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Geo-Spatial Tools to Bring Agronomy to Scale

MICHAEL HAERTEL, TUNRAYO ALABI, STEFAN HAUSER

International Institute of Tropical Agriculture (IITA), Nigeria

Abstract

During the last 40 years IITA conducted thousands of agronomic and plant breeding trials. Most experiments have been carried out at the IITA HQ Campus, an IITA station or nearby because it was more convenient to travel and access the farmland. Existing connections to farmers, communities and strategic partners or donors also caused a limitation in the spread of farm sites used for experiments. Over the years the continuous use of fertiliser, inoculants, herbicides or insecticides modified the soil properties such that the overall soil condition on-station is likely to differ from most smallholder farmlands in sub-Saharan Africa which means that the transfer and the repeatability of results from the on-station experiments to other places is likely to be poor and unreliable. Environmental factors often have been neglected in the site selection or have not been described in such a way that they could serve as covariates in analyses. The research often focused on short-term results like testing varieties for susceptibility to pests or response to fertiliser application. Soil samples were taken and analysed to interpret yields but there was no investment in long-term integrated soil fertility management (ISFM) strategies as a process to prevent soil degradation or rehabilitation of already degraded soils. Without sound knowledge of the local soil conditions and appropriate strategies to maintain or increase soil fertility any predictions of expected crop responses to interventions outside the usual on-station situation are likely to be biased. To overcome poor extrapolation of results on larger areas, IITA is interested to carry out trials in more and so far not used locations. Two approaches appear feasible to identify new locations: one option is looking for similar environments to which findings are transferred into “real” cropland and farmer conditions to be verified there; the other option is looking for different environments to evaluate interventions’ effects and to assure that new technologies can be disseminated to regions where they have not been tested. The IITA GIS Unit aims to explore new unbiased methods of identifying locations to conduct experiments (with strong focus on long term trials) that fully consider soil conditions and climate factors without neglecting accessibility, market connection and other social and economic factors. Geo-Spatial methodologies are known to help in this regard. The poster outlines the use of similarity/distance calculations and classification procedures to identify new locations.

Keywords: Classification procedures, extrapolation domains, similarity/distance calculations, site selection