Black text: Reviewer #2.

Red text: Response by the authors.

The article describes an analysis of bibliographic information (abstracts, keywords, title, publication year, language) performed for the period 1901-2022 to identify trends and focus areas in drought research. In general, the article is well written, contains high quality figures for illustration and addresses an interesting topic. I find in particular the consideration of trends and regional priorities in drought research very interesting. However, I have a number of concerns and suggestions that may be considered to improve the manuscript:

Thank you for the positive overall evaluation of the manuscript. We appreciate your time and effort in reviewing the manuscript. In the forthcoming revision we will consider each of your suggestions.

General comments:

The methods applied by the authors are based on a number of important assumptions that should be made transparent to the readers and also being discussed. First of all, the authors limit their analysis to abstract and keywords. This has the advantage that a large number of articles can be considered but the disadvantage, that it is not clear at all how well the specific abstracts and keywords really reflect the content of the articles and the research results.

We will address and state this limitation in the discussion. The limitation of only looking at the abstracts and not at the full paper is well noted. While a dependency, the methods and results rely on and benefit from the peer review process carried out on abstracts.

Second, it assumes, that terms and definitions used in drought research have been similar across time, regions, disciplines and scales.

This is correct to some degree. We will address this point in the discussion section. The strength of Latent Dirichlet Allocation (LDA) is that it uses all words within a document for analysis. While we cannot exclude terminology to play a role in topic formation, it is always a number of keywords rather than few which form the context and a single topic. We will add this in the discussion.

Certainly, these are strong assumptions. To my experience it is frequently not clear whether statements in the abstract section represent the present understanding in the research community, opinions of the authors, or really conclusions drawn from the research results that are justified by real data. One example is the abstract of the present manuscript. In the last sentence the authors state: “In future, we recommend research and funding agencies to strengthen the track of more interdisciplinary and systemic cross-topic drought research in order to cope with drought as a multi-sectoral risk requiring multi-sectoral response frameworks.” Is this recommendation justified by the results of the present analysis? Certainly not. Instead it is the opinion of the authors and reflects well a popular believing of a large part of the drought research community. Nevertheless, this statement can also be challenged. Interdisciplinary, systemic, cross-topic and multi-sectoral research is more expensive and requires more effort than targeted disciplinary research. Funding agencies may have to decide therefore in practice whether they fund 5 small disciplinary projects or one big interdisciplinary project. It seems therefore, that such a general statement is not appropriate.

Certainly, to provide solutions for very specific problems (that nevertheless can have a big impact) such as to improve drought tolerance of crops, to develop more efficient water use technologies or to develop new approaches to improve groundwater recharge, disciplinary research will likely be sufficient. In contrast, to improve drought management in large basins, a multidisciplinary approach

may be appropriate. This example shows that the approach to simply extract words and terms from the abstract without considering the other sections and the context of the article may result in misleading conclusions.

First, we agree with reviewer #2 that some abstracts in the corpus may not reflect the content of the paper or may also include misleading statements. This is a qualitative aspect of the source data which sets constrains to the use of literature and is beyond the scope of our analysis.

Second, we will revise the statement(s) in this study's abstract. The results of the study allows to identify research topics where drought research is already spanning disciplines and sectors, and which sectors are rather looked at disciplinary. We will highlight that this study gives a comprehensive overview across the various sectors affected by drought and where research priorities are based on published articles. Last but not least, we will highlight the importance of addressing water scarcity i.e. drought research through consideration and active inclusion of multiple stakeholders i.e. interest groups in competition for the limited resources. Here, the study quantifies research and sectors affected in Figure 3.

One interesting result of the present study is that the majority of drought related articles address either plant genetics and physiology or drought forecasting. These domains address completely different scales and, even more relevant, may use different definitions what a drought is. At large spatial scales, the terminology is distinguishing drought as an extreme event from aridity as a climate indicator. At plant level drought stress is usually when the water supply is lower than needed for optimal growth. Here, no difference is made between water deficits caused by the fact that crops grow in arid regions and water deficits caused by droughts. Consequently, drought has a different meaning and drought research has another context at these two scales. 3 out of the 12 topics presented in figure 3 (plant stress response, crop breeding, plant genetics) are in a context where drought is understood as a water deficit in general, 7 topics are in contexts that consider drought to be an extreme event and 2 topics (farming, water use efficiency) may use one or the other understanding, depending on the context. While it is as it is, this example shows that the use and meaning of terms may be context specific, a difference that likely cannot be detected by a simple analysis of article abstracts.

I also think that the use of terms in the literature has changed over time. For example, most of the large body of historical articles related to dryland research will have drought in the list of keywords although, according to the present understanding, this research is more linked to aridity and therefore not to drought as an extreme event. Consequently, the results of the trend analysis performed by the authors also have to be taken with care.

Thank you for pointing this out. This is an important finding. We appreciate reviewer #2's analysis and will expand on the definition and meaning of drought in different contexts. We will investigate and note in the discussion, whether the observation that drought can be defined as water deficit in general (plant physiology related) and as an extreme event (forecasting related), and if these two definitions are overlapping. This related to the notion that the use of drought may have changed over time. We will also note this in the discussion.

Specific comments:

Abstract: see general comment 1

Introduction: is very general and mainly describes why drought research itself is relevant. Research questions are not mentioned and the reader will not be prepared for the analysis described later. There is hardly any link between the introduction and the methods section. Consequently, the reader does not know what the authors what to find out and why they use the specific methods described in

the Methods-section. The specific gap of knowledge is not described so that it is difficult for the readers to see the novelty. There are so many review papers in the literature about drought research, please make more clear what the innovation of the present article is and what you make differently compared to the review papers that have been published before.

Thank you. We agree and will strengthen the link between introduction and methods. We will achieve this through a paragraph on motivation, addressing the points made by Reviewer #2.

Methods: It is well described which methods have been used but not why. What is the advantage of using LDA in that specific case, compared to other alternatives?

We will address this question in the method section.

Results: The first four lines are a summary of the methods but not results.

Thank you. We will remove the summary of the methods from the results section.

Figure 1: Many of the readers will not know what cosine similarity means. Please explain that in the figure caption. That the number of drought related articles has increased over time is not surprising since there are more researchers who write more articles per year, compared to former times. I would find it more interesting to see the change in the relative share in drought related articles in the whole scientific literature.

This is a good point and we will add information on drought research in comparison to the overall number of articles published for example in the Web of Science Core Collection. We will also add the explanation for cosine similarity to the figure caption.

Discussion: Please add one section describing the limitations of data and methods used in the present research.

Details on limitations of data and methods will be added either as discussion section or in the methods section.