**Introduction**

- In Peruvian cacao production, nitrogen fixing trees called *inga* are interplanted to provide nutrients to the cacao trees.
- Slash and burn is a technique used to clear native forest growth. Once cacao plantations are established, the soil will be productive for 15 years, then the cycle begins again.
- There haven’t been many studies done on how the incorporation of these trees impacts cacao tree health.

**Questions**

- How does the incorporation of nitrogen fixing trees impact cacao tree health on sun and shade grown cacao farms?

**Methods**

- Randomly chose cacao trees from Hoja Nueva’s sun and shade grown cacao farms.
- Measured distance from nearest planting of *inga* to each cacao tree measured.
- Compared distance from nearest *inga* tree to trunk diameter, height, and crown diameter.

**Results**

**Trunk Diameter vs Distance to Nearest Inga Tree**
- $R^2 = 0.0043$
- $R^2 = 0.0697$

**Height vs Distance to Nearest Inga**
- $R^2 = 0.0016$
- $R^2 = 0.3626$

**Crown Diameter vs Distance to Nearest Inga**
- $R^2 = 0.2013$
- $R^2 = 0.0664$

**Summary**

- The distance between cacao trees and *inga* plantings impacted cacao trees in different ways.
- There was a relatively strong negative correlation between height and distance to nearest *inga* in the shade farm (See fig. 3).
- There was a strong positive correlation with crown diameter and distance to nearest *inga* in the sun farm (See fig. 4).
- Overall, there wasn’t a clear difference in how nitrogen fixing trees impacted cacao trees on a shade farm or sun farm.

**Implications**

- More research into nitrogen fixing trees and their impacts on both the health of cacao trees and the health of the soil needs to be conducted.
- If there is more research done on these trees, slash and burn style agriculture could decrease as farmers focus on soil health.
- These trees could be used in American orchard systems as a cost effective source for nutrients.

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