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Drought vulnerability
- *in forested ecoregions & cold climates.*

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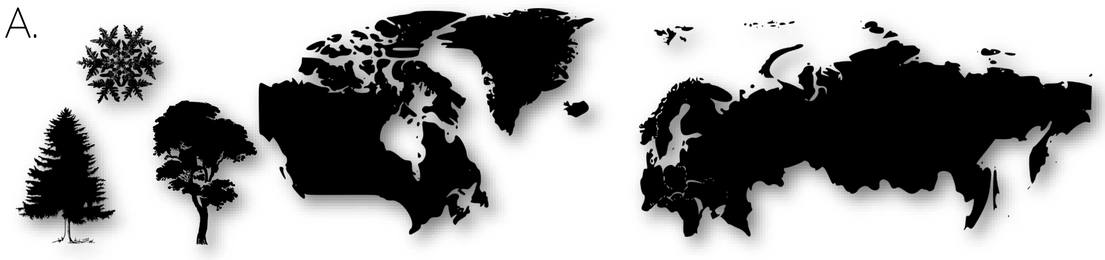
1. Introduction

Following the global call for proactive drought risk management[1], drought vulnerability assessments are progressively taking their stage in the drought research community[2].

As drought vulnerability is dependent on the social, ecological and hydroclimatic context in which it occurs[3], identifying vulnerability factors relevant for specific climatological and ecological regions may improve the quality of vulnerability assessments. Meanwhile, a holistic overview of factors affecting vulnerability in polar and cold climates is currently lacking.

2. Method & study region

A.



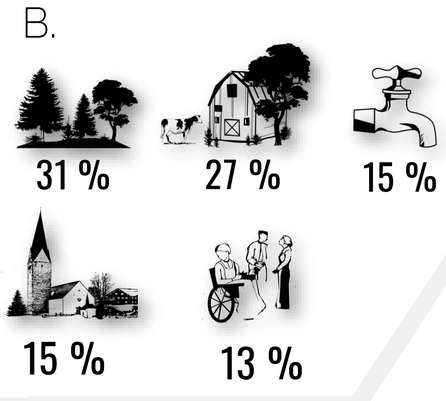
An interdisciplinary systematic literature review, including 55 peer-reviewed articles, were used to form an understanding of drought vulnerability for forested ecoregions in the Köppen-Geiger D & E climates (A). Vulnerability factors, as described by several scientific disciplines, for several sectors of society, were identified and combined into a conceptual model for drought vulnerability in the region.

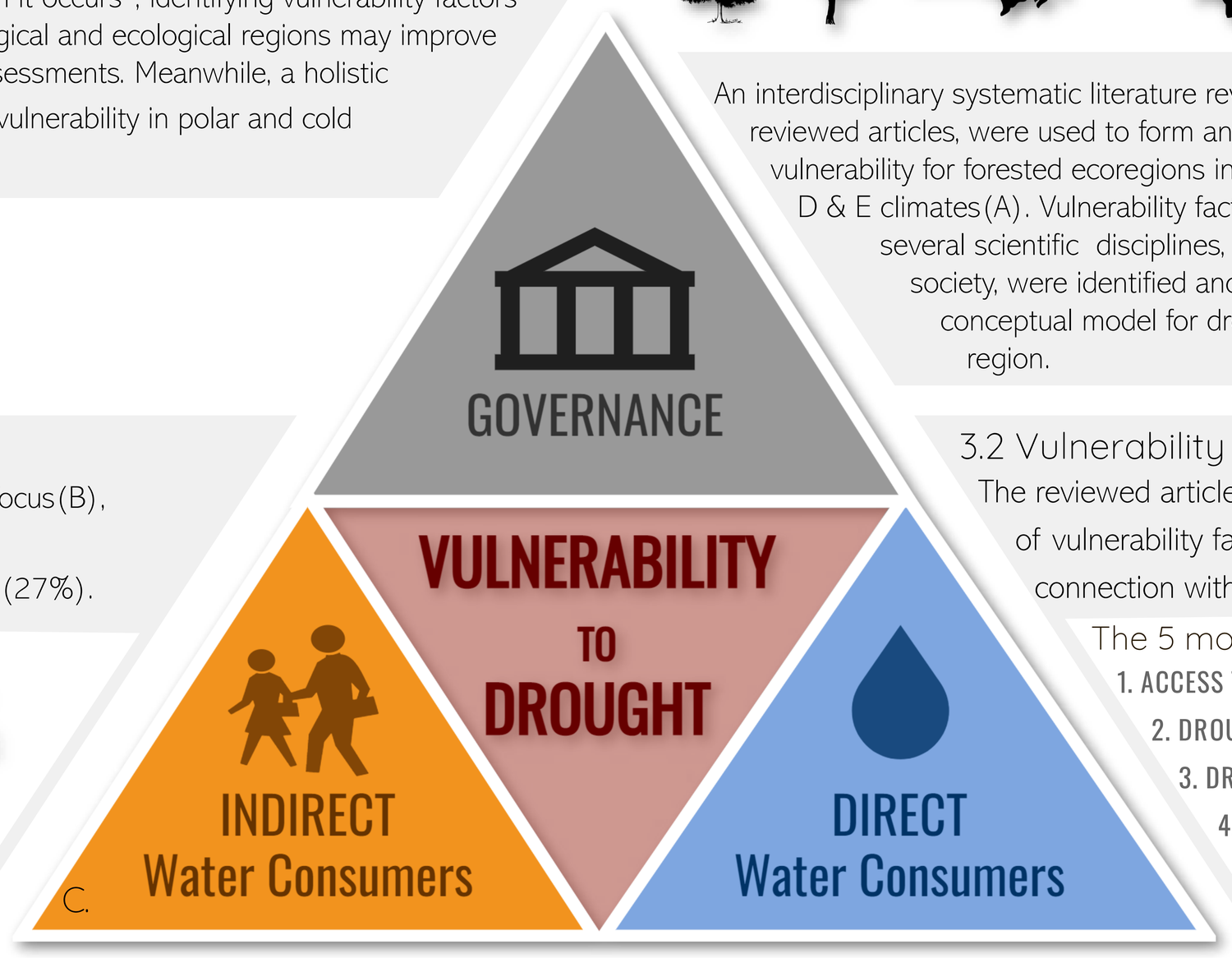
3. Results

3.1 Article focus

Factors differed by sectorial focus (B), with a majority focusing on forestry (31%) or agriculture (27%).

B.





C.

3.2 Vulnerability factors

The reviewed articles resulted in a large list of vulnerability factors described/used in connection with drought vulnerability.

The 5 most common factors:

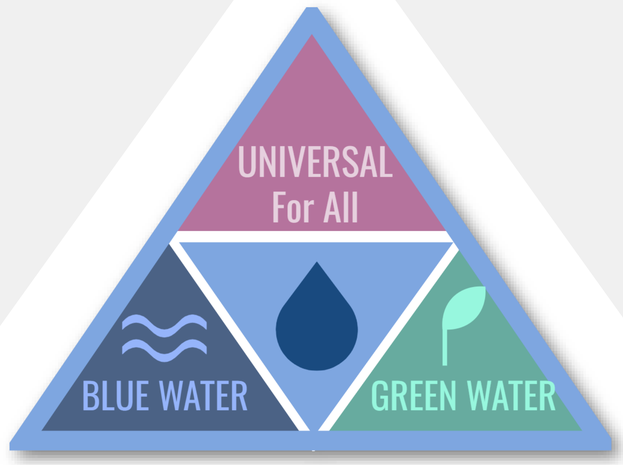
1. ACCESS TO IRRIGATION
2. DROUGHT TOLERANCE
3. DROUGHT EXPOSURE
4. SPECIES SUITABILITY
5. WATER STRESS & COMPETITION

3.3 Conceptual framework for drought vulnerability

The literature review revealed three distinct categories of vulnerability factors (C):

1. **Governance processes and plans**, such as policies/plans concerning droughts or financial ability to adapt or respond to drought etc.
2. **Indirect water consumers**, i.e., sectors or groups that use water indirectly (i.e. food, electricity)
3. **Direct water consumers**, i.e., sectors or groups using water directly either as (D):
    1. Blue water (using surface water och groundwater)
    2. Green water consumers (using water stored as soil moisture)
    3. Or vulnerability factors that are universal for all direct water consumers

D.



4. Conclusions & next step

The literature review identified key vulnerability factors for the study region and allowed the development of a novel conceptual model for identification of systemic vulnerability patterns.

In order to further adopt this framework to a Nordic setting, an expert survey will be conducted to identify the relative importance of identified factors for a Swedish setting.

Abstract

This presentation participates in OSPP
EGU
Outstanding Student & PhD candidate Presentation contest

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Sources:
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2. Hagenlocher, M., Meza, I., Anderson, C. C., Min, A., Renaud, F. G., Walz, Y., Siebert, S., & Sebesvari, Z. (2019). Drought vulnerability and risk assessments: State of the art, persistent gaps, and research agenda. Environmental Research Letters, 14(8)
3. McEwen, L., Bryan, K., Black, A., Blake, J., & Afzal, M. (2021). Science-Narrative Explorations of "Drought Thresholds" in the Maritime Eden Catchment, Scotland: Implications for Local Drought Risk Management. Frontiers in Environmental Science, 9

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