

MONYO, Harrison E.* MOSI, Epafra J., MBWAMBO, Suzana G. and MARO, Godsteven P.
 Tanzania Coffee Research Institute (TaCRI), P.O.Box 3004, Moshi, Tanzania
 *Corresponding author: harrison.monyo@tacri.org



Introduction

The Lyamungu Estate was established in 1934 and taken over by TaCRI in 2001. No record of land suitability information for coffee in the estate is available, even though it has hosted many coffee field trials. Suitability criteria for Arabica coffee have been well documented as a matter of principle, but, as both the climate and soil fertility are changing, the absence of such record was an obvious gap. The aim of this study was therefore to assess the quality of land as pertaining Arabica coffee production, thus filling the information gap.

Materials/Methods

A total of 113 randomly located survey sites across the estate had their soil samples analyzed for routine soil fertility parameters. Land evaluation (qualitative, parametric method) was done, with climatic data adopted from a local weather station. Laboratory data included ACEC, SBC, pH and OC. The square root method (Khidir 1986) was used to compute the climatic index (I_c), whose rating (R_c) was used in the determination of the land index (I_L); rated as S1 (very suitable), S2 (moderately suitable), S3 (marginally suitable) and N (unsuitable) for the respective I_L ranges of 100-75, 50-74, 25-49 and 0-24. The I_L values were spatially interpolated using the IDW algorithm in ArcGIS10.7.1.

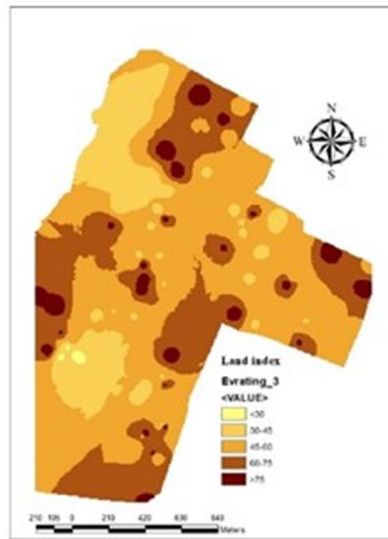


Figure 2: The coffee land suitability map

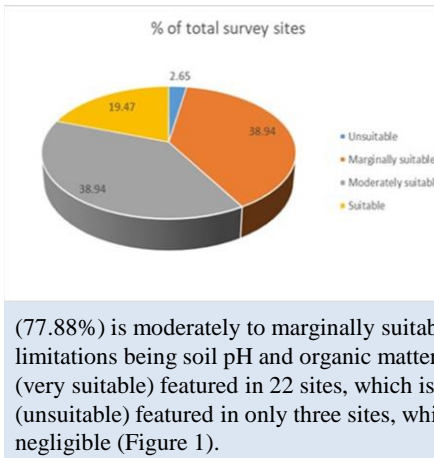


Figure 1: Land suitability categories

Results/Discussion

Of the 113 sites evaluated, the categories S2 and S3 shared 44 sites each (38.94%) implying that the bulk of the land

(77.88%) is moderately to marginally suitable for Arabica coffee, with limitations being soil pH and organic matter content. The category S1 (very suitable) featured in 22 sites, which is 19.5%. The category N (unsuitable) featured in only three sites, which is 2.65% and therefore, negligible (Figure 1).

The map (Figure 2) shows that areas of high I_L (>60) include Fields 46, 45, Usagara A, Ziwani, part of Kilmani and Mowe-Matunda. The bulk of the land fell between 45 and 60, which is moderately suitable. Areas having low I_L (<45) are two: the area around TTD, which also include Mianzini and Field 2, together with the north-westernmost part.

Conclusion/Perspectives

The land at TaCRI Lyamungu Estate is suitable to marginally suitable for Arabica coffee. The limitations of low pH and low organic matter content can be mitigated by careful liming and mulching/manuring respectively. With the changing climate and soil fertility statuses, we recommend such an activity to be routinely done once every ten years.

References:

Khidir, S.M. 1986. A statistical approach in the use of parametric systems applied to the FAO Framework for land evaluation. *PhD Thesis, State University Ghent, Belgium. 141pp.*