Identification of constraints affecting the coffee productivity and quality in Burundi

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Introduction

- Arabica coffee occupies 10% of the cultivated land and is an important source of income in Burundi (ISABU, 2009).
- Favorable climate and the Bourbon varieties are great assets that the country has to develop (OIC,2015). However, yield and quality of coffee in Burundi is declining.

Objective

- To identify the agronomic and environmental constraints that affect the productivity and quality of coffee in Burundi, in order to help the sector regain its competitiveness.

Materials & Methods

- Diagnostic survey in 198 coffee farms across the three main coffee production areas (Mumirwa, Humid plateau and Dry plateau) in both 2018 and 2019.
- Data collected : plot characteristics, yield parameters, soil fertility and the nutritional status of the coffee tree (soil and leaf sampling followed by chemical analyses), sensory quality of the coffee (score).

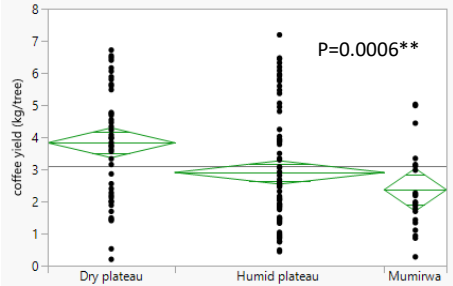

Figure 1: Effect of location on coffee bean yield per tree

Table 1: Correlations between coffee yield and soil fertility factors

Factors	Mumirwa	Humid plateau	Dry plateau
pH-H_2O	ns	ns	ns
Soil OM (%)	0.56***	0.41**	0.34*
Soil CEC ($Cmol_c.kg^{-1}$)	0.55***	0.52**	0.48**
Soil N (%)	0.55***	0.44**	0.38*
Soil P(mg/kg)	ns	ns	ns
Soil K_exch. ($Cmol_c.kg^{-1}$)	ns	ns	0.34*
Soil Ca_exch. ($Cmol_c.kg^{-1}$)	ns	0.27*	ns
Soil Mg_exch. ($Cmol_c.kg^{-1}$)	ns	ns	0.27*

"ns": no significant correlation
* Significant at 5% level (P≤0.05).
** Significant at 1 % level (P≤0.01).
*** Significant at 0.1% leve l(P≤0.001).

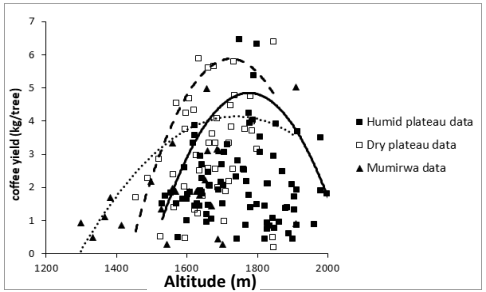

Figure 2: Effect of altitude on coffee bean yield per tree

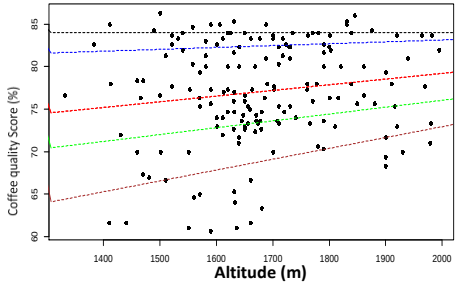

Figure 3: Effect of altitude on coffee quality

Results

- There are large regional differences in terms of coffee tree productivity (Fig. 1)
- Soil organic matter, CEC and N are positively correlated with coffee yield (Table 1).
- pH and phosphorus are not correlated with coffee yield in any of the agroecological zones of Burundi.
- Exchangeable K and Ca are positively associated to yield in the dry and humid plateaus, respectively.
- Altitude around 1700 m was the most favorable for coffee yield per tree (Fig. 2).
- High altitude (> 1700 m) favors coffee quality, but good quality coffee can also be achieved at lower altitudes (1400-1700m) (Fig. 3)

Conclusions & Perspectives

- Abiotic parameters such as soil organic matter (OM), nitrogen (N), and CEC, potassium, calcium, magnesium and altitude affect coffee yield.
- Whereas high altitude is ensures better quality coffee on average, high quality coffee can also be produced at lower altitudes.
- In order to better understand how to improve the productivity of coffee in Burundi, factors limiting coffee productivity need to be evaluated in situ through on-farm experiments

References:

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OIC, 2015. Organisation International du café. Données historiques : Statistiques commerciales. Rétrospective 2013-2014.