

Extended Abstract

Paper/Poster Title	A Review of Economic Assessments of Drought Risk Reduction Approaches in Agriculture
---------------------------	---

Abstract prepared for presentation at the 97th Annual Conference of the Agricultural Economics Society, The University of Warwick, United Kingdom

27th – 29th March 2023

Abstract	200 words max
<p>Due to climate change, the frequency and intensity of droughts are expected to increase. To improve resilience to droughts, proactive drought risk management is essential. Economic assessments are typically included to decide on the drought risk reducing investments to make. The choice of both methods and scope of economic assessments influences the outcome, and thus the investment choice. This paper reviews 14 actual economic assessments, evaluating the methods used based on seven criteria for economic assessments as derived from the United Nations Framework Convention on Climate Change (UNFCCC). The results show that in practice, economic assessments rarely address all criteria. Applying a limited number of criteria reduces the scope and narrows the approach, possibly leading to the underestimation of drought risk reduction approaches' related benefits. Applying the seven criteria in practice will improve the results of economic assessments of drought risk reduction measures, allowing for the optimal investment selection. Based on the different criteria, a Framework for Economic Assessments of Drought Risk Reducing Applications (FEADRRA) is set up to aid decision makers.</p>	
Keywords	Drought, Climate Change Adaptation, Disaster Risk Management, Agriculture, Economic Assessment, Literature Review
JEL Code	Q540 Climate; Natural Disasters and Their Management; Global Warming
Introduction	100 – 250 words
<p>Of the different natural disasters expected to increase in both frequency and intensity due to climate change, drought is the most elusive. Drought risk is often underestimated, since its impact is less visible compared to other natural hazards. Yet, droughts can lead to severe social, economic and environmental damages. Especially the agricultural sector is highly vulnerable, with drought impacts threatening livelihoods, food security and agroecosystems. Proactive drought risk management is needed to reduce the vulnerability of farmers to drought. Several reports show that the cost of acting through taking drought risk reducing measures are lower than the costs of inaction. For every US\$ spent on drought risk reduction, at least two US\$ can be saved on future disaster costs.</p> <p>While various drought risk reducing measures exist, their implementation is lagging. What could complicate the investment decision is the uncertainty regarding the benefits and costs of these drought risk reducing measures. Incomplete assessments</p>	

of drought risk reduction measures could result in inaccurate conclusions concerning the planned investments. Investing in inefficient measures can result in a loss of financial resources while not effectively decreasing damages. To avoid this, it is crucial to determine which elements should be included in the economic assessment of drought risk reduction approaches and whether this is effectively carried out. It is the objective of this paper to compare the economic assessment methods of drought risk reduction approaches and evaluate them based on a set of guiding criteria.

Methodology

100 – 250 words

The methods used in this review paper consist of two different elements. Firstly, a systematic literature search was carried out to identify different cases in which an economic assessment of drought risk reduction approaches was used, more specifically related to the agricultural sector. Then different criteria were identified that should be considered during the assessment of climate change adaptation measures. The selected records were evaluated based on these criteria in order to study the translation of theoretical guidelines into practice.

Through the databases of Web of Science and Scopus, as well as grey literature, 14 papers were identified that perform an economic assessment of drought risk reducing measures in the agricultural sector. Seven criteria were identified that should be included in an encompassing economic analysis. These criteria are: Impact/vulnerability assessment, Stakeholder engagement, External effects, Multiple assessments, Equity, Viability in broad context, and Sensitivity analysis.

The 14 records were evaluated based on these seven criteria, to identify whether economic assessments carry out these requirements in practice. After evaluating the various records, a framework is proposed to facilitate the economic assessment of drought risk reduction approaches. This framework includes the different steps researchers should consider during the assessment, so that the optimal investment selection can be made.

Results

100 – 250 words

The 14 different records were scored on how they apply the various criteria. A negative score is given if the criterion is not mentioned or applied. A neutral score is the result of applying the criterion in a limited manner. A positive score is given if the criterion is included in an encompassing manner.

Through identifying the number of positive scores per paper, it becomes clear that the criteria required for a comprehensive economic assessment are rarely applied in practice. On average, two positive scores were achieved per paper, with seven being the highest possible score.

After identifying that the seven criteria are rarely applied in practice, it is also possible to distinguish which of the criteria are applied the least. The equitability of the related costs and benefits is often not included, only two of the 14 records were able to do so. The criterion of stakeholder engagement is the most well applied, yet still only half (7/14) of the evaluated records were able to do so.

Based on the results of our systematic literature review and evaluation, we've set up a Framework for the Economic Assessments of Drought Risk Reduction Applications, or FEADRRA in short. This framework summarises which criteria need to be included and what should be paid attention to, in order to perform an encompassing economic assessment. This ensures that the most important costs and benefits are considered and reduces possible skewness of the results.

Discussion and Conclusion

100 – 250 words

One aspect of drought risk management is the selection of drought risk reduction approaches. While knowledge on this research topic is increasing, little information is available on the economic assessment of measures. This paper assessed how evaluation criteria for a reliable economic assessment of drought risk reduction measures are addressed in the agricultural sector. 14 assessments were evaluated on seven criteria, derived from recommendations for assessing costs and benefits of climate adaptation. The results show the seven criteria are rarely applied in practice. While this does not indicate that the results of the respective studies are not useful, it could indicate that their results are skewed. Exclusion of criteria could be due to the high uncertainty of the data and estimates required to include them. Another explanation could be the increasing complexity and time requirement of the assessments when more of the criteria are considered.

Through not addressing the different criteria the results obtained might be skewed, causing a possible underestimation of the attractiveness of drought risk reducing measures. While the economic assessment is not the only factor to consider during the selection process, an increase in reliability of the economic information can facilitate decision-making. The creation of the FEADRRA is a first step in facilitating the process of economic assessments regarding drought risk reducing measures and can aid practitioners in their assessments. However, the framework has not yet been tested in practice. It is the intention of the author to translate the FEADRRA into practice in future research.