CocoaSoils

Nutrient offtake & biomass distribution in cocoa

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To understand the nutrient requirements of cocoa, we made a simple nutrient offtake model for cocoa in Excel. The model requires data on the nutrient content of different parts of the cocoa tree. Two students carried destructive sampling of complete cocoa trees (with roots) to obtain

the required data.

Objectives

- To understand the distribution of biomass and nutrients over cocoa tree parts (leaves, trunk, roots, pods)
- To develop a simple nutrient offtake model
- To calculate the nutrient offtake (immobilization and removal in pods) for different yield levels

Results and Discussion

- Biomass distribution of cocoa trees is shown in Figure 1
- With the collected data, nutrient requirements for the different treatments in the CocoaSoils trials could be calculated
- An example of the nutrient offtake model is shown in Figure 2

Figure 1: Biomass distribution in cocoa trees of different age groups in Ecuador and Côte d'Ivoire



Methods

- Destructive harvesting of cocoa trees in Côte d'Ivoire and Ecuador
 - Vegetative measurements and biomass determination
 - Nutrient content analysis
- Development of an offtake model in Excel using nutrient data and allometric relations from literature and from own research
- Checking model outcomes with other models and with literature

Figure 2: Screenshot from offtake model

		Requirement total		
Tissue nutrient content (% DM)		Low	Medium	High
N	Yield (kg)			
	0	56.3	62.4	68.5
	1000	97.0	111.7	124.5
	2000	137.7	161.1	180.5
	3000	178.3	210.4	236.5
P2O5	Yield (kg)			
	0	47.3	54.9	62.5
	1000	72.5	91.5	110.2

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References

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