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# Dynamics of Soil Microarthropod Populations Affected by a Combination of extreme Climatic Events in Tropical Home Gardens of Kerala, India

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**Abstract**

Climate change is predicted to increase drought and flooding events in the coming decades, especially in the tropics. Soil microarthropods represent an important component of soil living communities and play a role in maintaining soil quality and health. We need to understand the short-term responses of both plant community and soil microarthropods populations to these extreme events. Yet most of our current knowledge on this comes from manipulative studies in

temperate regions.

Some microarthropod groups present specific adaptations to soil conditions which make them suitable candidates for estimating soil biological quality.

The present study reports the impact of a severe summer drought followed by a catastrophic flood in 2018 on soil microarthropod density and biological soil quality across 25 tropical home gardens in Southern India.

Drought reduced the density of organisms six-fold and flooding caused a further threefold reduction. Biological soil quality in the home gardens that were not flooded was restored during the monsoon season but this was just partially possible for microarthropod population density. Three months after flooding, the microarthropod groups that we encountered were generally able to re-establish their population to the condition prior to flooding. However, none of the group recovered to the mean seasonal values. The severity of previous drought seemed to have overridden any possible adaptation to annual summer water scarcity. Plant species richness in home gardens played a key role towards mitigation and possible resilience to disturbance of these ancient agroecosystems. The capacity of the soil microarthropod communities to recover over the long term after extreme climatic events and its relevance to maintaining ecosystem functions and services in home gardens through soil fertility warrant further investigation.

**Keywords:** , , , Drought, Flood, Plant community, QBS-ar index, Resilience, soil fauna

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