BTracT – A Tracking Tool for Banana Breeding

Research GAP

Banana breeding has several **unique challenges** that sets it apart from other crops. Inherent sterility, low seed set, poor germination, polyploidy, etc. lend themselves to a lengthy breeding cycle fraught with the potential for multiple errors and traceability. While research continues to resolve these various issues across the breeding pipeline, **improvements in tracking, data collection and data analysis is also critical**.

What WE DID

We **mapped out the data and information needs** across the entire banana breeding workflow, as well as developing **detailed standard operating procedures** for field, tissue culture and screenhouse activities. The current data formats, reporting requirements and any **challenges faced in the management and analysis of the data** were also captured.

Following this, we **developed a suitable software system** that could be applied using a mobile device for practical use in the field for data collection. We then designed a user friendly, **web-based dashboard**, based on the user requirement specifications, for aggregating data and which can be visualized. A range of hardware and **tools were implemented to support the system**, such as barcode labelling, barcode scanners and tablets to provide a streamlined, interlinked data system.

What WE ACHIEVED

An open source system called the **B**anana breeding **Trac**king **T**ool (BTracT) is now **successfully implemented in Tanzania and Uganda banana breeding programs**. This provides a streamlined data collection system that is now fully integrated into the global banana breeding database, *Musabase*. A user feedback process is in place to continually finetune and improve the system. It is now being prepared for use on other crops.

Why THIS IS IMPORTANT

This tracking tool and data capture mechanism **enables accurate and efficient tracking of each and every plant** resulting from the breeding program, from pollination through to yield and farmer evaluation. This **reduces mistakes** in identity and **enables identification of critical bottlenecks and redundancies**, improving efficiency and management of resources. It also allows for **real-time reporting and data analytics**, which permits **access to any location at any time** and **immediate status updates** through tracking indicators that are linked to monitoring and evaluation tools. This highly innovative system, which further **facilitates the ability to design new varieties** using deep learning algorithms based on biological insights mined and extracted from the system, is helping to **revolutionize the banana breeding process**.

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