

Interactive comment on “Using ordered weight averaging (OWA) for multicriteria soil fertility evaluation by GIS (case study: southeast Iran)” by Marzieh Mokarram and Majid Hojati

Anonymous Referee #1

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English use in the manuscript is quite poor, it needs a careful editing by an editing service or a native English speaker.

The references are weak. Many (probably most, but I didn't do exact counts) are from non-Thompson Reuters indexed sources. This is not typical best practice when trying to publish in an indexed journal. To be acceptable for publication in a leading journal, the references will need to be significantly strengthened. In addition, there are some journal names I am not familiar with and when I tried to look them up I could not find them. That means the journals are either 1) very obscure or 2) the authors have not been careful in entering their references. Neither case is encouraging in a manuscript submitted for peer review in a strong journal.

It is not possible to determine the data quality with the information given, and if the data is not quality data, the maps generated are worthless. More information is needed about sampling depth, size of the sampling area (ha or square km) and testing methods used to determine soil fertility parameters. I know the authors did not run the fertility analyses, but there must be information about this in the government report.

The Materials and Methods, Results, and Discussion sections are intermixed. Each has material in it that belongs in one of the other sections.

Detailed comments: Page 4 – What is a “moderate climate”? And why is the climate first described as moderate, but then described as hot and semi-arid just a couple lines later. “moderate” and “hot” are relative terms and not very scientific. Give average temperature and precipitation values, and/or use climate categories from an established system such as the Köppen climate classification.

Page 4 – What is the relevance of the Shiraz population or the statement that the majority of the population is Persian? I did not see anywhere in the manuscript where this information was important. I suggest deleting it.

Page 5 – Why are these paragraphs numbered? Numbers need to be removed.

Figure 1 – There needs to be a map of Iran that shows where in the country the study area is located. This can be an inset as part of an expanded figure 1. Solid Earth is an international journal, and as currently presented most readers would have no idea where in Iran the study site is.

Page 7 – For each soil fertility parameter, report how it was determined. There are many different ways to determine organic carbon and P, for example. Also, are these total values, exchangeable values, etc.? Information like this is very important to understanding this study.

Table 1 belongs in the Results section. Even though you did not determine these soil fertility values, they were determined using techniques you need to report, and they

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are results that you utilized in this study.

Page 10 – In line 198 it says “the points are not scattered well”. Then in lines 204 it says “sample points were selected randomly”. These two statements are a bit confusing, especially because of the order in which they are presented. In addition, in line 196-197 it says “using a random sampling method of merely wheat fields”. If only wheat fields were sampled, this was not a truly random sampling design. This section needs to be rewritten, clarified, and conflicting statements (random sampling versus sampling only of wheat fields) need to be rectified.

Figure 3 – What are the units for each of the soil fertility measurements? Also, the latitude/longitude measurements along the sides of the figures are too small to read. This second statement is also true of Figure 4.

Page 14 – At the bottom of the page it talks about the fuzzy method maps. In this discussion, it says that Mn values were close to 0, while P and Zn parameters were close to 1. However, map g is Zn, and as I look at map g, most of the values are close to 0, not close to 1. On the other hand, map e is Mn, and much more of map e is close to 1 than of map g. The discussion of these maps needs to be carefully reconsidered and rewritten, because right now the maps do not correspond to the discussion.

Page 15 – Conclusions are made here regarding overall soil fertility status, but soil fertility status is based on an assemblage of soil fertility parameters, not on single parameters. This study would be much more robust if the authors would use GIS to overlay the fuzzy maps and generate new maps that show locations that are high in all (or most) fertility parameters versus areas low in all (or most) fertility parameters.

Page 15, Lines 243-247 – How were the weights determined for the seven fertility factors? This should be discussed in detail in the Materials and Methods. As currently given, you have simply assigned weights with no real explanation and asked the reader to accept them. In such a situation, the reader cannot independently evaluate the validity of your assigned weights.

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Page 16, Lines 255-261 – This section also needs much more explanation in the Materials and Methods section.

Pages 17-18, Lines 268-279 – I don't follow this. It needs better explanation.

Page 18 – The first paragraph of the Discussion belongs in Materials and Methods.

The overall discussion is weak. It does not show how this study adds to our body of knowledge and compare and contrast the findings from this study to the findings of other similar studies.

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