

Black text: Reviewer #1.

Red text: Response by the authors.

## 1. Summary

This research article analyzes over 130,000 peer-reviewed articles on drought research from 1901 to 2022. It highlights a shift in research priorities towards plant genetic research for drought-tolerant genotypes and methods in drought forecasting, with decreasing focus on ecology, groundwater, and forest research. The study underscores the importance of interdisciplinary research and recommends enhanced interdisciplinary and systemic approaches to address drought as a multi-sectoral risk.

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 and implement the necessary changes.

## 2. General comment

This work undertakes an impressive effort by conducting a review of drought-related literature spanning over a century. The emphasis on interdisciplinary approaches to address multi-sectoral drought risk deserves particular attention. I found the section discussing the geographical distributions of the topics extremely interesting. While the article is well-written, improvements could be made by addressing certain aspects outlined below, such as, but not limited to, providing more clarifications and references throughout the manuscript, improving explanations in the figure captions, adding additional references to support statements, and ensuring consistency in numerical representation.

We will take up these suggestions in the review process.

## 3. Specific comment

### 1 Introduction

Lines 36-37: Might be relevant to additionally reference here the recent preprint looking at drought as a continuum process: <https://egusphere.copernicus.org/preprints/2024/egusphere-2024-421/>

We will consider this reference where appropriate.

Lines 40-50: the line 38 provides examples of drought-sensitive sectors, followed by a detailed discussion of impacts on ecosystems and agriculture in the next paragraph (lines 40-50). However, it does not delve into the impacts on health, energy, and socio-political stability mentioned earlier as well.

We will add information on these impacts, as they are also touched on later.

Lines 51-57: this paragraph concludes the introduction by emphasizing the importance of adaptation strategies and the value of long-term drought research. I think it could benefit from better highlighting this paper's contribution. I think it could benefit from better highlighting this paper's contribution. For example: "The long-term research undertaken by this work helps reveal patterns and gaps in our understanding of drought, enabling the development of more effective adaptation strategies." This would underscore the unique insights and contributions of the paper to the field.

## 2 Methods

Line 60: are they all scientific publications (the 131,748 abstracts)?

Yes, as stated by the source.

Lines 73-74: while describing the “three Tiers” here for the first time, it would be helpful to refer to Fig. 2 already for a clearer schematic representation. This visual aid will enhance understanding and provide an easier reference for readers.

We will add reference to Fig. 2

Line 77: I would emphasize already here in the beginning that the similarity between 2 topics is **within a document** otherwise its not clear until the reader reads about it on Line 79.

Thank you. We will clarify this earlier as suggested.

## 3 Results

### 3.1 Major and specific topics in drought research

Figure 1: I think this Figure needs a clearer explanation in the caption, stating what exactly is shown on the right x axis and the left x axis (especially on the right – the similarity index corresponds to the degree of intedisciplinarity).

We will clarify the axis.

Figure 2: the figure would benefit from adding labels such as "major topics" next to Tier 1 with an indication of "5 topics," "intermediate topics" next to Tier 2 with "12 topics," and "highly specialized topics" next to Tier 3 with "50 topics." This would help readers better orient themselves within the manuscript.

Thank you. We will take up this suggestion.

Figure 2: the categorization of topics (M,M,I,M,E) lacks clarity, particularly the selection of "E" (events and historical analysis) for the topic "Precipitation and Drought types." Why wouldn't "Methods and processes" be a fitting category for this topic?

We will reconsider and clarify this.

Lines 117 and 119: require consistency in numerical representation, whether as spelled-out words ("twelve topic") or numerals ("12-topic").

Well spotted. We will clarify this here and throughout the manuscript.

Figure 3: a question regarding the sequence of the 12 topics displayed in the box: should they align with the sequence seen in Tier 2 of Figure 2? Additionally, it would enhance clarity to label the box containing the 12 topics as "Intermediate Topics Tier 2" at the top, facilitating a quicker understanding of its connection to the preceding Figure 2.

They should not align with the sequence in Tier 2. As in Figure 2, we will add a heading to the legend to facilitate the interpretation of the Figure.

Lines 144-146: quite hard to read this sentence, I would recommend rephrasing it.

We will revise the sentence accordingly.

### 3.2 General and emerging trends

Line 168: would recommend to add ref to Figure 4 here already? And potentially to explain why to focus only on last 4 decades?

Agreed. We will add the reference here already.

Line 178-179: the authors should provide references to support this statement. Additionally, it's crucial to note that while increased drought resilience of crops through genetics is valuable, relying solely on this aspect may not suffice, and other mitigation strategies are equally important.

We will take this point up in the manuscript.

Figure 4: The color choice for "Plant genetics" seems to have changed and become more orange as compared to more yellow assigned to it in Figure 2.

Indeed. We will modify Figure 4 to match the color code throughout the manuscript.

Lines 191-194: one of the contributing factors is also the technological advancements that have strengthened forecasting methods.

Thank you. We will note this in the manuscript and add references accordingly.

### 3.3 Interdisciplinarity of drought research

Lines 208-209: "manifested in sedimentary records and tree ring records" is it referring to "Forest and Fire topic"? Would recommend to mention it in the text.

We will clarify this sentence.

Line 236: what exactly does "regional studies" refer to? Isn't it more about spatial characteristics rather than a specific topic?

We will investigate this in more detail and clarify the result in the manuscript.

Figure 6: I'm surprised to find "Drought Palmer Index" listed as a distinct topic rather than under a broader category like "Drought Index." Additionally, I couldn't find anything related to Forecasting among these 50 topics. Could it be that certain topics, such as Forecasting, have been split into smaller segments (e.g. modelling)?

Yes, this is the case. We will clarify the focus on smaller subtopics for Figure 6. The meteorological drought index and Palmer Drought Index are both amongst the 50 sub-topics. The major general topic forecasting has been split into smaller topics. Forecasting as the more general topic is made up of many smaller topics which are also inter-linked. Modelling and the two drought indices are three out of the fifty more focused sub-topics.

### 3.4 Geographic patterns and priorities

Figure 7: Is it built on 40 or 100 years review, need to mention this. Additionally, wasn't "forecasting" previously indicated in blue but now appears in yellow? Consistency in color usage throughout the manuscript is recommended. Regarding the figure caption, isn't "forecasting" positioned at the top everywhere, not only in Europe and Asia (same as mentioned in the abstract).

Fully agreed. We will harmonize the color code for the 12 topics. We will clarify that forecasting is positioned at the top i.e. of major interest everywhere.

#### 4. Discussion and Future Directions

##### 4.1 Implications for research, policy and institutions

Line 288: its not clear which indicators are meant here? Drought indicators or agricultural impact indicators?

We will clarify. Drought indicators are meant.

Lines 288-290: what about the priorities of research community as well and their influence on the trend?

An individual's H-Index of 50 can be considered high while on average the 50 sub-topics possess 2620 publications. Looking at the number of publications (>131k) and the potential size of research communities, individual research communities must be of considerable size in order to play a role in the formation of topics.

Line 291: to advance drought impact forecasting, it's crucial to consider several related topics besides genetics.

Agree. This paragraph and discussion should focus on bridging the gap. While many related topics are considered already, plant traits, genetic breeds and advances seem to be considered rather limited.

Line 298: "knowledge reviews as are required ..." spelling

This will be corrected.

Line 303: here written as "drought indices" but its only "Palmer Drought Index?" within the 50 topics?

We will clarify that also the meteorological drought index is a separate topic within the 50 topics.

#### Supplementary

Couldn't find Figure A and Figure B (Lines 187 and 190) in the Supplementary, I only see Figures S1, S2, S3, S4

This is correct. We will correct the cross-references in Section 2 to the Appendix instead of Supplementary.