

## ***Interactive comment on “Municipal solid waste open dumping, implication for land degradation” by M. Yazdani et al.***

**M. Yazdani et al.**

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Dear referee 2 Thank you for reviewing our manuscript and your comments.

We have attempted to do fundamental revisions in all sections of paper and fix the defects, so we hope that our responses and the revisions in supplement file will be sufficient and useful to make our manuscript suitable for publication in Solid Earth.

Response to General comments:

1. The Contamination of soil is the major environmental risk related to unsanitary land filling of solid waste. In this paper we have assessed an open dumping as an example of land degradation in Iran with Geographic Information System. So we think this paper is within the scope of soil science system section in Solid Earth journal.

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2. The English grammar and style have been revised in supplement file.
3. The topic have been changed to “Comparison of two suitability methods to assess a landfill site using Geographic Information System Analysis” in the supplement paper.
4. Introduction section has been rewritten in supplement file.
5. Materials and methods section has been rewritten in supplement file.
6. Discussion section has been rewritten, we have attempted to fix defects in new version.
7. Conclusions section has been rewritten and revision form has been done in bullet points in supplement.
8. References have been checked and rewritten.

Response to Detailed comments:

Page 1098: Abstract

Line 2: MSW have been altered by Municipal Solid Waste. Please refer to line 14 page1 in supplement file.

Line 6: have been re-written: “In Iran, standards”. Please refer to line 17 and 18 in supplement file.

Line7: restrictions and trouble in unsanitary open dumping such as air, soil and water and underground water pollutions and etc.

Line 10-11: This sentence have been rewritten to “Mazandaran province, northern Iran, and the southern coast of” please refer to supplement file.

Line 9-12: This section have been rewritten to “The objective of this work is study the suitability of Tonekabon existing municipal landfill site in the west area of Mazandaran province, northern Iran, and the southern coast of the Caspian Sea using Geographic Information System methods”. Please refer to line 20 -23 in page 1 supplement file.

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Line 12-17: these lines have been rewritten according to your comment. Please refer to line 24-28 page 1 in supplement file. Some texts have been added (underlined ) and your mentioned words have been rewritten (red words)

Introduction

Line 19-21: We have rewritten it to” In the developing countries, due to population increase and urbanization, it is necessary to develop an efficient waste management system”.

Line 21-26: These lines have been rewritten and merged to “Despite of the developing in waste management in the world, the disposal of solid wastes in landfills is one of the initial methods at the bottom of the hierarchy of options for integrated waste management system, still remains the most commonly used method in developing countries (Leao et al.,2004; Mahini and Gholamalifard, 2006; Sumathi et al.,2007; Donevska et al.,2013).” Please refer to line 2-7 page 2 in supplement file.

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Line 3: It has been changed to suitable land for landfill site sitting.

Line 8-11: It has been changed to “Previous works found that leachates from landfills”

Line 8 to line 4(page: 1100) have been rewritten in supplement file as bellow:

“Previous works found that leachates from landfills had contaminated the underground water (Mor et al., 2006; Dimitrio et al., 2008; Nema et al., 2009), and soil (Raman and Narayanan, 2008; Shaylor et al., 2009; Hernandez et al., 1997). Another main problem in open dumping and also in this mentioned site is open air burning because of gases emitted from waste degradation process. In some papers the effect of fire on soil have been studied (Guenon et al., 2013; Leon et al., 2014). The other serious threat to soil in landfill site is salinity, improper land use such as deforestation causes soil salinity. Salinity causes soil degradation and promotes underground water salinization level (Iwai et al., 2013). One of the major cause of land degradation is insufficient and

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improper land use management, the effects of land use changes on degradation had been examined (Mohavesh et al., 2015). There are many research investigations, emphasize the negative impacts of improper land use management system (Biro et al., 2013; De Suza et al., 2013; Pallaviciny et al., 2014).One of these unsuitable systems in developing countries is MSW management system and improper landfill site sitting.” Please refer to supplement file.

Line 4-10: this section has been changed to “To protect the environment and natural resources in the developing countries, a proper solid waste management is a necessity (Rao et al., 2007). In Iran, the environmental standards are not completely considered, so the environmental evaluation of landfills is an example of these limitations and problems.” Please refer to line 27- 30 page 2 in supplement file. Line 10 : This citation has been deleted .Line 30 page2 in supplement file. Line11: In the world has been deleted. Please refer to line 31 in supplement file.

Line12: Which is unsafe method has been deleted. Please refer to line 32 page 2 in supplement.

Line 15 to 2(page: 1101): These lines have been rewritten. These lines have been decreased and merged to “Although numerous efforts around the world, in order to reuse the municipal solid waste, unfortunately in Iran, wastes are dumped without any consumption in most cities. In this time reuse of waste and treated wastewater has increased in the world (Murogan et al., 2013; Al-Karaki et al., 2011).” Please refer to line 1-4 page 3 in supplement file.

Page 1101

Line4: poor has been rewritten.

Line 5: line 6: rules, has been changed to laws.

Line 10- 12: All the changes have been done according to your comments.

Line 18 to 2(page 1102) have been rewritten and changed to: Please refer to line 19

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page 3 to line 2 page 4 in supplement file.

“Some evaluation of municipal landfill sites have been done in Iran and the other parts of the world by different methods, for example Monavari and partners evaluated all the landfill sites in Tehran province in Iran by Oleckno method, (Monavari et al., 2007), Salimi and partners evaluated the suitability of the new sanitary landfill site location in Isfahan with Oleckno method too (Salimi et al.,2013), Assessment of groundwater vulnerability to landfill leachate induced arsenic contamination in Maine had been done with Drastic method (Wang, 2007), USEPA method (Christensen et al., 1992); In another research in Iran two municipal solid waste landfills, Rasht in Gilan province in the north of Iran and Andisheh, in Karaj Province which are, respectively, located on humid and arid areas, were evaluated by Monavari 95–2 method (Ghanbari et al., 2011), and the Karaj municipal landfill site had been evaluated by local and Regional Screening method (Aliowsati et al., 2013), Davami and partners evaluated the municipal solid waste landfill site in Ahvaz city by local screening incorporating GIS (Davami et al., 2014). The first step to improve MSW management system is evaluation of the current landfill sites state in the country. The objective of this work is to evaluate the Tonekabon landfill site suitability using two methods: Minnesota pollution control agency and regional screening method.”

Page 1102:

Materials and methods: this section has been rewritten, would you please refer to supplement file. In this section there have been many changes in methodology. Some maps have been added and also a flowchart to describe the methodology. Please refer to line 3 page 4 to line 25 page 8.

Page 1106:

Result section has been rewritten, please refer to line 27 page 8 to line 16 page 9 in supplement file.

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Page 1108:

Discussion section has been rewritten, please refer to line 18 page 9 – line27 page 10 in supplement file.

Page 1109:

Conclusion section has been rewritten, please refer to line 28 page 10 – line 10 page 11 in supplement file.

Page 1110:

References section has been rewritten, please refer to line 12 page 11 – line 23 page 15 in supplement file.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/7/C710/2015/sed-7-C710-2015-supplement.pdf>

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Interactive comment on Solid Earth Discuss., 7, 1097, 2015.

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