*Ms. Ref. No.: ECOLIND-20200  
Title: LPDynR: a new tool to calculate the Land Productivity Dynamics indicator  
Ecological Indicators  
  
Dear Mr. Michael Cherlet,  
  
Reviewers have now commented on your paper. You will see that they are advising that you revise your manuscript. If you are prepared to undertake the work required, I would be pleased to reconsider the revised paper for publication.  
  
For your guidance, reviewers' comments are appended below.  
  
If you decide to revise the work, please submit a list of changes or a rebuttal against each point raised by the reviewers when you submit the revised manuscript. We would like to receive your revision by Oct 29, 2021.  
  
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Highlights (mandatory)  
  
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Yours sincerely,  
  
Arturas Kaklauskas, Prof, DrSc, PhD  
Associate Editor  
Ecological Indicators*

*Reviewers' comments:  
  
Reviewer #1: Ecol Ind 20200  
  
The submission presents an R-based tool designed to calculate a vegetation-o-centric time series indicator, with inputs derived from remote sensing. The indicator is relatively intuitive and rather elegant. The ultimate result is a map using binned categories and a large-scale and useful case study is included.*

*This manuscript is particularly well-written and logically-presented but strongly methodologically oriented. There is not a lot of context provided. The submission eschews the more typical Intro-Methods-Results-Discussion format for what is akin to a cookbook approach. The manuscript might not be a good fit for many journals, but it is perhaps an excellent fit for Ecological Indicators. I think that the work could prove to be a much-used reference for other practitioners in this area but it may, conversely, have little appeal for generalist readers in ecology and the environmental sciences.*

**Response:**

**We would like to thank Reviewer #1 for agreeing to review this article and for his/her comments.****It is true that this paper’s main purpose is to introduce the LPDynR tool rather than analyse the final product provided here with the case study. And, therefore, the target audience are mostly practitioners who might be interested in using this tool for their own analysis. The case study is included as a way to illustrate LPDynR functionalities and to show the final products which can be derived by using them. We leave for future studies/papers deeper analysis and ecological interpretation of results obtained both with the same data set used here and with others (comparison of different data sources, interpretation of regional to global product, etc). However, as requested also by other reviewers, we have included now some more discussion about the case study presented in the manuscript**

*\*The concluding sentence of the conclusions\* captures the primacy of methodology over context: "The package, once installed, includes several examples and a small data set for testing the functionalities and the different parameters to tune them." This is not a bad thing, just a departure from the norm for papers in this field.*

**Response:**

**We also agree. This last paragraph was just a take-home message of the introduced tool, as it is itself the starting point for the users to use LPDynR for their calculations. As mentioned now in the Introduction (L93-96), the LPD product derived with this tool is the one suggested by the UNCCD to derive the SDG Indicator 15.3.1, thus it is expected that some of the countries which need to report their land degradation neutrality level will use, directly or indirectly LPDynR.  
However, we have restructured the Conclusions section and we hope now it is more comprehensive.**

*Small points:  
  
Highlights: I think that abbreviations make a paper more difficult to read in general, and there is little benefit to using them. In particular, abbreviations should be avoided in the Highlights.***Response:**

**The length of each highlight is very limited, therefore, if we use Sustainable Development Goal instead of SDG, that limit is almost already reached. Moreover, we believe that, in this particular case, SDGs is probably more well known and wider used than the not abbreviated term.**

**In contrast, we keep the not abbreviated term “Land Productivity Dynamics” in the highlights. And, in addition, we have also tried to reduce the use of abbreviations along the main text of the article, and particularly in the abstract and conclusions, but especially where the use of the not abbreviated term is not compromising the readability of the text.**

*L 139 Along those same lines . . .  
"Above ground vegetation productivity (from now on, SB)  
Above ground season vegetation productivity (from now on, CF)  
Start of vegetation growing season (from now on, SBD)  
End of vegetation growing season (from now on, SED)  
Vegetation growing season length (from now on, SL)"  
  
These are a lot of abbreviations for the reader to track, particularly because they are not at all intuitive, at least in English. Your paper will be more accessible if you minimize abbreviations (formulae, etc. are of course exceptions).*

**Response:**

**Removed these abbreviations, also from the rest of the text.** *Table 1 Something seems to be off to me. Are the descriptions for Steadiness1 and 2 reversed?  
I think that it would be valuable to include additional context that relates the work to complex indicator development. Doing so would increase reader interest without detracting from the (valuable) how-to nature of the manuscript.***Response:** **The descriptions are not reversed. The steadiness index is discrete, so the number 1 to 4 do not mean any particular “continuous level of steadiness”, but only a category. To make it more clear, we included the term “Steadiness” before the number (e.g. Steadiness1, and so on). As an example, for a particular pixel, a negative slope (meaning that the tendency of change is negative) combined with a negative net change confirms the strong negative dynamics of an ecosystem compared to a negative slope combined with a positive net change which points to more moderate but still negative dynamics.**

**We have included some more explanations in these two paragraphs (L96-217) to clarify the point.**

*Reviewer #3: The manuscript entitled "LPDynR: a new tool to calculate the Land Productivity Dynamics indicator" focused on the evaluation of the ecosystem dynamics and change via land productivity indicator based on vegetation-related indices (phenology and productivity). This study can further improve the credibility of land assessment. However, there are several problems that need to be corrected before the manuscript is published*

**Response: We would like to thank Reviewer #3 for his/her time in reviewing this manuscript, as well as for the comments made on it.** *Main comments:  
1. Abstract is very simple and difficult to reflect the research focus, authors should add some relevant results to show research findings.*

**Response:**

**As explained above (comments to Reviewer #1), the main purpose of this paper is to introduce the *LPDynR* tool, rather than analysing the results of the case study. This case study is merely illustrative (although accurate), and the main aim of it is to show the different functionalities and applicability of the tool. However, we have rewritten the abstract, expanding its content to make it more focused on the tool itself, and pointing out the general results of the case study.**

*2. The Introduction and Abstract are highly repetitive and needs to be refined.*

**Response:**

**The abstract has been rewritten and now it is less redundant with the introduction.**

*3. I suggest that the analysis of long-term change should add analysis charts under different time scales, otherwise it is very difficult to understand.*

**Response:**

**We do not think that in this step the introduction of generating charts with different time scales needs to be clarified. We think that at this point it is better to keep the entire time series for the calculations of the Long Term Change Map in order to see the general approach. We show later (section 6.2) that the “partial LPD indicators” might help to understand the dynamics of land productivity within the observation period. Then, it is up to the user to calculate also the Long Term Change Map for different time windows as they see fit. We mention this now in L598-599.**

*4. The overall structure of the article is slightly scattered, so it is recommended to adjust (4, 5 and 6).*

**Response:**

**We agree that the structure of this paper is not the classical Introduction – Materials & Methods – Results – Discussion but, as mentioned by Reviewer #1, we believe that its general structure is suited (and widely used) for this kind of “cookbook” papers. In particular, sections 4, 5, 6 follow the sequence of the steps in *LPDynR* to calculate the indicator, grouping in section 4 (and its sub-sections) the steps for the Long-Term Change Map, in section 5 the Current Status Map and in section 6 the Combined Assessment plus variants.**

*5. The applicability of this method remains to be verified, and a single case is far from enough to prove it.*

**Response:**

**We have now included more discussion and comparisons with other LPD products, i.e. one calculated with a similar methodology (the original Land Productivity Dynamics approach), another with a completely different method (from literature), and another one calculated with the same *LPDynR* tool but with different data sets (L502-522; new Figure 5). We believe that now the methodology behind the tool is better tested and verified.**

*Reviewer #4: This article presented the application of the R-based tool LPDynR to calculate the Land Productivity Dynamics indicator in detail. It provides a methodological reference for the study of land productivity dynamic. Moreover, I have some suggestions with the analysis as performed now.*

**We thank reviewer #4 for his/her time reviewing the manuscript, as well as for the comments and suggestions provided.**

*1. The tables and figures need to be further adjustment and clearly explained.*

**Response:**

**We have included some more explanations, both along the text and in the captions; e.g. L119-123, L211-217, 222-223, 296-298, 301-302, 534-535**

*2. The innovation and significance of the article can be explained in the Abstract or Conclusion.*

**Response:**

**We have rewritten and expanded the Abstract to make it more focused on the *LPDynR* tool functionalities and potentialities. Equally, we have restructured the Conclusions to give more significance to the tool.**

*3. Please consider whether you can add more discussion.***Response:**

**As explained above (see responses to Reviewers #1 and #3), the main aim of this paper is presenting *LPDynR* functionalities and usage as a tool for practitioners and scientists to produce their own indicators, rather than deeply analysing the case study included in the manuscript. However, we have included some more discussion and references along the manuscript with the aim of discussing also the indicator provided with the case study, e.g. L491-514, L660-661; we have also included a new figure (Fig. 5; L516)**