

FOOD PRODUCTION AND CLIMATE CHANGE

Fruit, nuts and seeds under environmental stress

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Environmental stressors — rising tropospheric carbon dioxide and ozone levels, deviations in temperature trends and rainfall patterns — affect agricultural yield and nutritional quality of food, most often demonstrated in crops, vegetables and legumes. The consumption of fruits, nuts and seeds is important for human health, and is a prominent feature of sustainable diets. To date, however, there has been limited analysis of environmental stressors on the yield and nutritional quality of fruits, nuts and seeds.

Systematically reviewing literature spanning almost 50 years, Carmelia Alae-Carew, from the London School of Hygiene and Tropical Medicine, and colleagues present the impacts of change in isolated and combined environmental exposures on nutritional quality and/or yield of commonly consumed fruits, nuts and seeds. Using PRISMA guidelines, 81 studies pertaining to fruit and 21 pertaining to nuts and seeds were identified; the environmental exposures studied were changes in ambient temperature, water availability, water salinity, tropospheric carbon dioxide and ozone concentrations.

Though quantitative analysis was limited — the authors report heterogeneity in study design and lack of uncertainty estimates for the majority of studies — results suggest that reduced water availability, increased ozone concentrations and elevated temperature negatively impacted yields of fruits, nuts and seeds. Berry and peanut yields, however, increased with elevated carbon dioxide concentrations, but those gains were attenuated when elevated temperature was added to the model. Data on nutritional quality were sparse and mixed.

The present study gives an overview of the literature to date on environmental changes on yield and/or nutritional quality of fruits, nuts and seeds, and is a valuable addition to discourse on future food planning. Importantly, as systematic reviews frequently do, it highlights important research gaps — most notably here, the dearth of detail on potential impacts of environmental stressors on nutritional quality of foods that are centre-stage in proposed plant-based, sustainable diets for human and planetary health.

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