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“Reconcile land system changes
with planetary health”

Legume-driven agriculture: Changing paradigms to maximise agriculture’s contribution to nutrition while enhancing agricultural sustainability

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Abstract

The world faces significant challenges in providing nutritious food to a growing population within planetary boundaries. Food insecurity, manifesting as both hunger and obesity, persists, while agriculture continues to drive biodiversity loss and greenhouse gas emissions. Interventions that can accelerate progress in overcoming these challenges are increasingly important, and in this context, legume-driven agriculture has much to offer. There is untapped potential in legumes that can contribute to sustainable agrifood systems, as their benefits are neither fully recognised nor utilised globally, with current production levels remaining marginal compared to cereals.

A meta-review was conducted to synthesize the current state of knowledge on the contributions of legumes to agriculture and nutrition. Most frequently mentioned benefits of legumes include their richness in protein, minerals, vitamins, and carbohydrates, while also improving soil fertility through symbiotic nitrogen fixation. Diversity of legumes includes species well-adapted to poor soil and drought conditions, making them particularly instrumental for climate change adaptation. Their inclusion in crop rotations or intercropping has shown increased yields of non-legume crops and reduced reliance on fertilisers due to their improvement of soil fertility. Beyond the macronutrient and micronutrient composition of legumes, they contain antioxidant and bioactive compounds, which offer additional health benefits. Although some compounds may inhibit nutrient absorption, processing methods such as cooking can mitigate these effects.

This research aims to demonstrate why legumes should be an essential part of agrifood systems, based on the fact that they not only contribute to nutrition and food security but also due to their positive impact on environmental sustainability. By advocating for legume-driven agriculture, this paper goes beyond positioning legumes as fundamental crops in sustainable agrifood systems. It recommends rebuilding agricultural systems around legume species, which, as mentioned before, enhance environmental sustainability and support healthy diets. The diverse legume species provide a versatile portfolio of options that can be selected based on their adaptations to local conditions and specific nutritional profiles.

Keywords: Climate change adaptation, healthy diets, leguminosae, meta-review, planetary health

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