



# Is urban forestry 'living within the doughnut'?

## *An analysis of urban forestry policy guidance documents according to the planetary boundaries and social foundations sustainability frameworks*

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## Summary

We found the **planetary boundaries** (PB) most frequently discussed urban forestry policy documents were biosphere integrity, climate change, atmospheric aerosol loading (air pollution), tied with land-system change. We found the most frequently discussed **social foundations** (SF) were health, education, resilience, and social equity. Based on this analysis there are notable gaps within policy documents that lack discussion on certain planetary boundaries and social foundations. These gaps include gender equality, ocean acidification, and stratospheric ozone depletion.

## Introduction

- Scientists developed two frameworks, PB and SF to guide humanity toward an ecologically and socially safe space
- For each of the 9 PB, scientists proposed a set of limits placed before the point of no return, and it is crucial that we live within these proposed limits. Once we exceed, changes will be irreversible.
- Scientists proposed the SF: a basic set of needs and human rights necessary for life. Both sets of boundaries are deeply connected because social living depends on planetary condition.
- The idea of transgressing these boundaries resulted in a shift in viewing economics through a humanitarian scope, which included the consideration of human benefits and quality of living for humans.
- In acting to stay within these boundaries, it is essential to consider **more than 80% of Americans and Canadians live in urban environments**; therefore, it is crucial that we maintain the structure and health of urban forests in cities because of their significant impact on the planet and on humans.

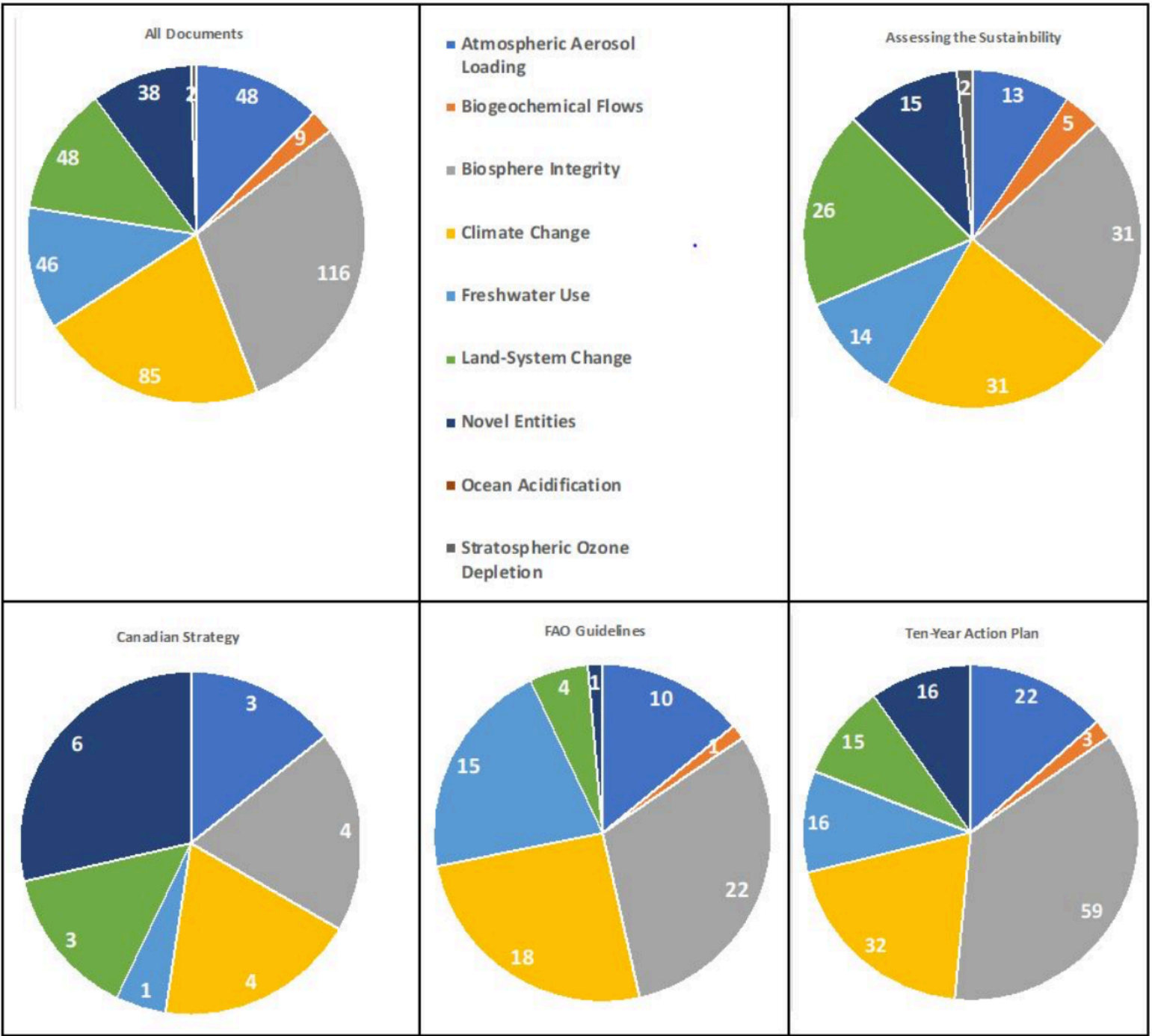
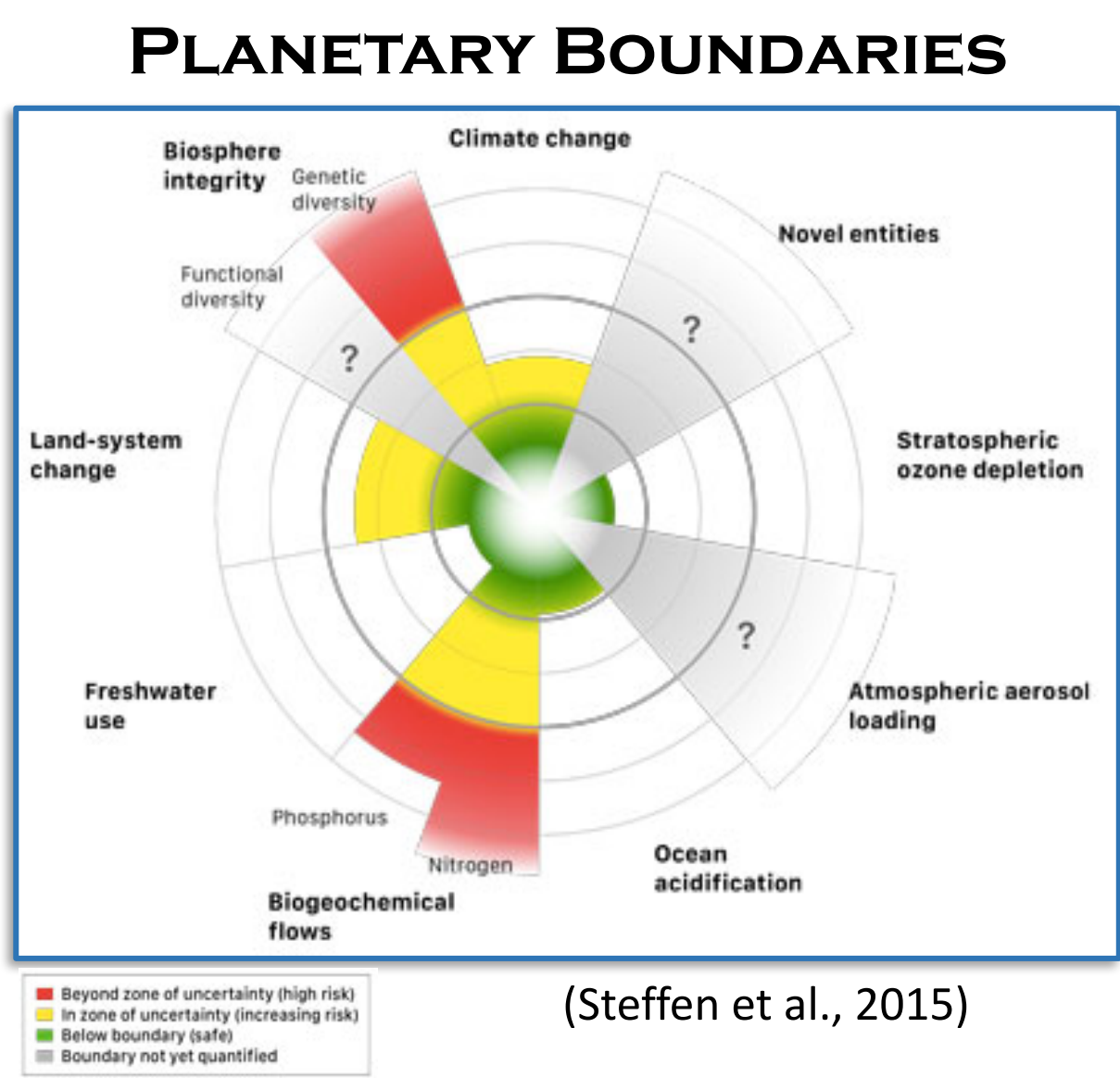


Figure 1. Distribution of references among planetary boundaries across four coded documents

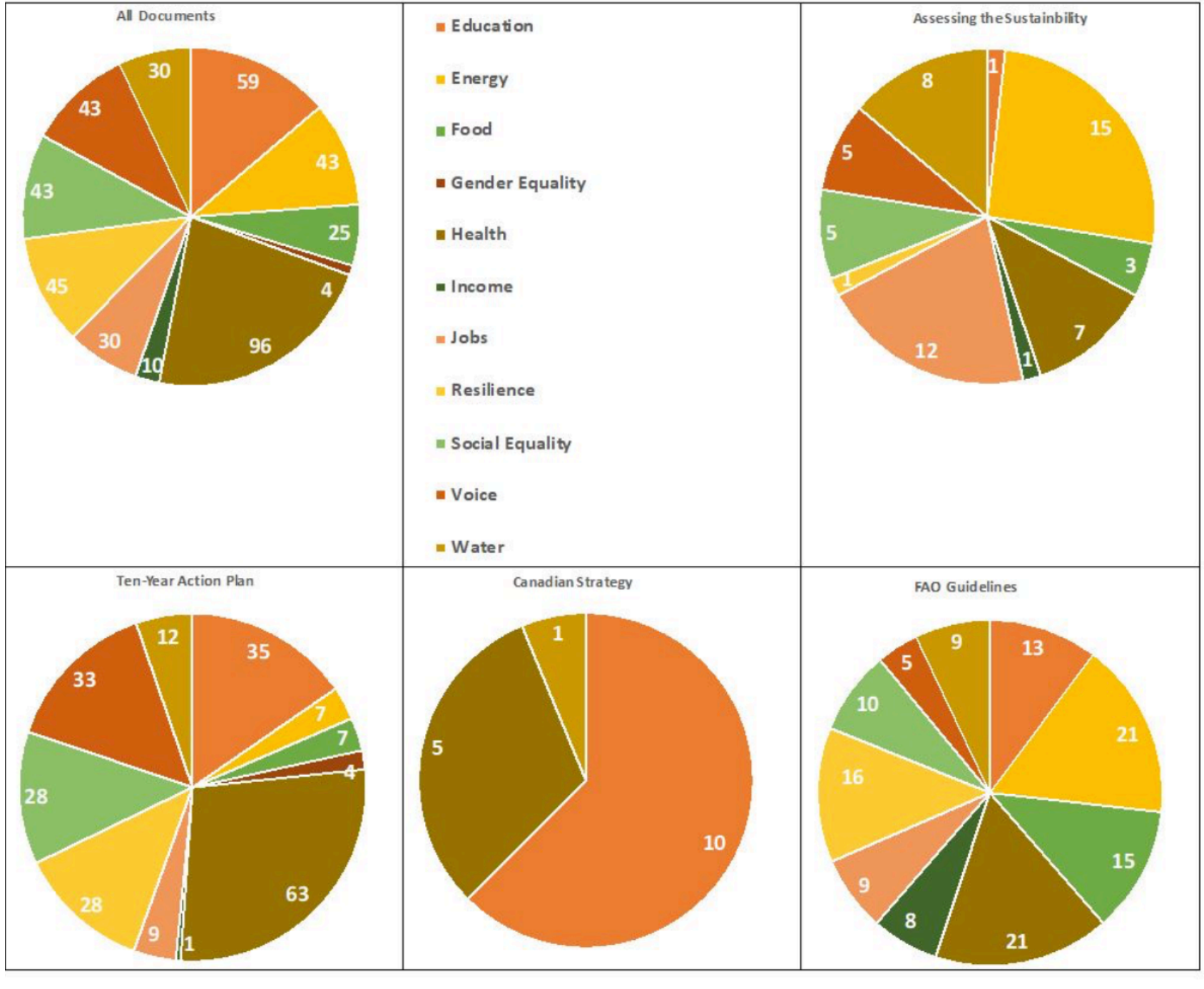


Figure 2. Distribution of references among social foundations across four coded documents

**Theme 1: Trees mitigate environmental stressors of the planetary boundaries by providing benefits for the environment.**

- Trees can play a large role in making cities more resilient to the effects of **climate change** by sequestration of greenhouse gasses
- A study observed that urban trees in the United States annually remove approximately 651,000 metric tons (717,000 tons) of **air pollution**, with a value of \$4.7 billion

**Theme 2: Trees mitigate social stressors and help society meet the social foundations**

- Urban forests boost people's mental, physical and physiological **health**. Particularly with hospital patients who have a faster recovery time when provided with a more pleasant view
- Leverage **education** to raise awareness of urban forestry; bow that ties all of the social foundations together
- Reduction of **energy** costs for A/C and heating

**Theme 3: Trees are impacted by the environment and humans**

- Novel entities** include the introduction of invasive plants and animals
- Air pollution** and the impacts of high levels of CO<sub>2</sub>
- Resilience** of trees to **climate change** and mitigation of impacts through environmental stewardship

## Methods

- Selected **4 urban forestry policy documents** to evaluate whether North American policy frameworks in urban forestry intersected with the PB and SF frameworks of sustainability.
- Documents were analyzed using **a priori qualitative coding** (Nvivo), where text from the documents were coded based on relevance to each of the 9 PB and 11 SF.
- Once finished with coding of all documents, a **keyword search** was implemented to ensure all relevant references were captured.
- Analyzed all references for each PB and SF for **common themes** and key takeaway points.

### Documents Analyzed

Robertson, G., & Mason, A. (2016). *Assessing the sustainability of agricultural and urban forests in the United States*. USDA Forest Service.

Salbitano, F., Borelli, S., Conigliaro, M., & Yujuan, C. (2016). *Guidelines on urban and peri-urban forestry*. FAO.

Network, C. U. F. (2015). *Canadian Urban Forest Strategy 2013-2018*. Tree Canada.

USDA Forest Service (2015). *Ten-Year Urban Forestry Action Plan: 2016-2026*. National Urban and Community Forestry Advisory Council.

## Gaps and Recommendations

- Significant gaps noted in our research were **gender equality**, which is of particular influence in developing countries; **ocean acidification**, which lacks relevance due geographic location for which each document was written, and **stratospheric ozone depletion**.
- Expand upon current strong areas in urban forestry policy documents such as **education**, **health**, and **climate change**.
- Integrate PBs/SFs with gaps to make them stronger and give them more relevance and understanding in the urban forestry community (i.e., discuss **gender equality** with **education**).

## Select Literature Cited

Raworth, K. (2012). A safe and just space for humanity: can we live within the doughnut. *Oxfam Policy and Practice: Climate Change and Resilience*, 8(1), 1-26.

Raworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist*. Chelsea Green Publishing.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., & Lambin, E. W. et al.(2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society*, 14(2), 32.

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett et al (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223), 1259855.