

# TAKING MAIZE AGRONOMY TO SCALE IN AFRICA (TAMASA)

*Helping millions of maize farmers across sub-Saharan Africa achieve greater yields and incomes through the provision of farm-specific agronomic advice*

## WHAT IS TAMASA?

The current R&D landscape, particularly in agronomy, is characterized by blanket recommendations, poor availability, and limited use of spatial data. There are few options for rapid and cost-effective data collection, the result being that agronomy remains experiential, rather than predictive, and that site-specific knowledge cannot be shared or easily scaled out.

TAMASA provides farmers with timely, accurate advice on subjects such as crop varieties, fertilizer use and seed spacing, which can help maximize their returns on input and labor investments. The project develops and institutionalizes geospatial, soil, and agronomic data-based decision-making tools to be used by smallholder farmers and agricultural service providers to increase crop productivity and profitability.

Since 2015, this four-year project has conducted research on maize-based systems in Ethiopia, Kenya, Nigeria, and Tanzania, with a range of implementation and capacity development partners. The project operates in areas where maize-based systems can be intensified. Areas with intensification potential are those where maize is an important crop and which have relatively high population densities and good access to markets.

## HOW DOES IT WORK?

- Using geospatial data and analytics to map maize areas, soil constraints to productivity increase, and actual and attainable yields at different scales.
- Working with service providers (including input suppliers, government and private research and extension services, agro-dealers, etc.) to develop systems and applications that transform geospatial and experimental data into usable products in order to reach clients more effectively.
- Building capacity within national programs to support and sustain these approaches, systems and products.

Research begins with the generation of spatially representative sampling frames, so that results from trials and experiments can be extrapolated to new sites. For example, in Tanzania, TAMASA works in 22 separate 10km<sup>2</sup> sampling areas, which represent about 70 percent of variation in soil factors. From experiments in these areas and other spatial data (including climate, soils, infrastructure, etc.) our researchers were able to generate predictions of yield responses to nitrogen application as well as profitability.

# DIGITAL INNOVATIONS

## NUTRIENT EXPERT®

Many countries across sub-Saharan Africa are investing in fertilizer provision to help farmers boost their yields. So far, however, most fertilizer-use recommendations are national- or sub-national-based and have not been adapted to more localized areas such as individual fields. The Nutrient Expert® app, developed by the International Plant Nutrition Institute (IPNI), gives site-specific fertilizer recommendations tailored to the objectives of individual users.

Between 2015 and 2017, over 700 on-farm nutrient omission trials were conducted in multiple locations in maize-producing areas of Ethiopia, Nigeria, and Tanzania to generate yield, yield response, and nutrient uptake datasets for the calibration of Nutrient Expert®. In a trial conducted with 435 farmers in Nigeria, the use of recommendations from the app increased yields from 2 tons to 4 tons per hectare, on average. Higher yields were achieved with less fertilizer, increasing the benefits for farmers by 60 percent. Pilots in Ethiopia and Tanzania showed similar results. Overall, use of the Nutrient Expert® was a highly efficient and cost-effective tool for improving fertilizer recommendations in smallholder farming systems characterized by highly variable soil fertility conditions.

## MAIZE VARIETY SELECTOR (MVS)

The Maize Variety Selector app helps both individual farmers and agricultural service providers to identify the best variety for their location. Geo-referencing software allows the user to locate their field, choose their preferred sowing and harvest dates and receive a recommendation about the most suitable varieties. The app also includes a database of maize variety characteristics.

## MAIZE SEED AREA APP

Plant population densities in farmers' fields are commonly much lower than those recommended by agronomists and seed companies. The Maize Seed Area application allows service providers and farmers to receive advice on how much seed a farmer needs to buy and how best to plant it. The app can measure the area of an individual field (which is also important for determining how much fertilizer to use), provide advice on optimal plant density and spacing, and calculate how much seed is needed for a given area and plant density. It can also provide information on variety characteristics.

# IMPACT

Nutrient Expert® is currently being piloted with partners in several countries. In Ethiopia, TAMASA is working in collaboration with the Ministry of Agriculture and National Resources and the Ethiopian Institute of Agricultural Research to pilot the service among 4,000 farmers. In Nigeria, TAMASA is working with Sasakawa Africa Association and the OCP Group to provide advice to tens of thousands of farmers, while 2,500 Tanzanian farmers have received advice from extension agents so far in 2018.

TAMASA is also supporting capacity development in all three target countries. Extension agents have been trained in the use of smartphone technology and digital apps, while 22 Ph.D. students have been supported in researching a range of relevant topics including variety adaptation, farmer production practices, decision-support tool development and data assimilation.

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