

# Leaf Area Index Response to Drought Dynamics

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## 1 Introduction

The Leaf Area Index (LAI) is a key biophysical parameter that quantifies the amount of leaf surface area per unit ground area and serves as a crucial indicator of vegetation structure and function. As such, LAI plays a central role in regulating water, carbon, and energy exchanges between the land surface and the atmosphere. Understanding how LAI responds to drought is essential for predicting ecosystem resilience under increasing climate variability. Droughts alter plant physiology, canopy structure, and productivity, yet the magnitude and timescale of these changes remain poorly constrained across spatial and temporal scales. This research aims to investigate the relationship between LAI dynamics and drought intensity, duration, and frequency, using remote sensing and climate datasets to identify patterns of vegetation response and recovery. By linking LAI variability to drought metrics, the study seeks to improve our understanding of ecosystem vulnerability and contribute to more accurate models of vegetation–climate interactions (?).

