's Name:

Beneficiary's Address:

Bank Account Number (Euro for CEJ):

Bank Name:

Bank Address:

SWIFT code (Wire Transfer Address):

Clearing number:

Awaiting your reply

[C.E.J] Editor Decision (Article #2023-4196)

External Inbox × CED ×

office C.E.J <office@civilejournal.org>
to Jescey, me, David, Edwin

Tue, Jun 27, 3:12 PM

Dear Dr. Prajogo:

We have reached a decision regarding your submission to Civil Engineering Journal, "The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Area".

Our decision is to: Accepted

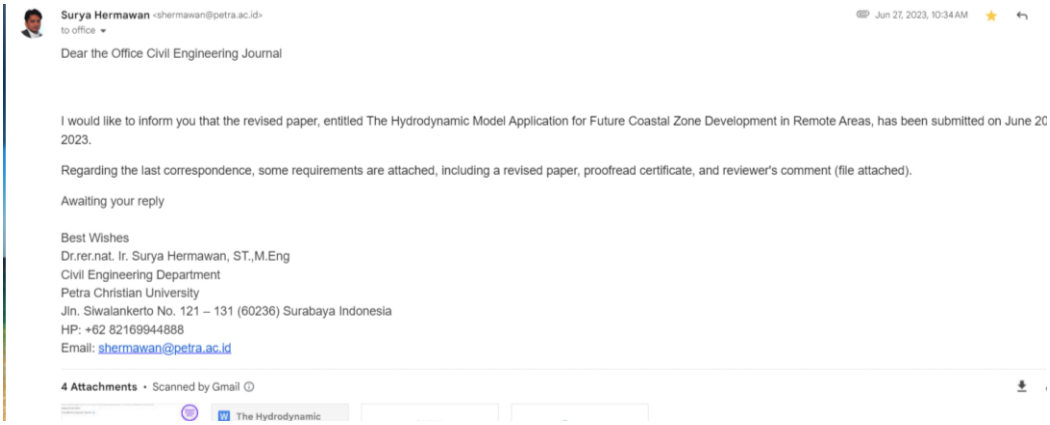
If you want to publish your article into Volume 9, Issue 09 please pay the APC (Article Processing Charge) of the Civil Engineering Journal till 30th of June.

- VISA/MasterCard (22% VAT & Transfer fees included):

https://buy.stripe.com/8wM2aocxV9p51sQdYC
Amount: 1495 Euro + 22%

**NOTE: Please send us a receipt (screenshot) after payment.

Kind Regards,
Editor in Chief: M. R. Kavianpour



Surya Hermawan <shermawan@petra.ac.id>
to office

Jun 27, 2023, 10:34 AM

Dear the Office Civil Engineering Journal

I would like to inform you that the revised paper, entitled The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Areas, has been submitted on June 20 2023.

Regarding the last correspondence, some requirements are attached, including a revised paper, proofread certificate, and reviewer's comment (file attached).

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
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The Hydrodynamic

The Hydrodynamic Model Application for Future Coastal Zone Development in Remote Area

Surya Hermawan [1], David Bangguna[2], Edwin Mihardja[1], Jason Fernaldi[1], Jescey Edlin Prajogo[1]

[1] *Civil Engineering Department, Faculty of Civil Engineering and Planning, Petra Christian University, Surabaya, 60236, Indonesia*

[2] *Civil Engineering Department, Sintuwu Maroso University, Poso, 94619, Indonesia*

Abstract

Indonesia is an archipelago country with a wealth of marine resources. However, - local communities have not optimally utilized the use of natural resources, including those in the coastal zone of Central Sulawesi, Indonesia. This research goal is to provide the potential coastal areas for - future development in the coastal zones, such as grouper floating net cage (FNC) culture, seaweed cultivation along with tourism areas. Thus, it is intended - by developing - methodology of the hydrodynamic models for decision support systems (DSS) within the analysis hierarchy process. There are a total of 25 parameters criteria to calculate the potential future coastal zone development, including physics, water quality, and zoning properties. This DSS can serve as the foundation for instruction, knowledge, and application in developing rural coastal regions. Because of its breadth, this research endeavour is still ongoing. After calibration and verification, the initial study of the potential area of approximately 98,000 ha indicates that the model meets the accuracy within the range of root mean square error of approximately 0.184. Then, the outcomes of the hydrodynamic model simulation in DSS can be used as essential information for maritime development at this location. The outcomes demonstrate that the best areas for grouper FNC cultivation, seaweed cultivation, along with marine tourism are 6,163 ha, 91,000 ha, and 9,024 ha, respectively. It is expected that this research will contribute to sustainable future coastal zone development in the vicinity of Central Sulawesi, Indonesia.

Keywords: hydrodynamic model, Central Sulawesi Indonesia, coastal potential, cultivation, decision support system

1. Introduction

Urban coasts can contribute to the city's identity, improve the area's visual appeal, and improve residents' quality of life in general when it is in a good condition [1,2]. Indonesia has already been referred to be a maritime country due to its 5.8 million km² of sea, of which 0.7 million km² are territorial waters- and 2.3 million km² are made up of sea islands [3]. One of the benefits of having water resources is besides having natural resources, it can also support the aquatic ecosystem as well as being an important component in the economic development [4,5,6]. However, researcher and scientist faced some limitation with respect to lack of measurement data including physical coastal water, water quality and coastal zone management. Thus, it is need to develop a method that accomodate and able to answer this constrains. Decision support system is one of the methods to support the economic development problem [7,8,9].

Comment [SH1]: We have revised the introduction

Central Sulawesi is one part of the islands in Sulawesi that has a lot of possible maritime activities due to its location - in a coastal area (see Figure 1). Given that Indonesia is one of the most popular travel destinations worldwide, tourism sector has contributed to raising the nation's overall Gross Domestic Product (GDP) [10]. However, local communities have not optimally utilized the use of natural resources. As a result, communities in Indonesia, especially those in the coastal areas, still live below the line poverty with a total per capita income still far below the World Bank's standard. There are activities, especially in the coastal areas, to raise economic gains such as seaweed cultivation, grouper cultivation, and tourism.

Comment [JF2]: We have updated our citation based on point 12

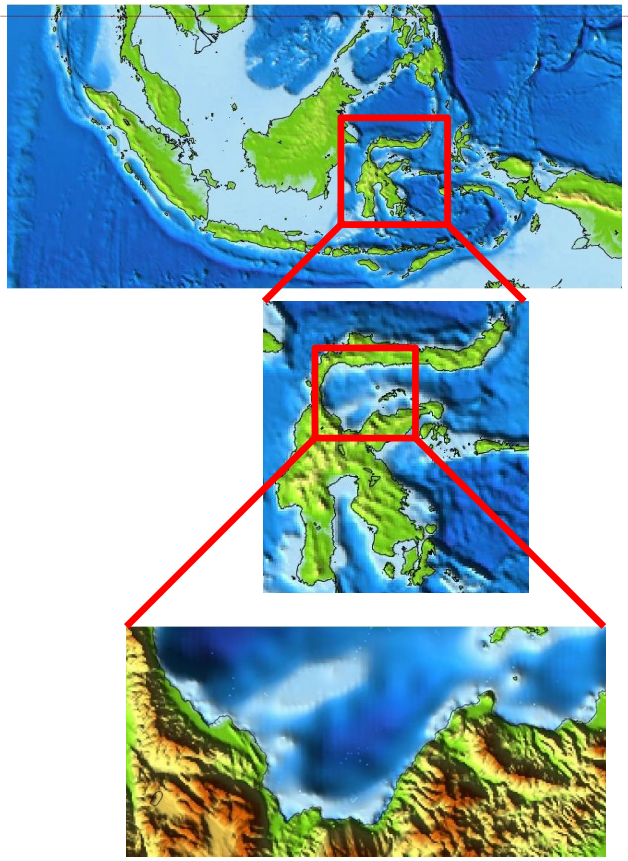


Figure 1. Central Sulawesi Indonesia. Research work location

Several studies have been done on the development of the coastal zones. Zeichen et al. [11] conducted a study on geospatial analysis along the Tyrrhenian coast in Tuscany, Central Italy for fish farming. This study indicates that aquaculture activities require further development to determine zones of the area suitable for aquaculture. Sarker et al. [12] used Generalized Additive Model (GAM) to describe the study of seaweed distribution in Bangladesh for ecological and economic values. Atzori et al. [13] conducted a study on the effects of climate change on Florida tourism destinations. This study discussed tourists' preferences based on condition variables such as environmental attributes and weather conditions. Garbossa et al. [14] used a hydrodynamic model to study seaweed dispersion in various environmental conditions in Brazil. Based on simulation parameters, the result indicates that there are variances in seaweed branches ranging from 2 ha to 6 ha. Spencer et al. [15] discussed tourism industry in the Caribbean, which is possibly threatened by climate changes caused by sea level rise. This results in economic losses from tourism, which is required to safeguard the future of Caribbean economies as well as tourism industries.

This research objective is to maximize the potential natural resources that have not been maximized by the local communities. The area is located in Central Sulawesi, Indonesia which utilized the hydrodynamic models to find out the oceanographic conditions such as wind speed, current speed, water level, and tides. The data obtained from the models are expected to be references in the future to determine what activities that can be done to advance the coastal areas in terms of mane cultivation such as seaweed and grouper cultivation, and marine tourism. This

Comment [JF3]: Figures have been updated with better image resolution as per reviewer recommendation

Comment [em4]: Referring to the point 3 and point 4, we have added recent references or studies about area suitability for marine culture/seaweed/fish farming, and tourism which has the potential to contribute the local economic growth.

research is also expected to be able to bring positive impacts such as information, education, and application for the communities around Central Sulawesi, especially the coastal areas, in maximizing the natural resources that have potential to be utilized.

Comment [em5]: Research gap which we wish to fill is to apply a technical approach, in this case, a hydrodynamic model and analysis hierarchy process (AHP) to evaluate the potential activities in selected areas in Sulawesi. We are evaluating the potential development of seaweed cultivation, grouper cultivation, and marine tourism. We believe that this work will assist the regional government in its area development potential with the aim to improve the economic growth of the local community.

2. Material and Methods

The hydrodynamic model was used for modelling in this research. The research location was Central Sulawesi, Indonesia. To begin the simulation, statistical data such as bathymetry, wind speed, and water level were required. Delft3D 4.04.02 is a program used to create hydrodynamic model. Root Mean Square Error (RMSE) technique was then used to compare the data validity and data verification. The output of hydrodynamic model could be utilized to assist the decision support system for an area development opportunity in Central Sulawesi.

2.1 Data

Bathymetry, wind speed, and water level measurement were used to simulate the model. The International Hydrographic Organization (IHO) provides sea level information. Bathymetry data were acquired from the General Bathymetric Chart of the Ocean (GEBCO) (See Figure 2). Bathymetry is the study of water depthwith the information gained useful for seafloor morphology and other sea activities [16,17]. Figure 2 shows bathymetry data which apply on the research location in the northern parts of North and Central Sulawesi.

Comment [JF6]: A brief explanation of the referred figure has been added. Figure 2 shows the bathymetry mapping on the research location area which is in northern part of North and Central Sulawesi

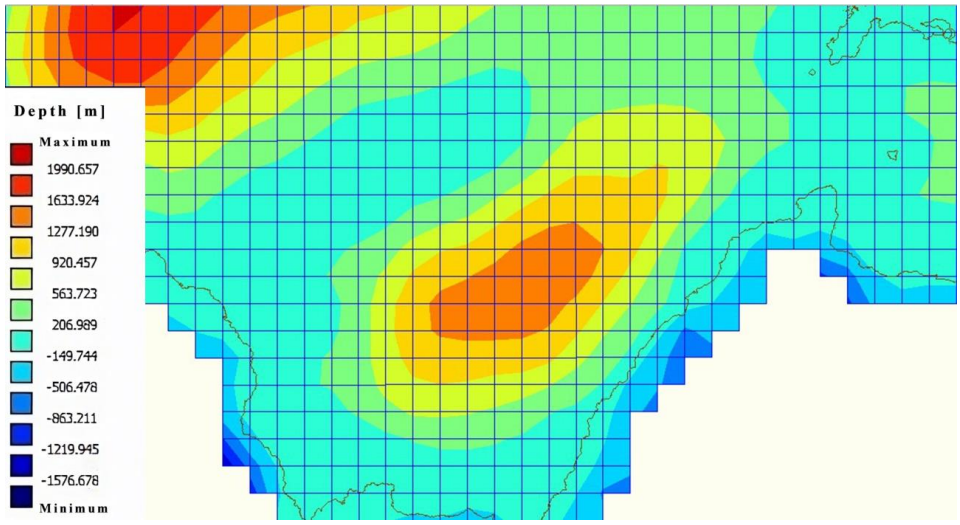


Figure 2. Bathymetry data in Central Sulawesi Indonesia area

The Copernicus provides wind speed statistics for the simulation. Copernicus is a program that gives data for observing the Earth's land, air, and sea conditions. The wind data gathered spans the last ten years, from January 1, 2011 to March 31, 2021. The number of data obtained is approximately 89,000 data with measurements taken every hour at a height of 10 meters owing to the wind speed being stable at that altitude. After that, the wind data are processed on a table and transformed into a wind rose diagram (See Figure 3). The wind rose shows that the wind in the research location, which is Central Sulawesi, is mostly flowing from the northeast direction.

Comment [JF7]: We gathered the wind data in the period of 10 years from 2011 until 2021 on research location and produced a wind rose diagram. Based on wind rose diagram, wind speed and direction can be obtained.

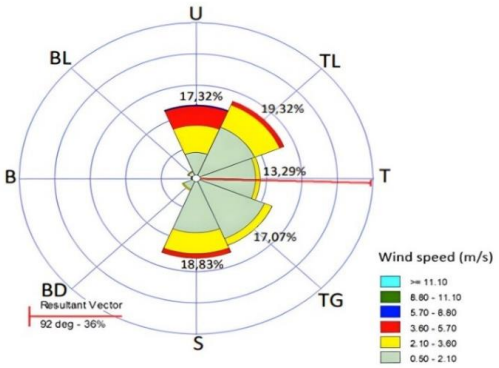


Figure 3. Wind Rose Diagram

2.2. Delft3D for Hydrodynamic Modelling

Deltf3D 4.04.02 is a 3D modeling application used to simulate hydrodynamic movements of bodies of water such as water qualities, currents, morphology, and sediment transport for estuarine, fluvial, and coastal environments [18]. This application requires other softwares to operate such as MATLAB and ArcGIS 10.8. Delft3D 4.04.02 is divided into two main softwares, namely Delft3D Flow and Delft3D Wave. Delft3D-Flow calculates the unsteady flows dy and phenomena brought by meteorological stress and tidal on a curved boundary fitted grid [19]. Delft3D Flow is also used to determine the Shallow Water Equation (SWE), which is also known as current water equation calculated using velocity and height variables. To get the result of the currents and tides from the model, Navier Stokes equation is used on Deltf3D calculation. The Stoke Navier Stokes equation is as follows: [20].

$$\frac{\partial \rho}{\partial t} + \frac{\partial(\rho u)}{\rho x} + \frac{\partial(\rho v)}{\rho y} + \frac{\partial(\rho w)}{\rho z} = 0 \quad (1)$$

x, y, z = Observation location coordinates

u, v, w = Speed component variables

ρ = Sea water density

The equation used in Delft3D-Flow is formulated in orthogonal curvilinear coordinates. Delft3d-Flow offers two vertical grid systems: the σ coordinate system and the Cartesian Z cordinate system (Z-model). The hydrodynamic model calculations used in this present study was the σ coordinate system. The system was invented by Philips (1957) for atmospheric models. The vertical grid consists of layers bounded by two σ – planes that are not strictly horizontal, but following bottom topography and free surface. A smooth illustration of the topography is created because the σ-grid is boundary fitted to both the bottom and the moving free surface. [21]

The σ coordinate system is defined as [21]:

$$\sigma = \frac{z-\zeta}{d+\zeta} = \frac{z-\zeta}{H} \quad (2)$$

With:

z	the vertical coordinate in physical spaces
ζ	the free surface elevation above reference plane (at $z = 0$)
d	the depth below reference plane [m]
H	the total water depth, given by [m]

Depth-averaged continuity equation:

$$\frac{\partial \mathrm{V}}{\partial \mathrm{t}}+\frac{U}{\sqrt{G_{\xi\xi}}}\frac{\partial \mathrm{V}}{\partial \xi}+\frac{V}{\sqrt{G_{\eta\eta}}}\frac{\partial \mathrm{V}}{\partial \eta}+\frac{UV}{\sqrt{G_{\xi\xi}}\sqrt{G_{\eta\eta}}}\frac{\partial\sqrt{G_{\eta\eta}}}{\partial \xi}-\frac{U^2}{\sqrt{G_{\xi\xi}}\sqrt{G_{\eta\eta}}}\frac{\partial\sqrt{G_{\xi\xi}}}{\partial \eta}+fu=-\frac{1}{\rho_0\sqrt{G_{\eta\eta}}}P_\eta-\frac{gU\sqrt{U^2+V^2}}{C_{2D}^2(d+\zeta)}+F_\eta+F_{s\eta}+M_\eta \quad (3)$$

$\frac{\partial \mathrm{u}}{\partial \mathrm{t}}$	derivative of u with respect to time
U	depth-average velocity in ξ- direction [m/s]
$\sqrt{G_{\xi\xi}}$	coefficient used to transform curvilinear to rectangular coordinate [m]
$\frac{\partial \mathrm{u}}{\partial \xi}$	derivative of u with respect to ξ
V	depth-average velocity in the y- or η-direction [m/s]
$\sqrt{G_{\eta\eta}}$	coefficient used to transform curvilinear to rectangular coordinate [m]
$\frac{\partial \mathrm{u}}{\partial \eta}$	derivative of u with respect to η
d	depth below reference plane [m]
ζ	water level above some horizontal planes of reference[m]
$\frac{\partial \mathrm{u}}{\partial \sigma}$	derivative of u with respect to σ
ρ_0	reference density of water [kg/m^3]
g	acceleration due to gravity [m/s^2]
C_{2D}	2D Chézy coefficient [m$^{1/2}$/s]
P_η	gradient hydrostatic pressure in η – direction [kg/(m^{2}s^2)]
F_η	turbulent momentum flux in η – direction [m/s^2]
$\frac{\partial}{\partial \sigma}$	derivative with respect to σ
M_η	source or sink of momentum in η – direction [m/s^2]

Comment [JP8]: Added hydrodynamics formula

Delft3D-Wave was used to simulate the wind-generated waves in coastal water that changes over time. The wave module computes wave generation by wind, wind field, wave propagation, non-linear wave-wave interaction, and finite depth [21,22]. The software can also be used not only for shallow type of water, but also for medium and deep types bodies of water.

Primary data were required to compare results from the hydrodynamic model simulation in which secondary data were used The bathymetry data using the Deeper Smart Sonar are one of the primary data needed. These primary data can be used as the base reference to predict the upcoming future current and wave movement in the areas.

2.3. Root Mean Square Error (RMSE)

The Root Mean Square Error (RMSE) is a standard for measuring errors in modeling studies that forecast quantitative data such as meteorology, climate study, and air quality [23,24]. The RMSE method is used as a standard statistics by researchers to evaluate how much error the model generated in geoscience activities [25,26]. Therefore, the hydrodynamic model generated by the RMSE method can be estimated using RMSE formula:

$$RMSE=\sqrt{\frac{\sum_{i=1}^{N}(Xi-Yi)^2}{N}} \quad (4)$$

Xi = Predicted value

Yi = Observation value

n = Data number

The parameters of RMSE were used to assess the results of the models. If the RMSE value is within or less than 0.1, the modeling can be marked as completed and considered accurate. If the RMSE value is greater than 0.1, the necessary data collection step to allow the simulation must be redone. The data could then be accessed online for future coastal research and growth. ArcGIS 10.8 was used for mapping the suitability of seaweed cultivation, grouper floating net cage cultivation, and tourist development.

2.4. Suitability criteria

The suitability criteria for future development in grouper floating net cage cultivation, seaweed cultivation, and marine tourism in this study are shown in the tables below (See Tables 1, 2, and 3). The evaluation of suitability mapping of Central Sulawesi area for above opportunities is based on these criteria.

Table 1 shows the grouper floating net cage cultivation criteria consisting of physical parameters and water quality. The physical parameters consist of minimum water depth, maximum depth (anchor), maximum wave height, wind speed, and current speed. The water quality consists of water temperature, salinity, dissolved oxygen, water pH, and water clarity. Table 2 shows the seaweed cultivation suitability criteria consisting of water depth, current speed, water temperature, salinity, and dissolved oxygen. Table 3 shows the marine tourism suitability criteria. The parameters consist of water depth, type of coast, coast width, water base material, current speed, coast slope, water clarity, coast land closure, dangerous biota, and freshwater availability. One of the parameters of the grouper floating net cage cultivation, namely minimum water depth, shows that if an area has a depth of more than 8 meters, the area is very suitable for grouper cultivation. If the depth is more than 6 meters, it is suitable for grouping farming, but if the depth is less than 6 meters, the area is not. All development needs to meet the parameters as shown on the table below.

Table 1. Floating net cage grouper fish cultivation suitability criteria [9]

Parameters	Unit	Very suitable	Suitable	Not suitable
Physical parameters				
Minimum water depth	m	> 8	> 6	< 6
Maximum depth (anchor)	m	< 20	< 25	> 25
Maximum wave height	m	< 0.6	< 1	> 1
Wind speed	m/s	< 10	< 15	> 15
Current speed	m/s	< 0.6	< 1	> 1
Water quality				
Water temperature	^{o}C	27 - 31	20 - 35	< 20 & > 35
Salinity	ppm	26 - 31	15 - 35	< 15 & > 35
Dissolved oxygen	mgO_2/l	> 5	> 4	< 4
Water pH	-log(H+)	7.8 - 8.5	6 - 8.5	< 6 & > 8.5
Water clarity	m	> 5	> 2	< 2

Table 2. Seaweed cultivation suitability criteria [27]

Parameters	Unit	Very suitable	Suitable	Not suitable
Water depth	m	> 2 (low tide)		< 2
Current speed	m/s	0.2 - 0.4	0.1 < x < 0.2	< 0.1 & > 0.4
Water temperature	°C	32 -26	26 - 20	< 20 & > 32
Salinity	mg/l	35 - 32	32 -28	< 28 & > 35
Dissolved oxygen	mgO_2/l	8 - 3	3 -1	< 1

Table 3. Marine tourism suitability criteria for coastal area category [28]

Parameters	Unit	Very suitable	Suitable	Not suitable
Water depth	m	0 - 3	> 3 - 6	> 6 -10
Type of coast		White Sand	White Sand, Less Coral	Black Sand, Coral, Steep
Coast width	m	> 15	< 10 - 15	3 - <10
Water base material		Sand	Sandy Coral	Muddy Sand
Current speed	m/s	0 - 0.17	0.17 - 0.34	0.34 - 0.51
Coast slope	°	< 10	10 - 25	> 25 - 45
Water clarity	%	> 10	> 5 - 10	3 - 5
Coast land closure		Coconut, Open Field	Shrubs, Low, Savannah	Tall Bush
Dangerous biota		None	Jellyfish and Sea Urchins	Sea Urchins and Stingrays
Fresh water availability	km	< 0.5	> 0.5 - 1	> 1 -2

2.5. Analysis Hierarchy Process (AHP)

Suitability mapping areas are processed using Analysis Hierarchy Process (AHP) technique for each growth sector based on the suitability parameters. The Analytic Hierarchy Process is a decision-making process that entails identifying and categorizing judgment goals, criteria, and constraints into a hierarchy, as well as evaluating

comparisons between elements at all levels of hierarchy [29]. The value was estimated using an analytic scheme described in Figure 4. [30]. The measurement data were then divided into three categories: very suitable, suitable, and not suitable. The re-classifications were added together and re-analyzed against the prior parameters, and the final suitability area was created.

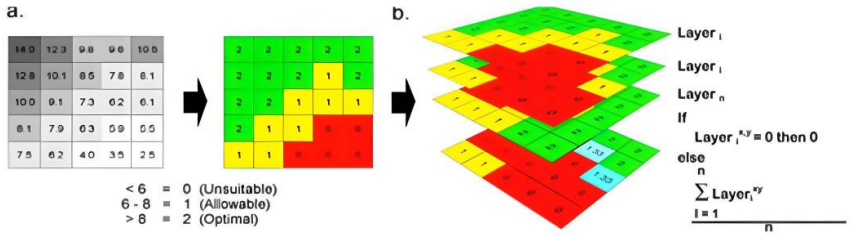


Figure 4. Summation value scheme [31]

2.6. Research Flowchart

The research starts by preparing and studying the location of interest. Primary data collection on location is used to validate the research processes. After collecting primary data, Delft3D software is used to make hydrodynamic model on the area of interest. Secondary data for the bathymetry data, model setup, and water level data are used to run the simulation. When all secondary data have been collected, Delft3D software can start running the simulation. Results are shown from the simulation and will be validated using the primary data. To validate the data, RMSE method is used. When data are validated, AHP process is used to plot the suitability areas based on each criteria such as grouper cultivation, seaweed cultivation, and marine tourism. When the results are met, the research process is completed, but are not, the secondary data and new models are needed until meeting the RMSE value.

Comment [JF9]: We have added a flowchart of how we conduct the technical approach to developing a hydrodynamic model with Delft3D 4.04.02 software. The obtained simulated data from the hydrodynamic model will serve as an evaluation point of view to see the area's suitability for marine tourism, grouper farming, and seaweed cultivation.

3. Results

3.1. Delft3D for Model Simulation

The model simulation used parameter data such as land boundary, grid, bathymetry, manning roughness, and

time step. These data were ultimately be evaluated for compatibility between the simulation mode and the actual condition in the area using trial-and-error technique. The results of multiple trials of the hydrodynamic model simulation using square grid and bathymetry data supplied by GEBCO are depicted in Table 4.

Table 4. Simulation model with Delft3D Flow

No.	Models	Grids (meter)	Bathymetry	Manning Roughness	Time Steps	Simulation Durations	Descriptions
1	A	200	GEBCO	0.05	60 minutes	365 days	Failed
2	B	1200	GEBCO	0.05	60 minutes	365 days	Failed
					5 minutes		
3	C	1600	GEBCO	0.05	30 minutes	30 days	Failed
					60 minutes		
					5 minutes		
4	D	5550	GEBCO	0.05	30 minutes	14 days	Successful
					60 minutes		
				0.05			
5	E	5550	GEBCO	0.033	5 minutes	14 days	Successful
				0.025			

As shown in Table 4, failed simulation happened on models A through C. The failures are attributed to small grids and lengthy simulation duration. On the other hand, models D and E showed successful simulations. Model E employed the same grid and simulation time with smaller manning roughness and time step variations of 5 minutes. Therefore, model E is applied in this research.

Figures 5 and 6 illustrate the results for the water level in 2D in Central Sulawesi at a certain time in the observation point. Figure 5 shows the changes in water level from 13 February until 27 February. It can be seen that the elevation of the water level on 15th of February 2021 at 00:00:00 is 0.45 m. The observation sites indicate that the water level was decreasing and increasing in elevation from that point forward, affecting the directions of the current as shown in Figure 7.

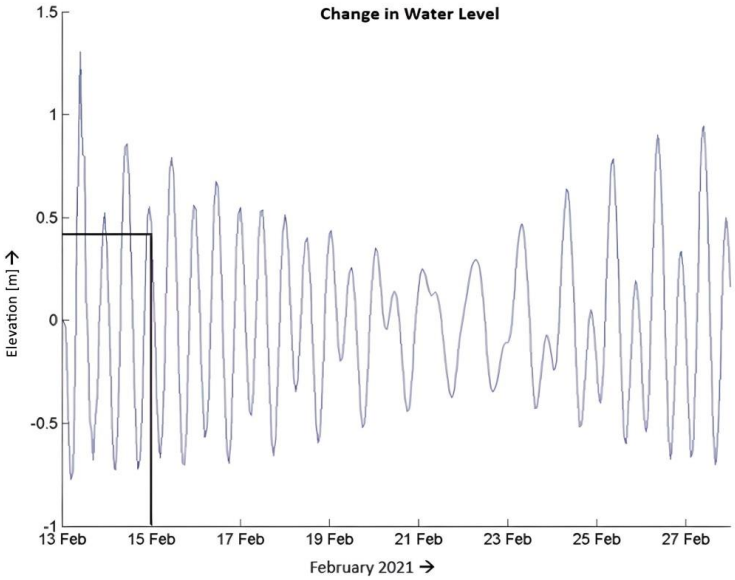


Figure 5. Hydrodynamic model results shown in water level changes

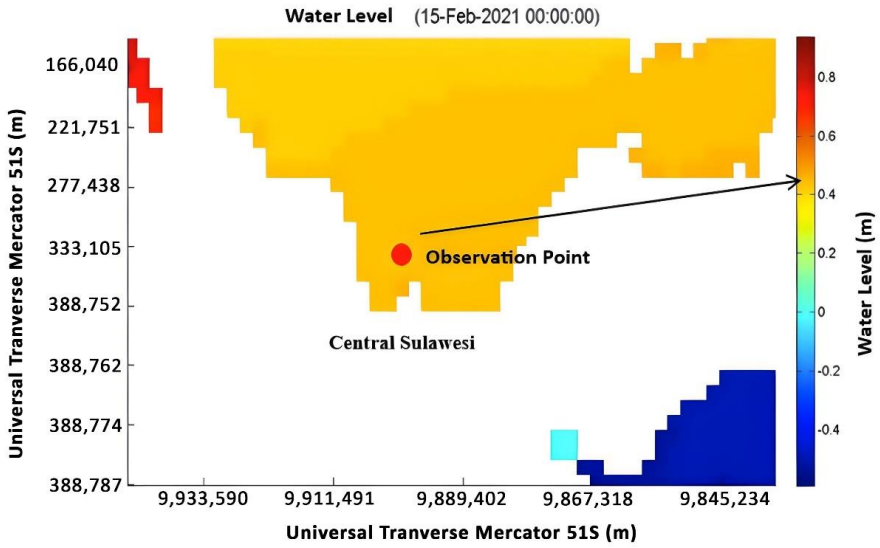


Figure 6. 2D Simulation results on water level changes

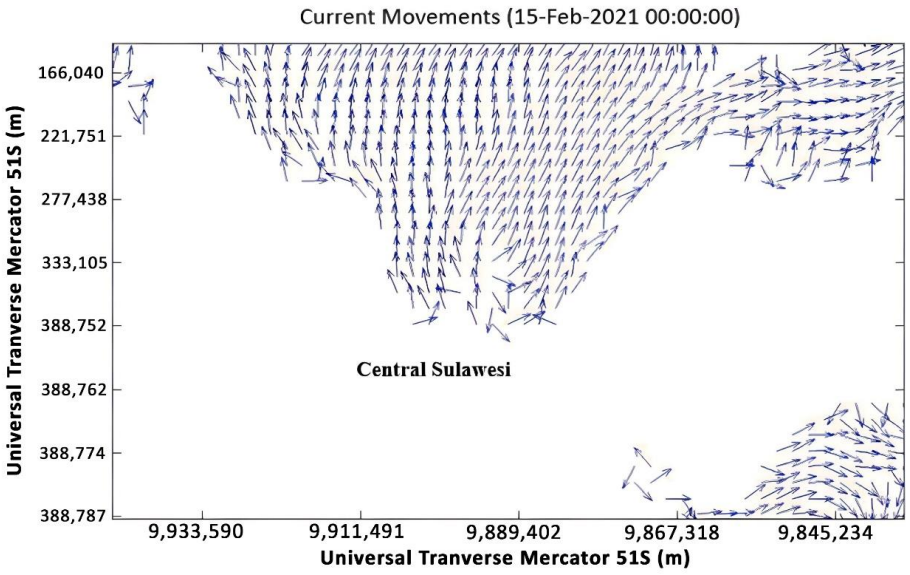


Figure 7. Simulation results of current movements on low tides

Figure 7 represents that the currents moving away from the coast because of a condition in which the wave shortly experiences a low tide condition. The current speed at the observation locations is shown in Fig. 8 below.

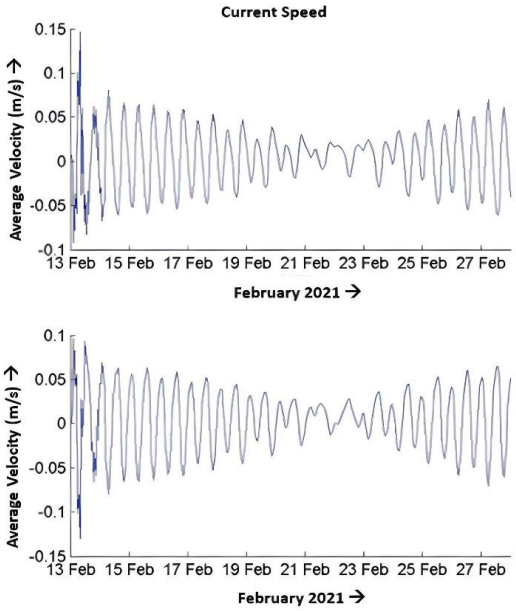


Figure 8. Current speed at observation point

The wave simulation in 2D format is also shown in the hydrodynamic model simulation (see Figure 9). Based on colour indicator on the right side of the figure, the wave heights around the observation point are around 0.1 - 0.2 meters. The model is then validated and verified using RMSE technique.

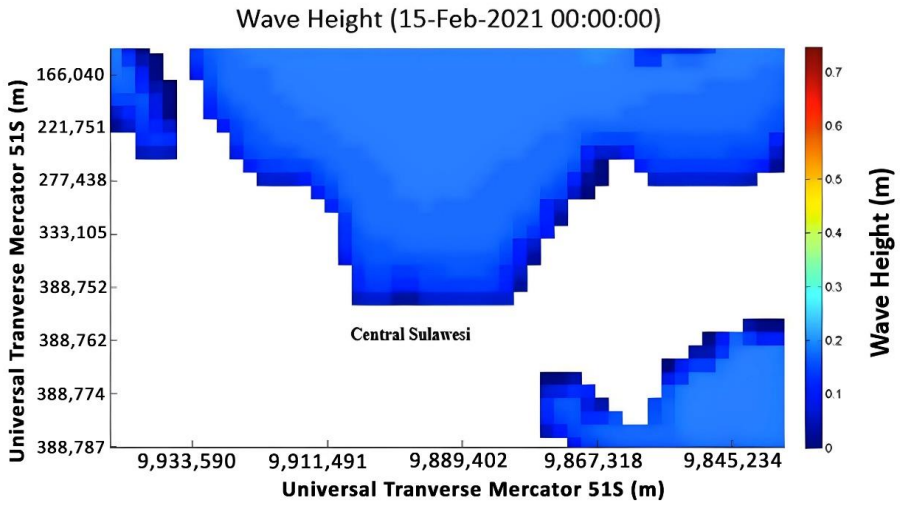


Figure 9. Wave heights on Central Sulawesi coastal area

3.2. Verification and Validation Using RMSE

Root Mean Square Error (RMSE) technique can be used to validate and verify the model between station measurements and simulation findings using Delft Dashboard software. The information on water level elevation is fed into RMSE formula. Model E is chosen for further study from several model simulations. Three distinct RMSE values are shown for three different manning roughness results from model E. Data for the research location, namely Central Sulawesi, are derived from the Delft Dashboard software and linked to the International Hydrographic Organization. (IHO). Table 5 displays the RMSE for model E with different Manning's roughness.

Table 5. RMSE values in Model E Summary

No	Manning roughness	RMSE Values
1	0.025	0.296
2	0.033	0.186
3	0.05	0.184

Based on simulation results with three different Manning's roughness, 0.05 has the lowest RMSE value of 0.184, indicating that the 0.05 manning roughness has the lowest error and is the most likely the field condition. Figure 10 describes a data comparison of the water level situation between station data and simulation data. The green line shows data from the station data, while blue dotted line shows the data from the simulation.

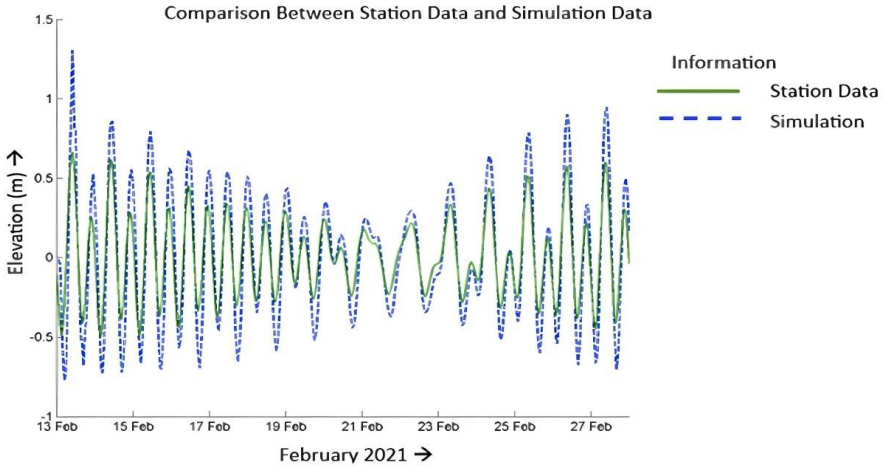


Figure 10. Comparison Water Elevation between Station Data and Simulation Data

Model E with manning roughness of 0.05 is selected for further investigation because the RMSE value in this model is the highest between those of the three models closes to 0.01, and it is sufficiently accurate to describe the actual field condition of the coastal area in Central Sulawesi. The model is used to map the suitability level of a coastal area in Central Sulawesi with the assistance of the ArcGIS 10.8 application.

3.3. Coastal Area Mapping Development

Hydrodynamic model, as validated with RMSE, can be used as support to complement the online data retrieved and used as suitability mapping data for the coastal area. ArcGIS 10.8 software was used to process the mapping of floating net cage for the grouper cultivation, seaweed cultivation, and marine tourism. Mapping was conducted only on the coastal area of Central Sulawesi.

3.3.1 Grouper Cultivation Suitability Mapping Area

The grouper cultivation suitability mapping results are evaluated based on the criteria of the floating net cage for grouper fish cultivation as described in Table 1. Based on the water depth as shown on Figures 11 and 12, most areas have water depth lower than 6 meters in height and are highlighted red which indicates that it is not suitable for grouper farming. Some areas have water depth of more than 8 meters height and are highlighted green which is very suitable for grouper cultivation.

Comment [JF10]: We try to elaborate more on our explanation for the result in the grouper cultivation area.

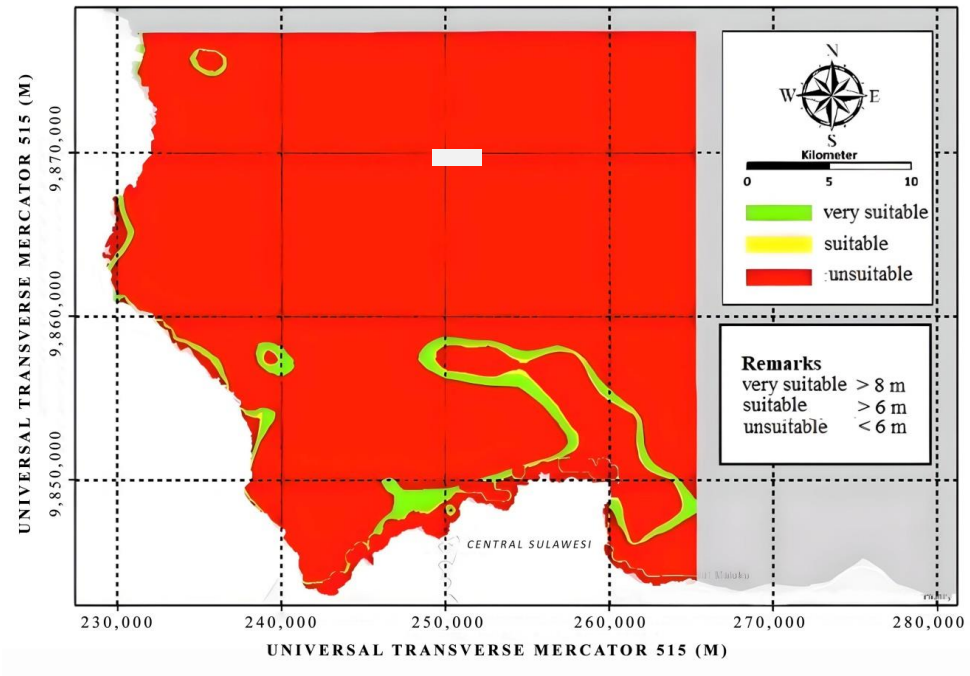


Figure 11. Grouper cultivation suitability area according to minimum water depth

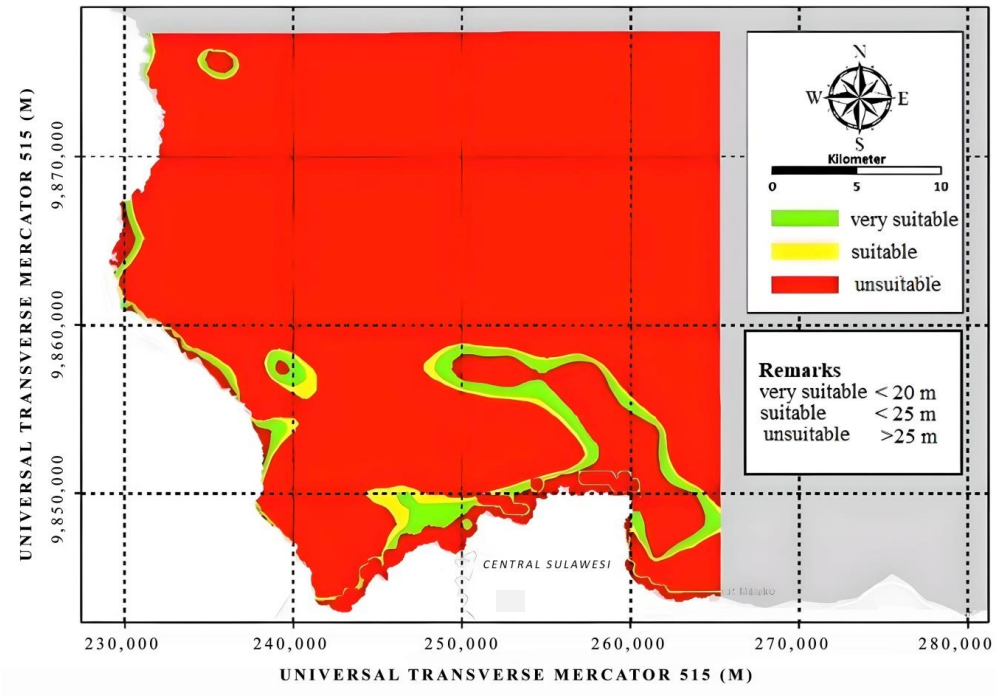
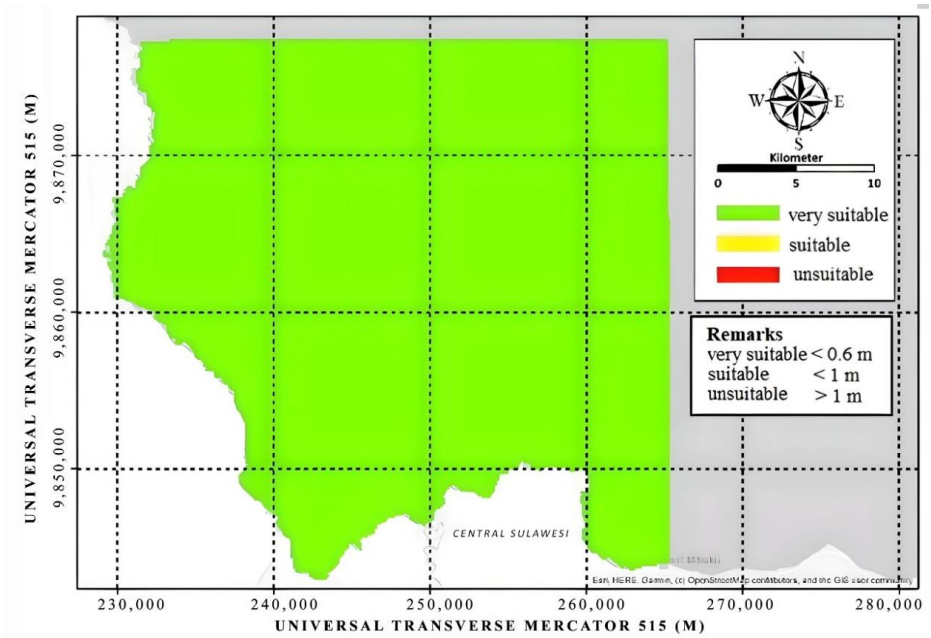


Figure 12. Grouper cultivation suitability area according to maximum water depth

Considering the wave heights, all areas shown in Figure 13 have less than 0.6 meters in wave height and are highlighted green which indicates that the areas are very suitable for grouper cultivation.



Comment [JF11]: Results figures has been updated based on point 10

Comment [JF12]: A brief explanation of the suitability area for grouper cultivation based on wave height criteria

Figure 13. Grouper cultivation suitability area according to wave height

Considering the current speed on Figure 14, most areas have lower than 0.6 m/s in current speed and are indicated green which shows that the areas are very suitable for grouper cultivation.

Comment [JF13]: More explanation for results has been added based on point 10

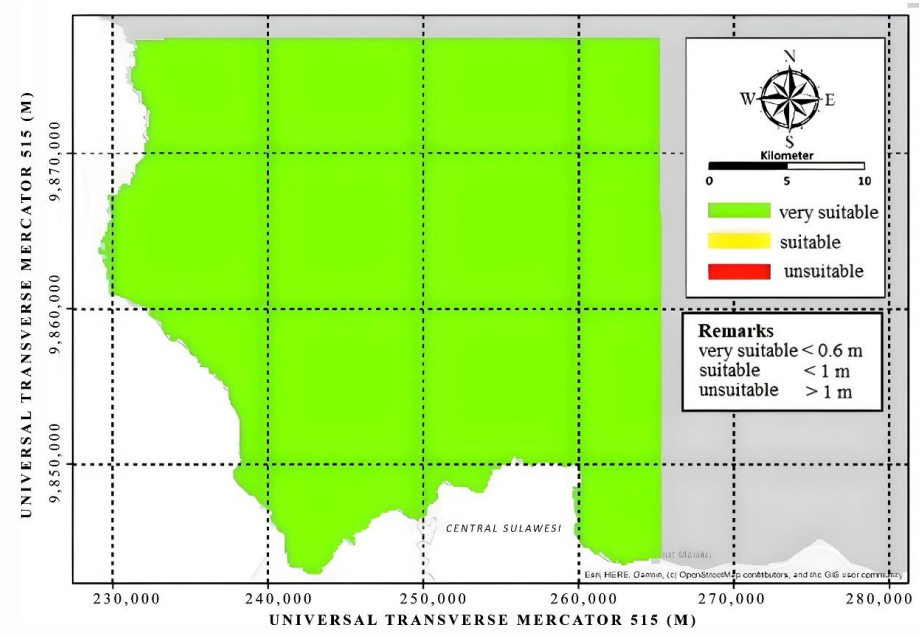


Figure 14. Grouper cultivation suitability area according to current speed

Considering the wind speed, Figure 15 shows that all areas are marked green and have wind speed lower than 10 m/s which indicates that the areas are very suitable for grouper cultivation.

Comment [JF14]: More explanation for results has been added based on point 10

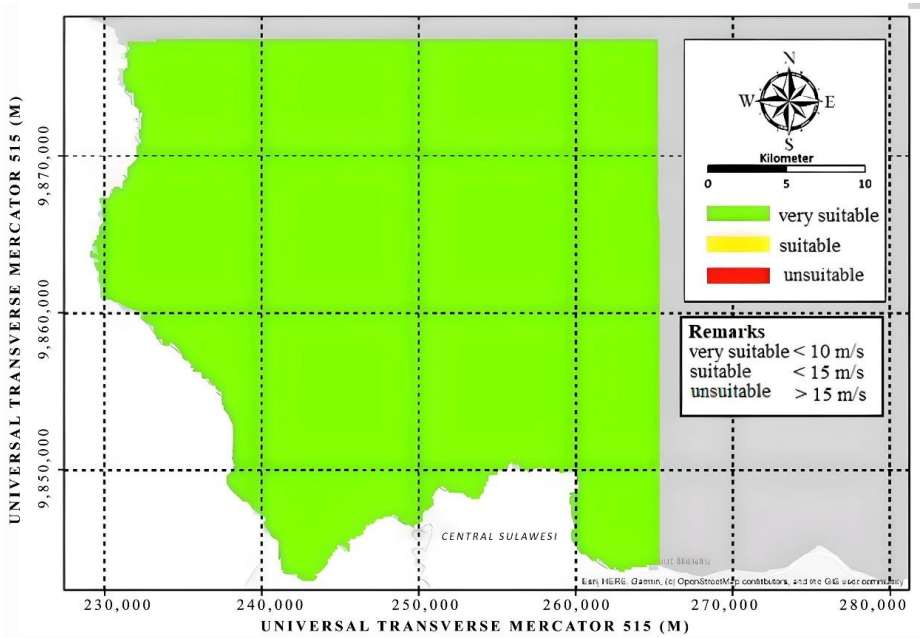


Figure 15. Grouper cultivation suitability area according to wind speed

Considering the water quality on Figure 16, all areas are marked green, and all parameters are suitable which shows that the areas are very suitable for grouper cultivation.

Comment [JF15]: More explanation for results has been added based on point 10

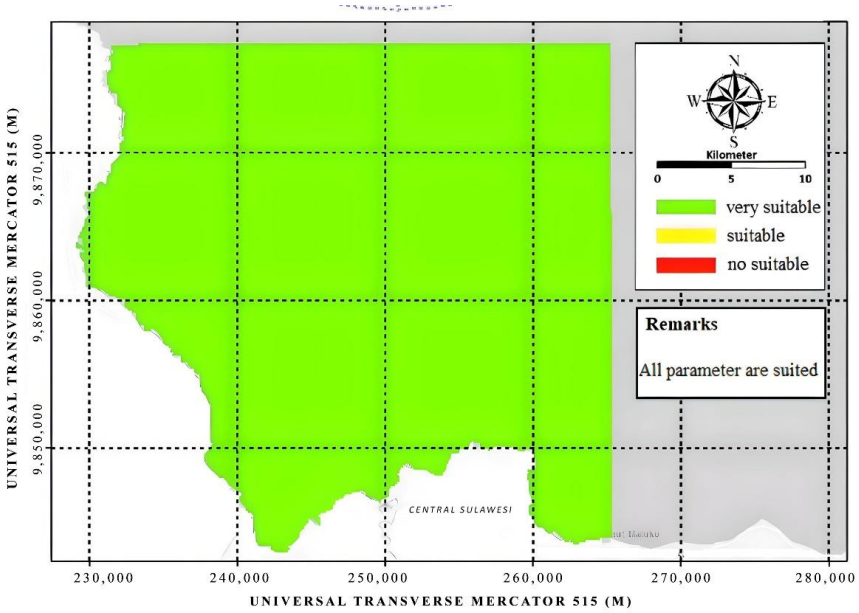


Figure 16. Grouper cultivation suitability area according to water quality

3.3.2 Seaweed Cultivation Suitability Mapping

The results of seaweed cultivation suitability mapping are based on Table 2as specified in SNI 7579.2:2010 to regulate the cultivation of Cottoni seaweed (*Euchema Cottoni)* using long-line method. Based on the water depth as shown on Figure 17, most areas marked green have water depth of more than 2 meters, which indicates that the areas are very suitable for seaweed cultivation. Some areas highlighted red have lower than 2 meters in water quality, which indicates that it is not suitable for seaweed cultivation

Comment [JF16]: More explanation for results has been added based on point 10

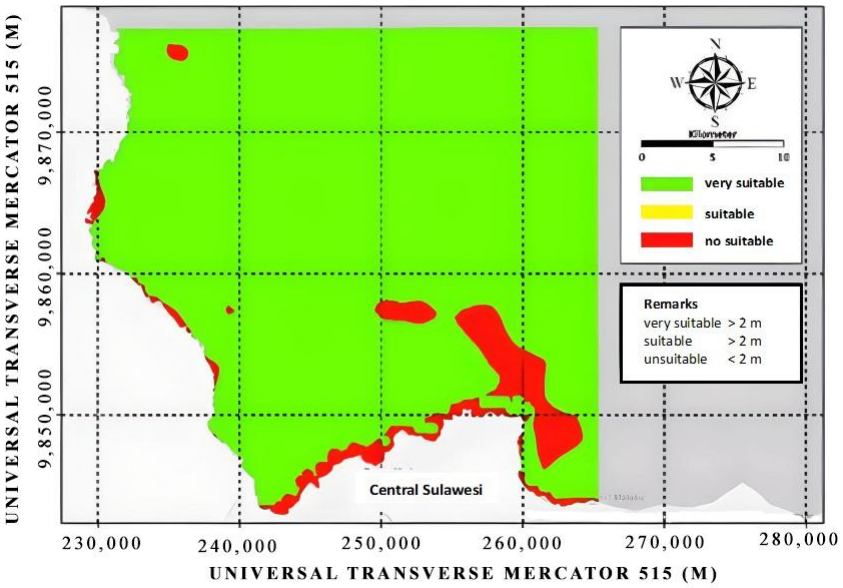


Figure 17. Cottoni seaweed cultivation suitability area according to water quality

Based on the current speed, most areas highlighted red have ranges of less than 0.1 m/s and more than 0.4 m/s in current speed, which are not suitable for seaweed cultivation. Some areas highlighted yellow have a range of 0.1 – 0.2 m/s, which indicates that those areas are suitable for seaweed cultivation.

Comment [JF17]: More explanation for results has been added based on point 10

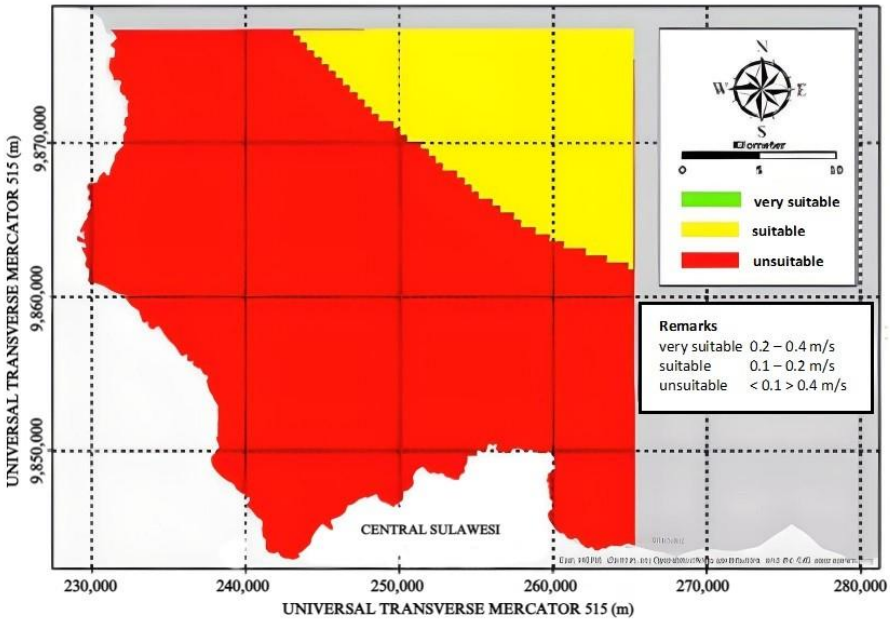


Figure 18. Cottoni seaweed cultivation suitability area according to current speed

Based on the water temperature shown on Figure 19, all areas have water temperature ranges from 26 – 32 ˚C and are hihglighted green, which indicates that thoses areas are very suitable for seaweed cultivation.

Comment [JF18]: More explanation for results has been added based on point 10

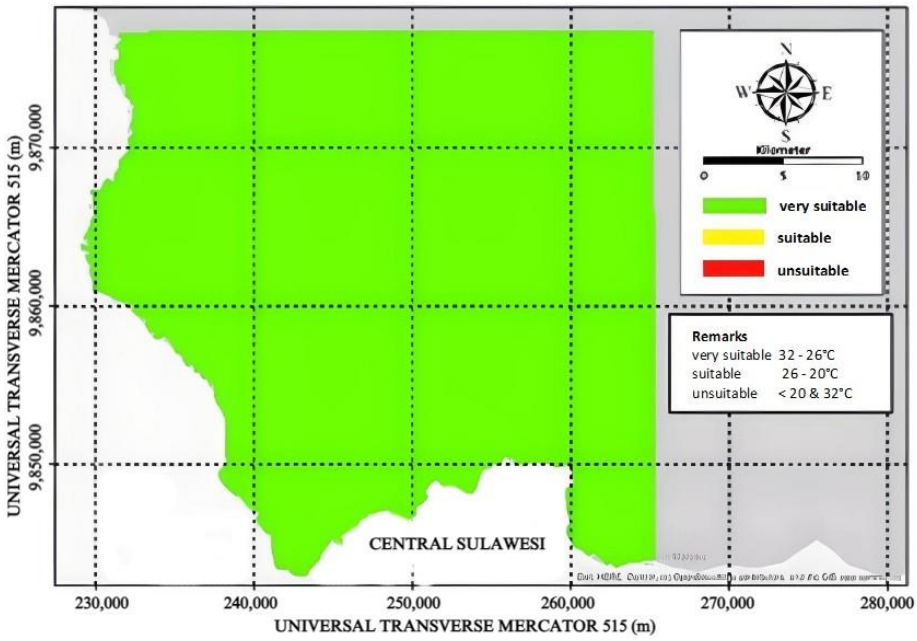


Figure 19. Cottoni seaweed cultivation suitability area according to water temperature

Based on the water quality on Figure 20, all areas are highligted green, and all parameters are suitable, which indicates that the areas are very suitable for seaweed cultivation.

Comment [JF19]: More explanation for results has been added based on point 10

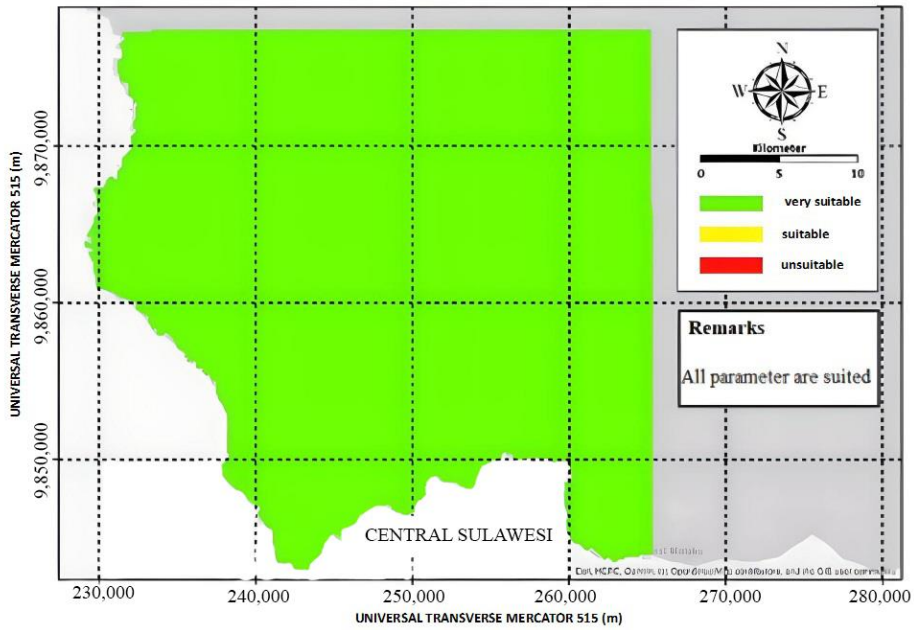


Figure 20. Cottoni seaweed cultivation suitability area according to water quality

3.3.3 Marine Tourism Suitability Mapping

The results of marine tourism suitability mapping were evaluated based on the described criteria in Table 3. The coastal marine tourism mapping in this research covers water depth, water clarity, current velocity, and coastal slope as these data are provided by the hydrodynamic model. The most optimum results for coastal marine tourism have not yet achieved the actual condition. Based on the water depth as shown on Figure 21, most central areas are highlighted red and have range of 6 – 10 meters in water depth, which indicates that it is not suitable for marine tourism, while some areas near the coastal area have range of 0 – 3 meters in water depth and highlighted green, which indicates that those areas are very suitable for the marine tourism.

Comment [JF20]: More explanation for results has been added based on point 10

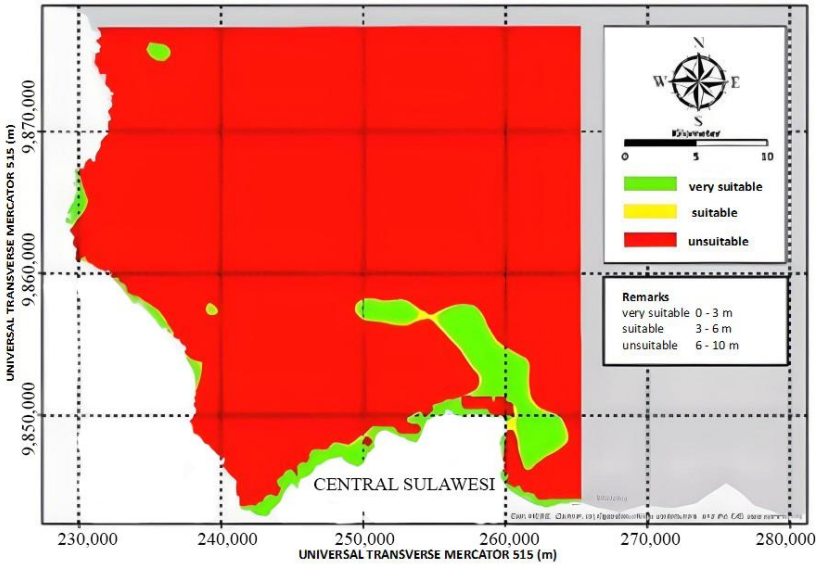


Figure 21. Marine tourism suitability area according to water depth

Based on the current speed in Figure 22, all areas have current speed ranging from 0 – 0.17 m/s and are highlighted green, which indicates that those areas are very suitable for marine tourism.

Comment [JF21]: More explanation for results has been added based on point 10

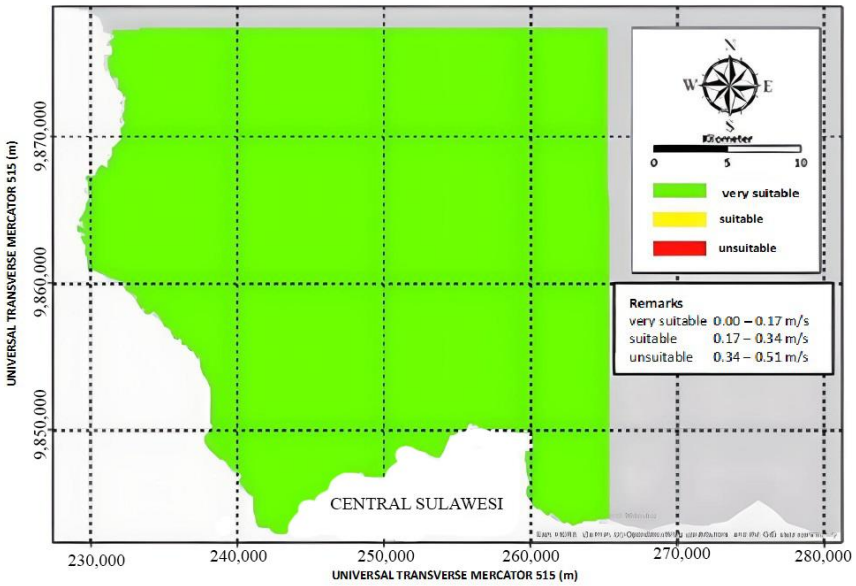


Figure 22. Marine tourism suitability area according to current speed

Based on the coastal slope shown in Figure 23, all areas are highlighted green and have a coastal slope of less than 10˚, which indicates that all areas are very suitable for marine tourism.

Comment [JF22]: More explanation for results has been added based on point 10

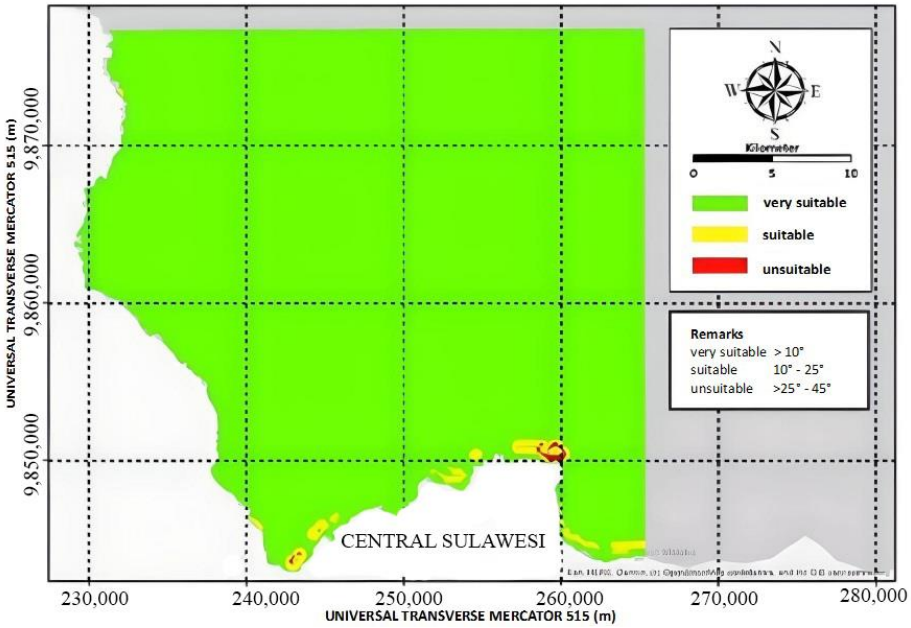


Figure 23. Marine tourism suitability area according to coastal slope

Based on the water clarity shown on Figure 24, most areas have water clarity of 3 – 5% and are highlighted red, which indicates that it is not suitable for marine tourism. Some areas are highlighted yellow and have water clarity ranging from 5 -10%, which indicates that those areas are suitable for marine tourism. A small area shown has water clarity ranging from more than 10% and are highlighted green, which indicates that those small areas are very suitable for marine tourism.

Comment [JF23]: More explanation for results has been added based on point 10

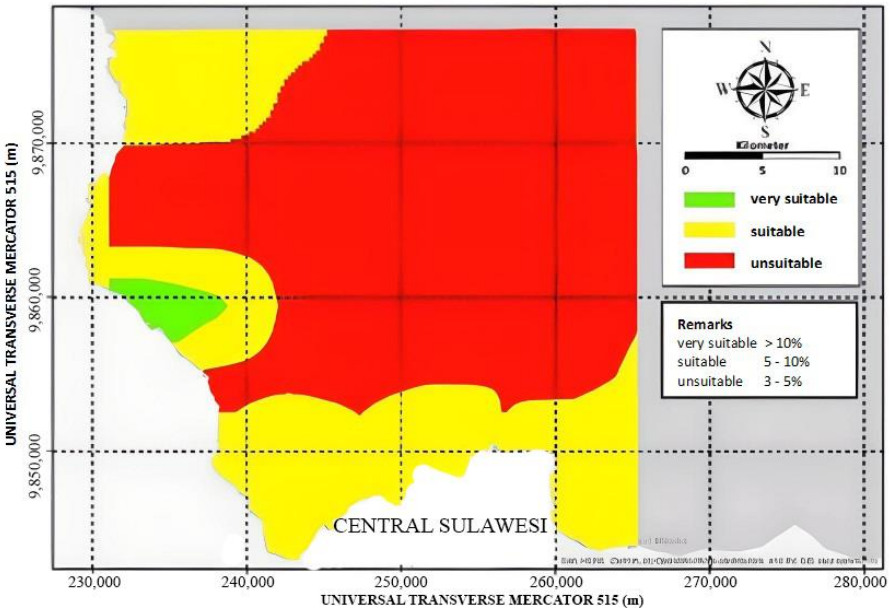


Figure 24. Marine tourism suitability area according to water clarity

3.3.4 Suitability Mapping Results

Based on all parameters that have been mapped based on each development sector, an estimated extent of the area is then conducted to produce suitability area of the grouper floating net cage cultivation, seaweed cultivation, and marine tourismas shown on Figures 25, 26 and 27, respectively.

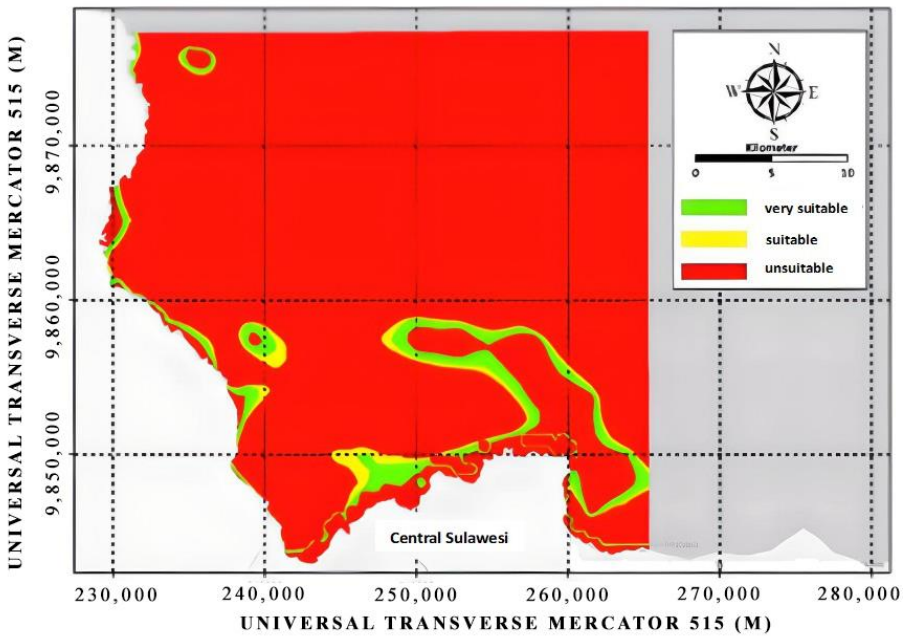


Figure 25. Grouper cultivation suitability area

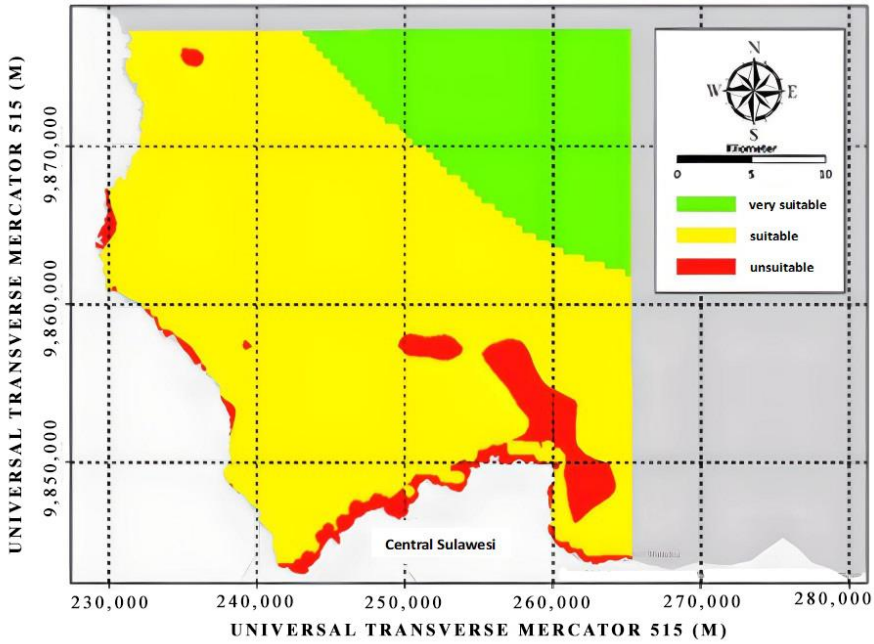


Figure 26. Seaweed cultivation suitability area

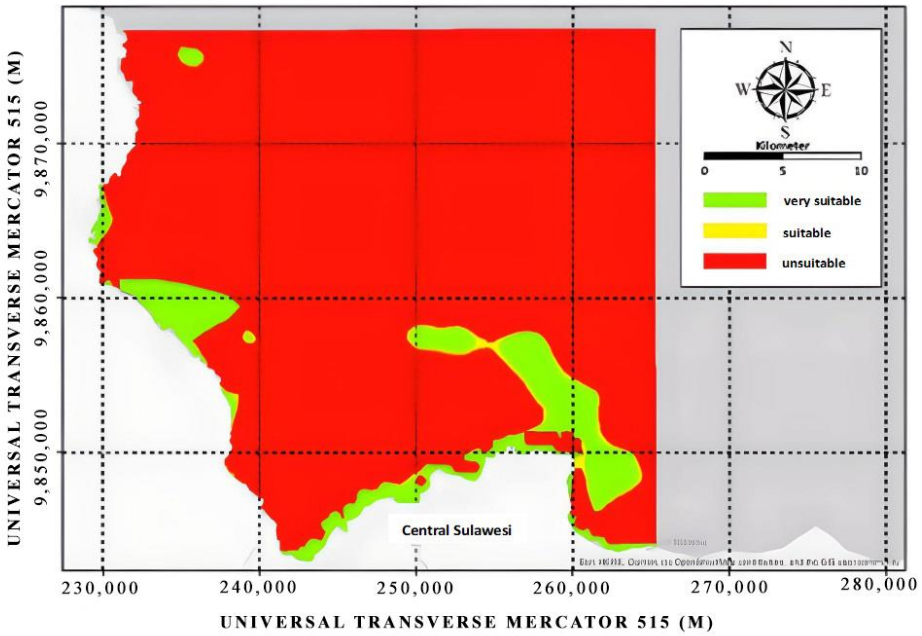


Figure 27. Mar

ine tourism suitability area

The extent of the areas for grouper cultivation mapping shows that 4,161 ha fell in the very suitable area category, while 2,000 ha is suitable area category. From Cottoni seaweed cultivation map, it can be observed that an area of 20,685 ha shows a very suitable area, while 70,316 ha shows a suitable area. In the marine tourism map, there are 7,979 ha of the areas fell into very suitable area category, and 1,045 fell into suitable area category. However, the results of the suitability map for each development sector is not optimal because several parameters or criteria are not fulfilled as the observation in this research is based on the hydrodynamic model scope.

4. Disscussion

The suitability map for all contents, which are grouper cultivation, seaweed cultivation, and marine tourism, may vary based on each parameter required. The use of hydrodynamic model may help the coastal area water simulation to help areas having a lot of potentials, but are yet to be developed. Parameters such as grid sizes and time steps taken are important to determine the accuracy of the model. The first model simulation was model A with grid size 200 meters, and 0.05 manning roughness with the duration of the simulation was 365 days, and the simulation failed. The model B was modified used bigger size grid that is 1,200 meters, but the model still experienced errors. With the next model, model C was modified by increasing the grid size into 1,600 meters with 3 different time steps and simulation duration of 30 days. However, model C encountered some errors when the simulation was running. The next model, namely model D, was modified by increasing the grid size into 5,550 meters and simulation duration of 2 weeks, with the same variables used by model C, and the simulation result was successful. Model E was created based on the parameters used by model D, but with 3 different manning roughness, the result turns out successful. Model E was used because the grid size and time step are rather good and show no errors when simulated using 3 different manning roughness, and model E had a result of RMSE value nearly 0.1, namely 0.184. With the result of RMSE, it can concluded that model E was the most accurate to describe the conditions of the waters in Central Sulawesi. The simulation data are then applied to ArcGIS software for the AHP processes to determine the suitability map for each sector..

Comment [JF24]: Discussion frame part has been updated based on reviewer's 4 point 6

Based on the results from the AHP processes for each development sector, results vary due to differences in seasons, locations, and conditions. The average temperature of seaweed cultivation in Brazil was around 22.17°C in a growing region and 17.11° C in the coldest month [7], while the results on Central Sulawesi region's average temperature was 32 – 36° C based on the parameteres, Central Sulawesi has a better area to cultivate Cottoni seaweed. The research in Florida shows that it is important for beach size, water clarity, and types of sand for a coastal area to be suitable for a marine tourism spot [6]. Wave height in Italy ranges around 0.01 – 0.4 m [14], which is relatively similar to the condition in Central Sulawesi for fish cultivation. The results show that different locations have different conditions for each cultivation sector. Areas located in tropical areas have different parameters such as wind speed, water temperature, and area size located in sub-tropical areas.

Comment [JF25]: Results comparison has already been done before on the discussion part. We try to see the comparison and found that our result complements the result of other studies

5. Conclusion

The utilization of the hydrodynamic model simulation in decision support system can be a method that benefits remote development in the vicinity of the coastal areas. The implementation of the decision support system which utilizes Analysis Hierarchy Process (AHP) can compute the suitability area of the potential area of 98,466 ha for future development in Central Sulawesi, Indonesia. The outcomes determine 6,163 ha of areas are suitable for grouper cultivation, 91,001 ha areas are available for seaweed cultivation, and 9,024 ha areas are available for marine tourism. However, the marine tourism suitability maps which require more data such as substrate mapping and mapping of dangerous animals are not available. Data needed to be researched further get more accurate suitability mapping. Primary data gathering by the local government is one of the solutions for data gathering. This research uses only 4 out of 10 factors, namely current speed, coastal slope, water clarity, and water depth to determine the suitability map. As a result, it is anticipated that this research will serve as the starting point for the development of more precise suitability mapping for choosing the right coastal marine tourism in Central Sulawesi, Indonesia.

During this research carry out, the lack of measurement data highlights the main challenge for the coastal researchers, and developers in Indonesia. Thus, for future research, it needs to deploy instruments for seawater measurement of the primary data due to physics, water quality, and coastal management. The utilization of the Decision Support System (DSS) proves can solve the complexity (physical, water quality and coastal zone

management) of the potential seawater information data for future coastal zone development in remote areas of Indonesia. Recently, there are still limiting studies about the practice of the DSS with respect to Indonesia's coastal water, especially in remote areas of central Sulawesi. Thus, this manuscript contributes to new knowledge application in the special domain (remote area) along with delivering information on one of the potential areas for the decision-maker and government for future development.

Comment [SH26]: Update the conclusion to include the newly formulated theoretical

6. Acknowledgements

The authors would like to convey their thanks to Faculty of Civil Engineering and Planning Petra Christian University Surabaya Indonesia and Institute of Research and Community Outreach Petra Christian University, Sintuwu Maroso University, the community in Poso Regency for their support and contribution during the research time.

7. Conflicts of Interest

The authors declare no conflict of interest.

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Comment [JF27]: Local reference has been replaced by updataed references

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Comment [JF28]: Local reference has been replaced by updataed references

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Comment [JF29]: Local reference has been replaced by updataed references

Comment [JF30]: Local reference has been replaced by updataed references

Comment [JF31]: Local reference has been replaced by updataed references

Comment [JF32]: Local reference has been replaced by updataed references

Comment [JF33]: Local reference has been replaced by updataed references

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Reviewers' Comments:

Reviewers' Comments: Reviewer #1:	
The topic is interesting and important. However, there are several key areas that need more work prior to publication. I have summarized the required changes in the hope that the feedback will be useful to you as you update the paper.	
1- The authors should ask the help of native English speaking proof reader, because there are too many typo and linguistic mistakes that should be fixed. (Authors should present a certificate of English editing).	done
2- More suitable and general title should be selected for the article. “at Coastal Zone Central Sulawesi Indonesia” should be deleted from the title. Title should contain 10-12 words.	The Hydrodynamic Models Application for Future Coastal Zone Development in Remote Area
3- The introduction **is poorly written** and it does not properly refer to previously published studies. The authors need to carefully review the published literature, identify the gaps in the literature, and propose their approach to fill the gap.	Tim: state of the art, eliminated national sources, renew the literature Referring to the point 3 and point 4, we have added recent references or studies about area suitability for marine culture/seaweed/fish farming, and tourism which has the potential to contribute the local economic growth.
4- **Literature review is not enough**. It is important to add some recent work **(2018-2023)** to the literature review. At least 8 new references should be added to article.	We believe that the research significance is a contribution to the local government on how to maximize the potential natural resources and its impact to improve economic growth. It will bring also huge impact to the local community so that they can improve their living condition once the area is start to be developed.
5- More suitable map should be presented for the study area instead of figure 1. The exact location of the study area should be presented in a map. It is suggested to show the general view of the study area to detail (Country, city …).	Figures have been updated with better image resolution as per reviewer recommendation
6- The research method, including the precise method of numerical modeling, should be expressed more.	Added hydrodynamics formula
7- Detailed explanation and interpretation should be provided for all figures and diagrams.	A brief explanation of the referred figure has been added. Figure 2 shows the bathymetry mapping on the research location area which is in northern part of North and Central Sulawesi

8- The quality of the figures is weak. The original (or editable) source of the figures should be used in the manuscript.	A brief explanation of the referred figure has been added. Figure 2 shows the bathymetry mapping on the research location area which is in northern part of North and Central Sulawesi
9- Draw a flowchart from your workflow that briefly shows the process of the methodology.	A research methodology in flowchart has been added and it explained how we conduct the research and develop a hydrodynamic model.
10- Much more explanations and interpretations should be added for the result, which are not enough.	Results figures has been updated based on point 10 A brief explanation of the suitability area for grouper cultivation based on wave height criteria
11- It is suggested to compare the results of the present study with previous studies and analyze their results completely.	Results comparison has already been done before on the discussion part. We try to see the comparison and found that our result complements the result of other studies
12- Some of the references are not international and valid. Authors should use from international resources. Maximum 3-4 local references are allowed: (e.g. [10] Muqsith, A. (2015). Valuasi ekonomi sumberdaya alam pantai sidem. Jurnal Ilmu Perikanan, Vol. 6, No. 2, pp. 135-142. [17] Febrianto, T., Hestirianoto, T., and Agus, S. B. (2016). Pemetaan Batimetri Di Perairan Dangkal Pulau Tunda, Serang, Banten Menggunakan Singlebeam Echosounder. Jurnal Teknologi Perikanan dan Kelautan, Vol. 6, No. 2, pp. 139-147. https://doi.org/10.24319/jtpk.6.139-147. [24] Fitriyani, I. R., Setiawan, B. D., and Perdana, R. S. (2018). Prediksi Indeks Harga Konsumen (IHK) Kelompok Perumahan, Air, Listrik, Gas, dan Bahan Bakar Menggunakan Metode Extreme Learning Machine. Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer, Vol. 2, No. 11, pp. 5667-5674. [26] Hafli, T. M. (2014). Simulasi Numerik Perubahan Morfologi Pantai Akibat Konstruksi Jetty Pada Muara Lambada Lhok Aceh Besar Menggunakan Software Delft3d, Undergraduate Thesis, Fakultas Teknik Universitas Syiah Kuala Darussalam Bandar Aceh. [27] Hermawan, S., & Syafrani. (2015). An Integrated Decision Support System for the Management of Sustainable Mariculture in Indonesia, Advances in Environmental Biology, Vol. 9, No. 7, pp. 21-27. [28] SNI 7579.2:2010. (2010). Produksi Rumput Laut Kotoni (Eucheuma cottonii) – Bagian 2: Metode long-line, Jakarta: Badan Standarisasi Nasional.	We have updated our citation based on point 12 Local reference has been replaced by updataed references

[29] Yulianda, F., Fahrudin, A., Hutabarat, Armin, A., Sri, H., Kusharjani, Sang, K.H. (2010). Pengelolaan Pesisir dan Laut Secara Terpadu, Bogor: Pusdiklat Kehutanan-Departemen Kehutanan RI-SECEM- Korea International Coorporation Agency, Book 3.)	
Reviewer #4: The main concern about the manuscript is its contribution to knowledge. It is expected that a critical gap analysis will be done in the introduction section to justify the necessity of doing this piece of research. It is partially done by the authors but it should consider all aspects of the problem including assumptions, limitations and constraints, pros and cons, and relative merits to the other publicly available studies and proposals.	done
- The English language of the manuscript needs to be edited.	done
- The research contributions of the paper should be articulated more clearly.	Results comparison has already been done before on the discussion part. We try to see the comparison and found that our result complements the result of other studies
The abstract is not representative of the content and contributions of the paper. The abstract does not seem to properly convey the rigor of research.	done
- Aside from the aim stated in the title, the research gap and the goals of the research are not specified which leads to the reader missing the significance of the research	Research gap which we wish to fill is to apply a technical approach, in this case, a hydrodynamic model and analysis hierarchy process (AHP) to evaluate the potential activities in selected areas in Sulawesi. We are evaluating the potential development of seaweed cultivation, grouper cultivation, and marine tourism. We believe that this work will assist the regional government in its area development potential with the aim to improve the economic growth of the local community.
- The discussion section needs to be described scientifically. Kindly frame it along the following lines: i. Main findings of the present study; ii. Comparison with other studies; iii. Implication and explanation of findings; iv. Strengths and limitations.	Discussion frame part has been updated based on reviewer's 4 point 6
- Conclusion: i. Update the conclusion to include the newly formulated theoretical contributions;	During this research carry out, the lack of measurement data highlights as the main challenge for the coastal researchers, and developers in Indonesia. Thus for future research, it needs to deploy instruments for seawater measurement of

ii. Mention the limitations of the study and prospects for future research; iii. Summarize the key results in a compact form and re-emphasize their significance; iv. Summarize how the article contributes to new knowledge in the domain.	the primary data due to physical parameter, water quality, and coastal zone management. The utilization of the Decision Support System (DSS) proves can solve the complexity (physical, water quality and coastal zone management) of the potential seawater information data for future coastal zone development in remote areas of Indonesia. Recently, there are still limiting studies about the practice of the DSS with respect to Indonesia's coastal water, especially in remote areas of central Sulawesi. Thus, this manuscript contributes to new knowledge application in the special domain (remote area) along with delivering information on one of the potential areas for the decision-maker and government for future development.
Technical Editor Comments: - Please add an ORCID for at least one author. - If one of the referees has suggested that your manuscript should undergo English revisions, please address this issue during revision. We propose that you use one of the editing services listed at https://www.euhera.org/language-editing-services/ or have your manuscript checked by a native English-speaking colleague. _____ Civil Engineering Journal http://civilejournal.org/index.php/cej	ORCID number: 0000-0002-6809-5566

[C.E.J] Editor Decision (Article #2023-4196) External Inbox ×

office C.E.J <office@civilejournal.org> May 31, 2023, 10:22 PM
to Jescey, me, David, Edwin, Jason

Dear Dr. Prajogo:

We have reached a decision regarding your submission to Civil Engineering Journal, "The Implementation of Hydrodynamic Models Application in Decision Support System for the Future Development in Remote Area at Coastal Zone Central Sulawesi Indonesia".

Our decision is to: Revision Required.

Please consider the reviewer's comments and revise it as soon as possible. If you do not submit the revision file, the article will be withdrawn within 20 days.

When you revise your manuscript, please highlight the changes you make in the manuscript by using the track changes mode in MS Word or by using bold

When you revise your manuscript, please highlight the changes you make in the manuscript by using the track changes mode in MS Word or by using bold or colored text.

** Please upload the revised version into your user home> Review tab> Author Version.

Regards,
Editor in Chief: M. R. Kavianpour
Kavianpour@civilejournal.org

Reviewer #1:

The topic is interesting and important. However, there are several key areas that need more work prior to publication. I have summarized the required changes in the hope that the feedback will be useful to you as you update the paper.

1- The authors should ask the help of native English speaking proof reader, because there are too many typo and linguistic mistakes that should be fixed. (Authors should present a certificate of English editing).
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3- The introduction is poorly written and it does not properly refer to previously published studies. The authors need to carefully review the published literature, identify the gaps in the literature, and propose their approach to fill the gap.

4- Literature review is not enough. It is important to add some recent work (2018-2023) to the literature review. At least 8 new references should be added to article.
5- More suitable map should be presented for the study area instead of figure 1. The exact location of the study area should be presented in a map. It is suggested to show the general view of the study area to detail (Country, city …).
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8- The quality of the figures is weak. The original (or editable) source of the figures should be used in the manuscript.
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Reviewer #4:

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- The English language of the manuscript needs to be edited.
- The research contributions of the paper should be articulated more clearly. The abstract is not representative of the content and contributions of the paper. The abstract does not seem to properly convey the rigor of research.
- Aside from the aim stated in the title, the research gap and the goals of the research are not specified which leads to the reader missing the significance of the research.
- The discussion section needs to be described scientifically. Kindly frame it along the following lines:

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ii. Comparison with other studies;
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iv. Strengths and limitations.
- Conclusion:
i. Update the conclusion to include the newly formulated theoretical contributions;
ii. Mention the limitations of the study and prospects for future research;
iii. Summarize the key results in a compact form and re-emphasize their significance;
iv. Summarize how the article contributes to new knowledge in the domain

iii. Summarize the key results in a compact form and re-emphasize their significance;
iv. Summarize how the article contributes to new knowledge in the domain.

Technical Editor Comments:

- Please add an ORCID for at least one author.

- If one of the referees has suggested that your manuscript should undergo English revisions, please address this issue during revision. We propose that you use one of the editing services listed at https://www.euhera.org/language-editing-services/ or have your manuscript checked by a native English-speaking colleague.

Surya Hermawan <shermawan@petra.ac.id> May 29, 2023, 12:40 PM

to office

Dear Office Civil Engineering Journal

I would like to give you a reminder about the reviewing process for both of our manuscripts, including:

1. The Implementation of Hydrodynamic Model Applications in Decision Support Systems for the Future Development of Remote Areas in the Coastal Zone of Central Sulawesi, Indonesia
2. Utilization of Hydrodynamics Model-Based Decision Support System for Sustainable Aquaculture Farm Scale in Indonesia

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department
Petra Christian University
Jln. Siwalankerto No. 121 – 131 (60236) Surabaya Indonesia

office@civilejournal.org May 22, 2023, 9:10 PM

to me

Dear Dr. Hermawan,

Thank you for the email.
As you have requested, your manuscript will review with fast option.

Surya Hermawan <shermawan@petra.ac.id> May 21, 2023, 9:53 AM

to office, Jescey

Dear the Office Civil Engineering Journal

Regarding your last information that if we are in a hurry,

It was possible to request the fast review option, which takes about 10 days (in this option, the journal's APC will increase to 1495 (995 + 500) euros due to the cost of the reviewers).

I do agree to request it for both of our manuscripts, including:

a. The Implementation of Hydrodynamic Models Application in Decision Support System for the Future Development in Remote Area at Coastal Zone Central Sulawesi Indonesia

b. Utilization of Hydrodynamics Model-Based Decision Support System for Sustainable Aquaculture Farm Scale In Indonesia

Awaiting your reply

Best Wishes
Dr.rer.nat. Ir. Surya Hermawan, ST.,M.Eng
Civil Engineering Department

Jescey Edlin Prajogo <b11190072@john.petra.ac.id> May 19, 2023, 9:36 AM

to me

---------- Forwarded message ---------
From: **office C.E.J** <office@civilejournal.org>
Date: Mon, Apr 10, 2023, 5:49 PM
Subject: [C.E.J] The Implementation of Hydrodynamic Models Application in Decision Support System for the Future Development in Remote Area at Coastal Zone Central Sulawesi Indonesia
To: Jescey Edlin Prajogo <b11190072@john.petra.ac.id>

Dear Dr. Prajogo,

We would like to inform you that the regular reviewing process takes 2.5-3 months and the article processing charge is 995 euros, which will be asked after acceptance. But if you are in a hurry, you can request the fast review option, which takes about 10 days (in this option, the journal's APC will increase to 1495 (995 + 500) euros due to the cost of the reviewers).

NOTE: It is important to pay attention that there is no guarantee of

Pada tanggal Sel, 18 Apr 2023 12.24, <office@civilejournal.org> menulis:

> Dear Jescey,
>
> Thank you for the email.
> You have submitted both articles recently, so you should be patient to complete the review process.
>
> Regards,
> Office C.E.J

On 2023-04-18 07:55, Jescey Edlin Prajogo wrote:
> Dear Editor Civil Engineering Journal,
>
> Good day to you,
>
> My name is Jescey Edlin Prajogo, Bachelor candidate at Petra Christian
> University in Civil Engineering and Planning. Currently under
> Dr.Hermawan as supervisor in my Bachelor program.
>
> I would like to follow up with you regarding our paper which we intend
> to send to Civil Engineering Journal, These two papers are:
> 1. The Implementation of Hydrodynamic Models Application in Decision
> Support System for the Future Development in Remote Area at Coastal
> Zone Central Sulawesi Indonesia
> 2. Utilization of Hydrodynamics Based Decision Support System for
> Sustainable Aquaculture Farm Scale in Indonesia
>
> I would like to ask if the paper is accepted, would you mind giving us
> a discounted rate for the submission or if there is any student rate
> which we could afford.
>
> Regards
>
> Jescey Edlin Prajogo

Fwd: [C.E.J] The Implementation of Hydrodynamic Models Application in Decision Support System for the Future Development in Remote Area at Coastal Zone Central Sulawesi Indonesia External Inbox × CED ×

Jescey Edlin Prajogo <b11190072@john.petra.ac.id> Fri, May 19, 9:36 AM
to me

---------- Forwarded message ---------
From: **office C.E.J** <office@civilejournal.org>
Date: Mon, Apr 10, 2023, 5:49 PM
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NOTE: It is important to pay attention that there is no guarantee of acceptance of the articles with a fast option.

Regards,
Office C.E.J
Civil Engineering Journal

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