# Analyzing agroforestry management

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The evaluation of both nutrient and non-nutrient resource interactions provides information needed to sustainably manage agroforestry systems. Improved diagnosis of appropriate nutrient usage will help increase yields and also reduce financial and environmental costs. To achieve this, a management support system that allows for site-specific evaluation of nutrient-production imbalances is needed.

Scientists at the University of Toronto and the University of Saskatchewan have developed a conceptual framework to diagnosis nutrient and non-nutrient interactions in agroecosystems. This work was partially financed by the Natural Science and Engineering Research Council of Canada and The Norwegian Agency for Development Cooperation through the PANTIL program at SUA.

The scientists revisited vector analysis, a model used to see changes in yield and nutritional response in a single graph. The result is an outline for diagnosing these interactions. The complete results from this study can be found in the special issue on Agroforestry and Environmental Quality from the Journal of Environmental Quality.

The current model does not consider non-nutrient resource effects on growth, such as light conditions and soil moisture content. In this study, scientists analyzed data from field trials of cocoa and pigeon pea intercropping systems using vector analysis. They quantified nutrient and non-nutrient interactions, illustrating the application of this analysis for managing agroforestry systems.

Using their advanced model, scientists were able to increase the yields of both cocoa and pigeon pea rotated with maize. Additionally, phosphorus concentrations declined, reducing environmental impact. These improvements were attributed to better light conditions for the cocoa and alleviated soil moisture competition for the pigeon pea crop.

These results helped in the production of an agroforestry management system that considers both nutrient and non-nutrient interactions. This advancement allows for an accurate way to correct nutrient imbalances, and helps sustain productivity while reducing environmental risks.

Scientist Marney Isaac explains, "Linking crop performance to appropriate nutrient application, as well as quantifying existing nutrient cycles and interactions, will not only have the economic advantage of increasing yields but will also diminish financial and environmental costs."

Further research is currently being conducted at the University of Toronto and the University of Saskatchewan to gather data on nutrient and non-nutrient interactions in agroforestry/multispecies systems to advance diagnostic techniques.

**More information:** www.soils.org/publications/jeq/articles/40/3/860

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