

Rebuts to referees Solid Earth

Reviewer 1 comments	Accept yes/no/ partly	Replay/Comments
The term “restoration” includes “human components” (social and economic) that I do not think they were well-developed in this work.	partly	We agree that restoration does include the human dimension. However, in this manuscript, we focus on ecological restoration, and even more specifically on soil indicators. We have added this clarification into the paper. Some social and economic discussion is included, but not discussed in depth (see integrated assessment chapter 6).
The objectives included into the Introduction are not suitable to the structure. I suggest that the manuscript was focused on environmental indicators, particularly i) on its description, ii) spatial patterns (distribution and scale) and temporal implications to make progress on vegetation survival and to highlight site potentiality iii) interactions and discussion of their applications.	Partly	The present text was adapted based on the reviewers’ suggestions: “The objective of this review is to: i) describe and discuss existing soil indicators showing potential to check the effectiveness of restoration activities in drylands at different spatial and temporal scales.” Both the question about vegetation survival and interactions are not included in the indicators objectives but in defining very well de framework in the interface between soil and plants. It was not our aim to define indicators for plants we are only dealing with soil indicators but making sure that we know the importance of the interactions between vegetation and soil.
A Figure to illustrate the structure of the review would be appreciated by readers.	No	We did not show a figure instead within the rationale of the paper we will divide the work in sections so that the reader understand the structure of the paper. The following text will be included: “This paper address the key interactions between plants, soil and climate (see section 2-3), having this in mind a series of soil indicators are discussed from local scale (see section 4) to landscape scale (section 5 and 6); the nature of the soil indicators cover the physical (section 4.1), chemical (section 4.2) and biological aspects (section 4.4 and 4.5), including the soil functional approach (section 4.3).”
1. Abstract: I think you have to change the order of the paragraphs. The last one must the second one because you include you outcomes and later you must describe them.	Yes	done
2. Please, in the lines 17-18, page 3647, you mention ”socio-economic evaluation and participatory approaches”, however, these points were not reviewed into the manuscript, please, clarify this sentence or justify it (otherwise, it is not appropriate).	Partly	We added the socio-economic indicators from WOCAT into chapter 6, without focusing only on the ecological ones. We have thus added a few sentences in chapter 6.
3. Introduction: Please, review my general comment, the objective is not suitable or it is too ambitious for the final content, particularly, you mentioned ecosystem functions, but there is no	Yes	We accepted this comment and the objectives associated to ecosystem services were deleted from several places in the introduction.

<p>much information about them in the manuscript. You can see that the following topics were not dealt (only a brief paragraph in the page 3668): Gas Regulation, Climate Regulation , Disturbance Regulation, Water Regulation, Soil Retention, Nutrient Regulation , Waste Treatment and Assimilation, Pollination, Biological Control, Barrier Effect of Vegetation, Supporting Habitats , Soil Formation, Food production, Raw Materials , Biomass, Water Supply , Genetic Resources, Provision of Shade and Shelter, Pharmacological Resources, Cultural Functions and Landscape Opportunity.</p>		
<p>4. In the pages 3649-3650, I suggest highlighting two points: the first one, the importance of economic-social-and environmental triangle associated to the development and the land use management; the second one, the constriction of drylands areas for vegetation survival which might limit site vocations and use objectives as in short as in long term.</p>	yes	<p>We thank the reviewer for the suggestion. The two points indicated by the reviewer are somewhat implicitly covered by Figure and by the related text. The revised text points them out in a more explicit way, along with the new figure caption.</p> <p>Concerning short term and long term objectives. Time scale is discussed by the paper with reference to the soil indicators. But we agree about recalling this concept also with regard to the objectives of the strategies. The revised introduction texts makes such a reference.</p>
<p>5. The chapter 2 must be included into the Introduction. In my opinion is convenient to include the description of general characteristics of drylands in this first part (in the beginning).</p>	yes	<p>Only chapter 2, but not chapter 2.1. The intro of chapter 2 was moved to 1.1</p>
<p>6. As for the chapter 2.1. I do think that must be the result of the analysis of indicators. I mean, the vegetation survival depends on critical factor/indicators that you must explain before. The experiences you presented would be good as a discussion where you discriminated the best species for different environmental conditions (indicators). In my opinion, the most important ideas of this part were water residence time in soils and the impact of root density as key aspects interacting with other environmental indicators to choose appropriate species. Please, write in italics the scientific names of species.</p>	Partly	<p>Rename title to ‘plant-soil interactions’ and justify the rationale of the chapter.</p> <p>The main objective of this paper is to review the use of soil indicators and not of environmental indicators. The main aim of the section 2 was to introduce the importance of the plant soil interactions to the understanding and choice of soil indicators. So we did not modify according to the suggested changes.</p>
<p>7. I suggest that Chapter 3 present the environmental indicators: 3.1. Climatological indicators (please, include the mean annual precipitation; 3.2. Topographical indicators (you mentioned in the page 3655); 3.3. Soil indicators Hydrological/Chemical/Biochemical/Biological). 4. Landscape Function analysis: temporal and spatial patterns. 5. Discussion: interactions and applications.</p>	no	<p>We are specifically focussing on soil indicators, not generally on environmental indicators, so we will not deal with climatic indicators. Topographical indicators mentioned on the page 3655 are used in land planning as complementing soil conditions.</p>

8. The chapter 5 is interesting, Why don't you mention specific connectivity indices too? Are there optimum spatial distributions or guidelines for different objectives or managements and species (trees versus herbs)?	Yes	We thank the reviewer for this comment. We included a brief reference to Flowlength and mentioned some other metrics for connectivity. As far as we know, there is no optimum spatial distribution of vegetation that can be applied to all types of drylands. In the case of LFA, the higher the size of the patches and the lower the length of the interpatches, the better ecosystem functioning. We have included some ideas in this sense
9. Please, review my overall comment and substitute the chapter number for 4.	Yes	OK it will be done
10. In the Chapter 6, I missed the discussion about the indicators described in the previous analysis in a global way. I think you need to explain: i) what is WOCAT; ii) why did you choose it to explain the impacts of SLM; iii) in what degree, environmental indicators presented were used.	yes	We have explained more clearly what WOCAT is and why we have chosen this method to explain the impacts of SLM. The environmental indicators presented were used in over 500 SLM assessments so far. We have added this information to the manuscript text.
11. In page 3668, line 22, correct "through".	no	the correct English says 'thorough'
12. In Conclusions, where the ecosystem services were dealt? See also overall comment.	yes	Checking all text on ecosystem services The ecosystem services point was deleted in the conclusions
13. In Table 6, include the complete name of LFA, please.	yes	OK it will be done
14. In Figure 1,3 and 4, include the complete name of SLM, please.	yes	OK it will be done