

Reviewer Sunarsih et al (Symmetry)

Reviewer 1

#### Comments and Suggestions for Authors

The article is interesting, but requires several amendments:

1. a short overview of fuzzy logic-based methods is missing in the introduction.
2. there is also no reference to other proposals to use fuzzy harvest theory in the VIKOR method
3. the introduction should end with a short presentation of the structure of the article
4. the introduction should have a more prominent contribution and motivation for the research undertaken.
5. Figure 3 should be corrected. Do colors mean anything? If it does not propose to change the presentation
- 6 The results obtained have not been compared with the results of any other method, which should be rectified. No reference ranking
7. proposes to extend the conclusions. Future research orientations should also be added.

The paper has a very good chance of getting a positive review after the revision.

Reviewer 2

The paper proposes article analyzed priority scales and decision making alternatives in the selection of reforestation areas using Trapezoidal Fuzzy VIKOR method (Visekriterijumsko Kompromisno Rangiranje) as a way of identifying the important criteria and alternatives. Using pairwise comparison values obtained from various expert opinions. The objective was to obtain priority scale of reforestation area by considering some criteria. The research is interesting, given the multiple attribute decision making approach and the presentation style is good but some aspect needs minor revisions. Minor revisions are required.

I have few suggestions for the improvement of the manuscript which can be grouped to the following:

#### General Comments

1. The abstract section of the paper did not clearly show the context of the study and highlight why it is important.

2. While the authors clearly demonstrate the application of this method in the selection process through a series of equations to convey how the tool works. They do not use this approach to extensively discuss the strengths and weaknesses as applied to their case studies. The purpose of the case study should be restated, and it will be better to talk about the meaning of the results, rather than just showing the result. I think that the authors should at least briefly discuss these problems and specify the motivations of the choice of this Method. With regard

to the results of their case studies in a different or separate discussion section. i.e. make a new discussion section.

3. I think the conclusion section fails to comment on significant issues, reveal problems, negative results (if any), and make recommendation for future works. Consider revising the "conclusions" section. It needs to have more information from the case study application supporting your arguments, describe the value of your research, show that you understand the material that you've presented.

4. Finally, in re-editing the paper, the authors are recommended to closely check word choice and to provide descriptive and consistent terminology to enhance readability and understanding. The style or structure of the paper needs improvement. Examples of some of these are: "In fact "and "word/term"

### Specific Comments

Study area: add more information to describe the study area and why this area is chosen for this study.

Line 156 to 159 overused of watershed.

Line 163 to 169 subdistrict is overused

Line 187 as shown in Tables 1 and 2 not Table 1 and Table 2.... Do the same in your manuscript. E.g. line 200.

Line 226 According to [28], ..... Should be According to Liu [28],... ..instead, please used this style in the manuscript. E.g. Line 211

Line 238: the used criteria based on [5] about the criteria in reforestation area selection.... Replace [5] with the authors name and rephrase the sentence.

### Reviewer 3

This study employed the trapezoidal fuzzy Vikor method for decision making used linguistic terms to evaluate the ranking of alternatives with respect to criteria, and the Priority Scale for Watershed Reforestation was investigated, it is interesting and can be accepted for its publication after minor revision, I have the following comments:

(1) What is the main focus of this study? method-focused or case-study-focused? I think that it is better that it is a method-focused. The structure of this study should be improved in the following way:

Introduction, Literature Reviews, Criteria System, Methods, Case Study, Results and Discussion, and Conclusions and Future Work.

(2) A more comprehensive literature review is prerequisite to present the research gaps and highlight the innovations of this study.

In literature review, you should have an overview of MCDA methods, then have an overview of the applications of VIKOR or its improved method, and I suggested to cite the following papers:

Abdel-Baset, M., Chang, V., Gamal, A. and Smarandache, F., 2019. An integrated neutrosophic ANP and VIKOR method for achieving sustainable supplier selection: A case study in importing field. *Computers in Industry*, 106, pp.94-110.

Wang, B., Song, J., Ren, J., Li, K. and Duan, H., 2019. Selecting sustainable energy conversion technologies for agricultural residues: A fuzzy AHP-VIKOR based prioritization from life cycle perspective. *Resources, Conservation and Recycling*, 142, pp.78-87.

(3) Sensitivity analysis by changing the weights of the criteria is prerequisite.

(4) What are the advantages and weak points of the proposed method? Future work?

## List of Changes

**Manuscript: Analysis of Priority Scale for Watershed Reforestation Using Trapezoidal Fuzzy VIKOR Method: A Case Study in Semarang, Central Java Indonesia**

*Response and Revision made by Author(s)*

**Reviewer #1:**

No	Comments	Revision/Changes
	The article is interesting, but requires several amendments:	
1	A short overview of fuzzy logic-based methods is missing in the introduction.	<b>Line 30 – 33 :</b> Fuzzy logic is an appropriate way to map an input space into an output space. For very complicated systems, the use of fuzzy logic is one solution. The addition of new input to the fuzzy system is a system that works based on the principles of fuzzy logic, it only requires the addition of a new membership function and the rules associated with it.
2	There is also no reference to other proposals to use fuzzy harvest theory in the VIKOR method	<b>Line 37-66 :</b> Noordian [2] used the VIKOR fuzzy method as a method for selecting the reinforcement of natural fiber composition for the front car hood; Research [3] is Implementation of the VIKOR Method for Scholarship Recipient Selection; Research [4] used the VIKOR method to evaluate consulting firms; Research [5] used the VIKOR method as a method for material selection in wall insulation; Research [6] used the VIKOR method as a project selection method.
3	The introduction should end with a short presentation of the structure of the article	Line 61 – 66 : This study shows that the VIKOR method can rank projects so that decision makers can choose the right project to conduct. Therefore, the objective of this study is to use fuzzy VIKOR with multiple criteria decision methods in decision making by ranking so that the chosen decision making is appropriate. In this research, besides using the VIKOR method, it also used fuzzy logic to determine the priority scale of reforestation in the Watershed (DAS) with a case study in the City of Semarang, Central Java, Indonesia, because this watershed is one of the critical watersheds.
4	The introduction should have a more prominent contribution and motivation for the research undertaken.	There are line 60-61. This study shows that the VIKOR method can rank projects so that decision makers can choose the right project to conduct. Therefore, the

		objective of this study is to use fuzzy VIKOR with multiple criteria decision methods in decision making by ranking so that the chosen decision making is appropriate.
5	Figure 3 should be corrected. Do colors mean anything? If it does not propose to change the presentation	Line 238 – 239 → Figure 3 correct.
6	The results obtained have not been compared with the results of any other method, which should be rectified. No reference ranking	<p><b>Line 316 – 319</b></p> <p>This hierarchical structure uses 6 criteria and is described as C1, C2, C3, C4, C5, C6 and ratings of the alternatives there are 6 alternatives (A1, A2, A3, A4, A5, A6. Vincent's research [18] to select a furniture supplier using 9 criteria furniture suppliers can described C1, C2, C3, C4, C5, C6, C7, C8, C9 and 3 alternatives A1, A2, A3.</p> <p><b>Line 344-347</b></p> <p>The fuzzy VIKOR method by researchers Noordiana [2] is used in decision making using linguistic terms to evaluate the ratings of alternatives with respect to criteria with decision makers between alternatives and on linguistic scale criteria according to decisions D1, D2, D3, D4, D5. While this study is used with decision makers D1 and D2.</p>
7.	Proposes to extend the conclusions. Future research orientations should also be added.	<p><b>Line 402 – 409</b></p> <p><b>In the future work</b>, for further research, alternatives and criteria on the linguistic scale according to decision makers can be added, so that the data entered is more varied. In addition, the VIKOR method can be applied in other programs as a ranking method to provide an alternative model for integrated watershed management policies in the form of a framework that can be implemented within a certain timeframe, both general for all watersheds and those that are specific on the basis of their critical criterion criteria. Integrated watershed management is very important in order to preserve the environment for the welfare of the community. The VIKOR method can also be applied in other fields of study as a ranking or decision support method.</p>
The paper has a very good chance of getting a positive review after the revision.		

## Reviewer #2:

No	Comments	Revision/Changes
	<p>The paper proposes article analyzed priority scales and decision making alternatives in the selection of reforestation areas using Trapezoidal Fuzzy VIKOR method (Visekriterijumsko Kompromisno Rangiranje) as a way of identifying the important criteria and alternatives. Using pairwise comparison values obtained from various expert opinions. The objective was to obtain priority scale of reforestation area by considering some criteria. The research is interesting, given the multiple attribute decision making approach and the presentation style is good but some aspect needs minor revisions. Minor revisions are required.</p> <p>I have few suggestions for the improvement of the manuscript which can be grouped to the following:</p> <p><b>General Comments</b></p>	
1	<p>The abstract section of the paper did not clearly show the context of the study and highlight why it is important.</p>	<p>I have added an abstract description <b>in the line 15-19</b>. Fuzzy systems are very suitable for reasoning approaches especially for systems that deal with problems that are difficult to define using mathematical models. The most widely used fuzzy numbers are fuzzy numbers with triangular membership functions and fuzzy numbers with trapezoidal membership functions. In this study, trapezoidal is used.</p>
2	<p>While the authors clearly demonstrate the application of this method in the selection process through a series of equations to convey how the tool works. They do not use this approach to extensively discuss the strengths and weaknesses as applied to their case studies. The purpose of the case study should be restated, and it will be better to talk about the meaning of the results, rather than just showing the result. I think that the authors should at least briefly discuss these problems and specify the motivations of the choice of this Method. With regard to the results of their case studies in a different or separate discussion section. i.e. make a new discussion section.</p>	<p>The discussion has been adapted to other discussants.</p>
3	<p>I think the conclusion section fails to comment on significant issues, reveal problems, negative results (if any), and make recommendation for future works. Consider revising the "conclusions" section. It needs to have more information from the case study application supporting your arguments, describe the value of your</p>	<p><b>Line 402 – 409</b></p> <p><b>In the future work</b>, for further research, alternatives and criteria on the linguistic scale according to decision makers can be added, so that the data entered is more varied. In addition, the VIKOR method can be applied in other programs as a ranking method to provide an alternative model for integrated watershed management policies in the form of a</p>

	research, show that you understand the material that you've presented.	framework that can be implemented within a certain timeframe, both general for all watersheds and those that are specific on the basis of their critical criterion criteria. Integrated watershed management is very important in order to preserve the environment for the welfare of the community. The VIKOR method can also be applied in other fields of study as a ranking or decision support method.
4	Finally, in re-editing the paper, the authors are recommended to closely check word choice and to provide descriptive and consistent terminology to enhance readability and understanding. The style or structure of the paper needs improvement. Examples of some of these are: "In fact "and "word/term"	It has been adjusted → in line 149. A word is said to be semantically fuzzy if the word cannot be well defined,
	<p><b>Specific Comments</b></p> <p>Study area: add more information to describe the study area and why this area is chosen for this study.</p> <p>Line 156 to 159 overused of watershed.</p> <p>Line 163 to 169 subdistrict is overused</p> <p>Line 187 as shown in Tables 1 and 2 not Table 1 and Table 2.... Do the same in your manuscript. E.g. line 200.</p> <p>Line 226 According to [28 ], ..... Should be According to Liu [28] .....instead, please used this style in the manuscript. E.g. Line 211</p> <p>Line 238: the used criteria based on [5] about the criteria in reforestation area selection.... Replace [5] with the authors name and rephrase the sentence.</p>	<p><b>Line 232 – 235</b></p> <p>There are 128 watersheds in Central Java, Indonesia, 35 of which are currently in critical condition. This is due to the increasingly lack of water catchment areas and agricultural practices that do not heed the rules of conservation. Semarang city watershed is one of watersheds that are considered critical. Therefore, it is very appropriate if in this study the Semarang City watershed is chosen.</p> <p>I delete it</p> <p>It has been adjusted. idem</p> <p><b>Line 279, 289</b></p> <p>According to Liu [36], hierarchical structure is a step to define the problem in a clearer and more detailed form.</p> <p>the used criteria based on Hamdan [11] other human activities that may damage watersheds are excessive logging or deforestation,</p> <p><b>Line 289-292.</b></p> <p>the used criteria based on Hamdan [11] other human activities that may damage watersheds are excessive logging or deforestation, human settlement project, conversion of forest land to plantations and agricultural lands, about the criteria in reforestation area selection can be described as follows:</p>

## Reviewer #3:

No	Comments	Revision/Changes
	<p>This study employed the trapezoidal fuzzy Vikor method for decision making used linguistic terms to evaluate the ranking of alternatives with respect to criteria, and the Priority Scale for Watershed Reforestation was investigated, it is interesting and can be accepted for its publication after minor revision, I have the following comments:</p>	
1	<p>What is the main focus of this study? method- focused or case-study-focused? I think that it is better that it is a method-focused. The structure of this study should be improved in the following way:</p> <p>Introduction, Literature Reviews, Criteria System, Methods, Case Study, Results and Discussion, and Conclusions and Future Work.</p>	<p>The structure of this study in the following:</p> <ol style="list-style-type: none"> <li>1. Introduction,</li> <li>2. Literature Review</li> <li>3. Criteria System,</li> <li>4. Methods,</li> <li>5. Case Study,</li> <li>6. Results and Discussion,</li> <li>7. Conclusions and Future Work.</li> </ol>
2	<p>A more comprehensive literature review is prerequisite to present the research gaps and highlight the innovations of this study.</p> <p>In literature review, you should have an overview of MCDA methods, then have an overview of the applications of VIKOR or its improved method, and I suggested to cite the following papers:</p> <p>Abdel-Baset, M., Chang, V., Gamal, A. and Smarandache, F., 2019. An integrated neutrosophic ANP and VIKOR method for achieving sustainable supplier selection: A case study in importing field. <i>Computers in Industry</i>, 106, pp.94-110.</p> <p>Wang, B., Song, J., Ren, J., Li, K. and Duan, H., 2019. Selecting sustainable energy conversion technologies for agricultural residues: A fuzzy AHP-VIKOR based prioritization from life cycle perspective. <i>Resources, Conservation and Recycling</i>, 142, pp.78-87.</p>	<p><b>Described in : Line 164 – 183.</b></p> <p>Multi Criteria Decision Making (MCDM) is a method of decision making to determine the best alternative for a number of alternatives based on certain criteria on Wang B, et al [25] Criteria are usually in the form of measurements, rules or standards used in making decision. Based on the objectives, MCDM can be divided into two models on Kusumadewi [26]: Multi Attribute Decision Making (MADM) and Multi Objective Decision Making (MODM). Frequently, MCDM and MADM are used to explain the same class or category. MADM is used to solve problems in discrete space. Therefore, in MADM, it is usually used to assess or select a limited number of alternatives, while MODM is used to solve problems in continuous space (such as problems in mathematical programming). In general, it can be said that, MADM selects the best alternative of a number alternative; while MODM designs the best alternative. There are several common features used in MCDM, which are [26]:</p>



		<p><b>Line 189</b></p> <p>The VIKOR method is one of the methods that can be categorized in Multi-Criteria Decision Analysis (MCDA). The VIKOR method was developed as a Multi-Criteria Decision Making (MCDM) method for resolving discrete decision-making on conflicting and non-commensurable criteria. The VIKOR ranking algorithm as follows [26], Abdel-Baset, M [27]</p>
3	Sensitivity analysis by changing the weights of the criteria is prerequisite.	<p><b>Line 330-332.</b></p> <p>At the lowest level is an alternative to the DAS decision in Semarang City which is used as an alternative to the network structure of this research hierarchy with the notation A1: Garang DAS, A2: Bringin DAS, A3: Karanganyar DAS, A4: Silandak DAS, and A5: Babon DAS.</p>
4	What are the advantages and weak points of the proposed method? Future work	<p><b>Line 391-398</b></p> <p><b>In the future work</b>, for further research, alternatives and criteria on the linguistic scale according to decision makers can be added, so that the data entered is more varied. In addition, the VIKOR method can be applied in other programs as a ranking method to provide an alternative model for integrated watershed management policies in the form of a framework that can be implemented within a certain timeframe, both general for all watersheds and those that are specific on the basis of their critical criterion criteria. Integrated watershed management is very important in order to preserve the environment for the welfare of the community. The VIKOR method can also be applied in other fields of study as a ranking or decision support method.</p>