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"Reconcile land system changes
with planetary health"

Gardenhub: optimising school gardens for sustainable food environments

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Abstract

Supporting decision-making in complex systems requires close collaboration between researchers and stakeholders. Effective communication and iterative model refinement are essential for aligning stakeholder insights with scientific approaches, ensuring interventions remain context-specific and actionable. As part of the Nutrition Intervention Forecasting and Monitoring (NIFAM) project, we developed a Bayesian decision-support model for school garden interventions in Hanoi, Vietnam. This model integrates expert knowledge, stakeholder input, and probabilistic reasoning to assess the impacts of different garden configurations on student nutrition, educational outcomes, and local food environments. It supports three scenarios: (1) a formally-integrated educational garden, (2) a school garden on campus that is not necessarily part of the classroom, and (3) a no-intervention baseline. To make this model accessible to non-specialists, we developed the GardenHub application. This interactive tool allows school leaders, teachers, and other stakeholders to explore how their data informs the probabilistic model, adjusting inputs like garden size, staff training, and community involvement. It supports ongoing, data-driven decision-making by providing real-time feedback on intervention effectiveness. We designed the app to foster co-learning and enable users to visualise the potential outcomes of their decisions while contributing new data to refine the model. GardenHub also provides a flexible platform for updating model parameters as more data becomes available, enhancing model accuracy and relevance. Integrating stakeholder insights with probabilistic modelling promotes evidence-based planning and continuous improvement in school garden management. GardenHub enables the design of effective and context-specific intervention in school gardens by translating complex data into actionable strategies and supporting improved student nutrition and learning.

Keywords: Food environment, participatory research, school garden, transdisciplinary

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