

CTAHR Nutrient Management Team

Doing More by Adding Less

The Situation

Although essential for crop production, fertilizers are often applied in excess for “insurance” purposes. After decades of this practice, some agricultural soils show 6x and 20x higher than recommended levels of nitrogen and phosphorus, respectively. Leaching or runoff of this nutrient-loaded soil with heavy rains can result in environmental and wildlife harm (e.g., algal blooms, turtles with tumors) and wasted costs.

With shipping and supply issues resulting from the impact of the COVID-19 pandemic, wise use of limited fertilizer has become even more critical. Future sustainability of Hawai‘i’s environment and agriculture depends on precise use of available fertilizer resources.

Extension’s Response

O‘ahu County Extension agents and UH Mānoa soil researchers addressed this farmer and community issue by installing several two-year, on-farm fertilizer trials with cooperating farmers, targeting key agricultural watersheds on O‘ahu: Ma‘ili‘ili, Hono‘uli‘uli, and Kaiaka watersheds. All trials consisted of treatments that reduced fertilizer amounts compared to the farmer practice (e.g., 75%, 50%, and 25%) based on nitrogen amount.

Alternative fertilizer treatments also included the following novelties:

1. phosphorus-absent v. -containing fertilizer types
2. organic and synthetic forms
3. cover crop-derived nitrogen to reduce fertilizer inputs.



Regular soil testing was conducted to guide pre-plant fertilizer recommendations or, with Soil Nitrate Quick Tests, to monitor soil nitrogen levels over time. Initial trial results were shared with cooperating farmers and at workshops for the Hawai‘i Farmers Union United Waianae Chapter, Hawai‘i Women Farmers Network, and Hawai‘i State Energy and Environmental Protection Committee.

Impacts

Overall, farmers were convinced to reduce their fertilizer input in multiple ways.

Environmental Benefits

Soil tests and trial findings demonstrated that soil phosphorus levels were in excess, and reducing phosphorus and nitrogen inputs did not impact yields. As a result, farmers recognized the environmental and economic costs and switched to fertilizers absent in phosphorus or reduced-phosphorus mixtures if organic nitrogen fertilizers were cost prohibitive. One 5-acre farm subsequently reduced their farmer practice from 900 to 400 pounds of nitrogen per acre.

Economic Benefits

For farms using synthetic fertilizers, farmers saved approximately \$700-\$1,300 per acre per year on fertilizer costs by reducing their inputs and/or utilizing cover crops as a soil health practice. For large farms, just removing phosphorus fertilizer alone saved as much as \$21,294 per crop year.

Our results clearly show that with proper nutrient management and soil testing, farmers can increase profitability while simultaneously protecting Hawai‘i’s fragile environment.

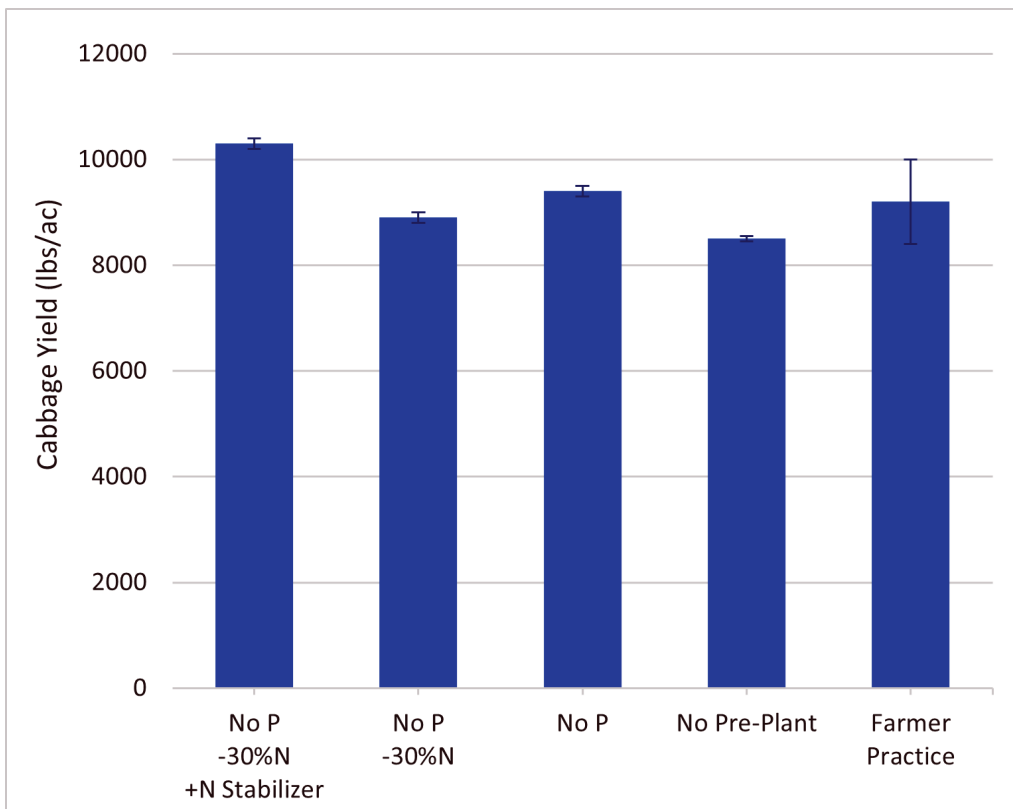


For more information, please contact:

Joshua Silva, Assistant Extension Agent
jhsilva@hawaii.edu, (808) 342-8560

Collaborators

Jonathan Deenik, Extension Specialist
Jensen Uyeda, Associate Extension Agent
Tai Maaz, Assistant Researcher



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