

# Validating a decision support tool for cassava maize intercropping in southern Nigeria

Christine Kreye<sup>1</sup>, Charles Chigemezu<sup>2,3</sup>, Pieter Pypers<sup>1</sup>, Adeyemi Olojede<sup>2</sup>, Mutiu Busari<sup>4</sup>, Mark Tokula<sup>2</sup>, Florence Olowokere<sup>4</sup>, Ademola Adebisi<sup>1</sup>, Shola Ejalonibu<sup>2</sup>, Meklit Tariku<sup>1</sup>, Stefan Hauser<sup>1</sup>, Johan Six<sup>3</sup>

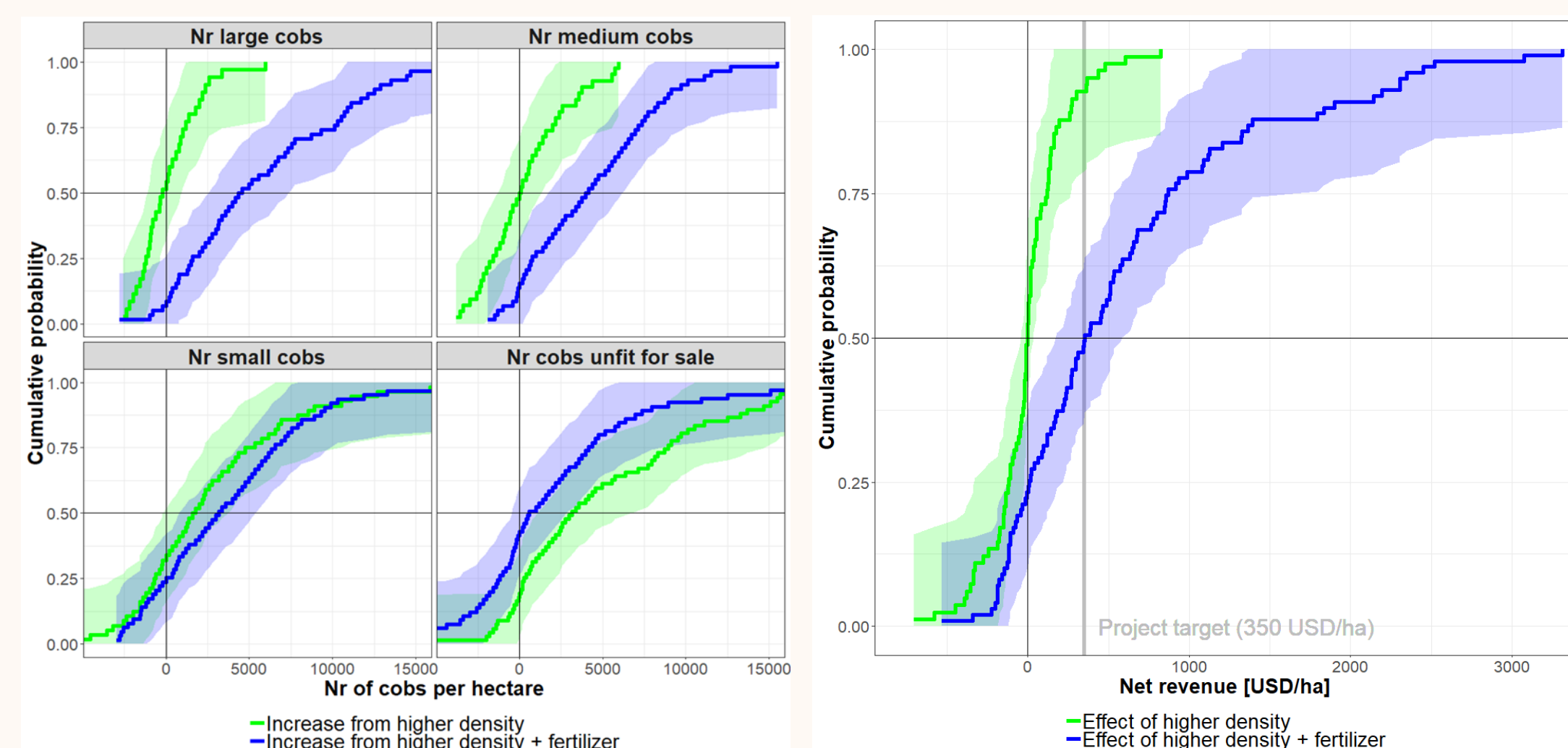
<sup>1</sup> International Institute of Tropical Agriculture (IITA), Nigeria and Kenya; <sup>2</sup> National Root Crops Research Institute (NRCRI), Nigeria; Swiss Federal Institute of Technology, ETH-Zurich, Switzerland; Federal University of Agriculture Abeokuta (FUNAAB), Nigeria



## Introduction

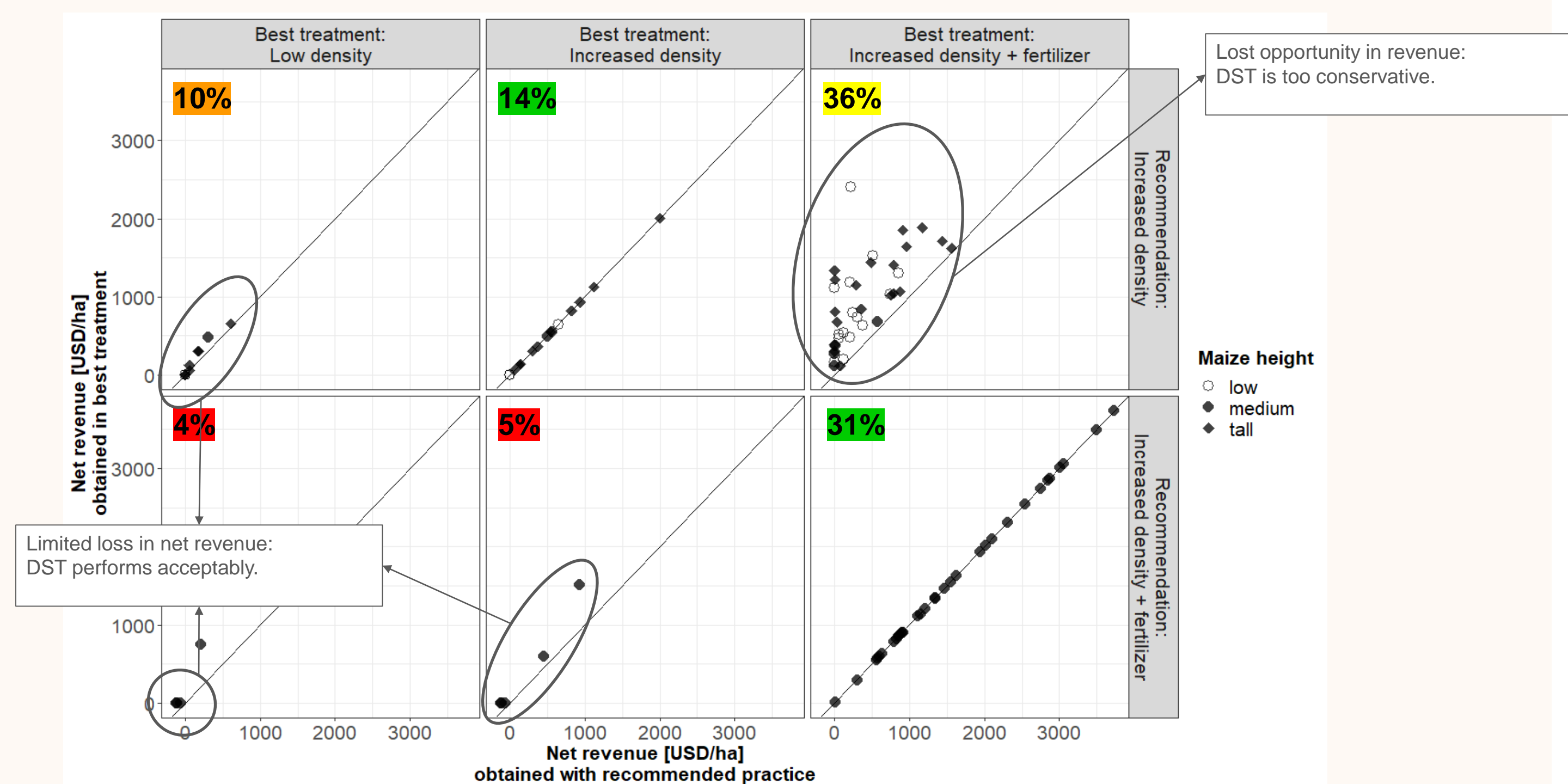
Cassava is a major staple food in Nigeria and often intercropped with maize. However, average yields in Nigeria are low, about 10 t ha<sup>-1</sup>. Thus, farmers request advice on improving cassava-maize cropping. Based on more than 150 researcher and/or farmer managed trials, planted in 2016 and 2017, in Anambra, Benue, Cross River, Ogun and Oyo states, we developed a first version of a decision support tool (DST). It advised on simultaneous planting of both crops, variety choice (erect growth type for cassava and early maturing maize varieties (90 to 95 days), planting density (12500 cassava plants ha<sup>-1</sup>, 40000 maize plants ha<sup>-1</sup>) and fertilizer application. The height of the previous maize crop was a proxy for soil fertility. In 2018, farmers and their extension agents planted 143 validation trials in all 5 states. The extension agent used the DST to derive a specific recommendation. Next, they implemented, 3 plots, testing fertilizer application and maize planting density.

## Results – Maize intercrop



**Figure 1. Cumulative probability of cob numbers and net revenue depending on increased maize planting density only and additional fertilizer application.**

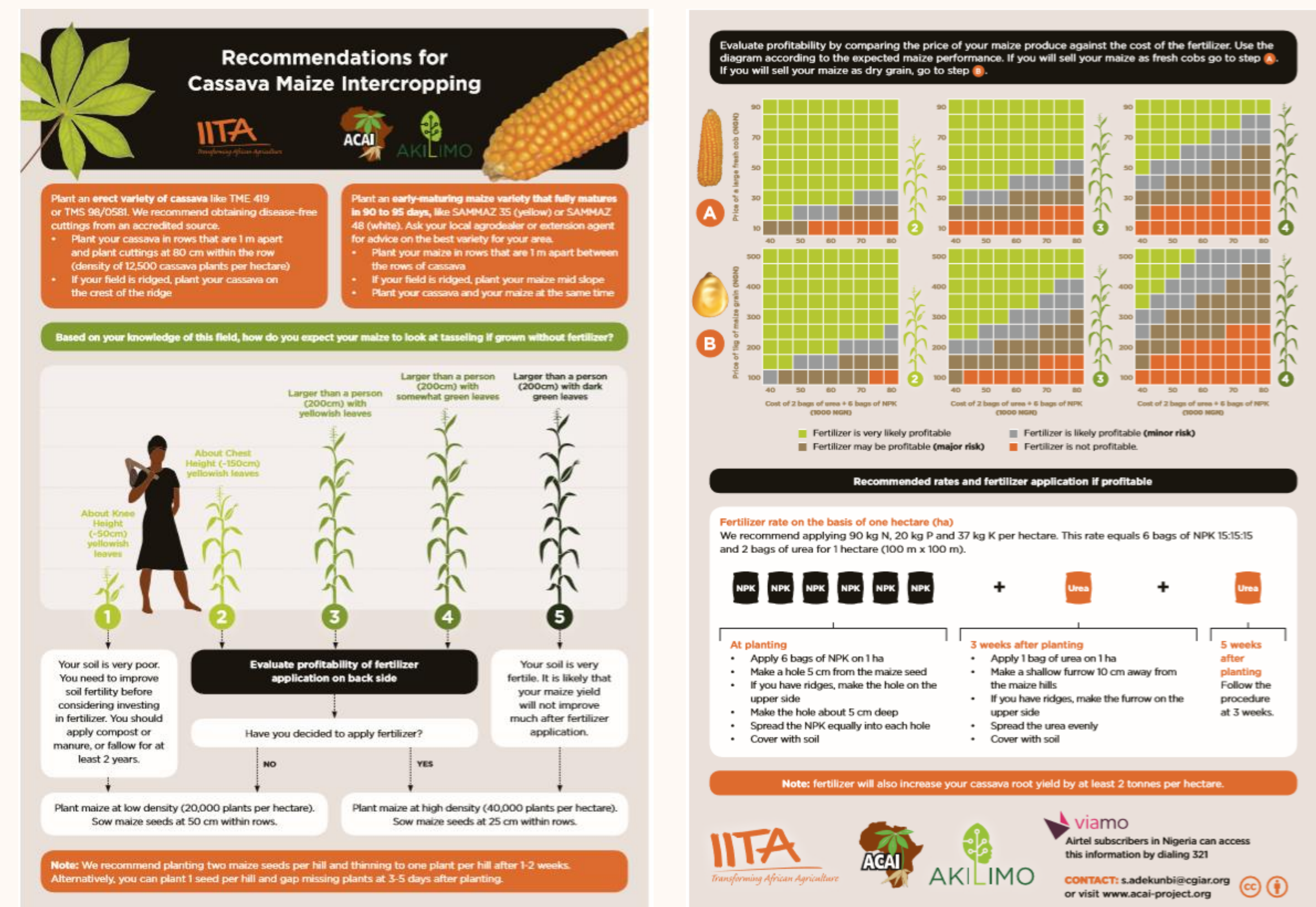
- **Increased density** only does not increase the number of large or medium cobs and did not entail an overall increase in net revenue
- About 25% of farmers have decreased numbers of large and medium cobs from increasing density only, resulting in small decreases of net-revenue.
- **Fertilizer application** to a high density maize crop increases cob numbers, especially **more large and medium cobs** for about 75% of the farmers and net revenue increased significantly. Only a minority (~5%) observed a small negative impact on net revenue.



**Figure 2: Comparison of net revenue obtained through the recommendation by the DST against the real best treatment in the field .**

## Conclusion – revised DST

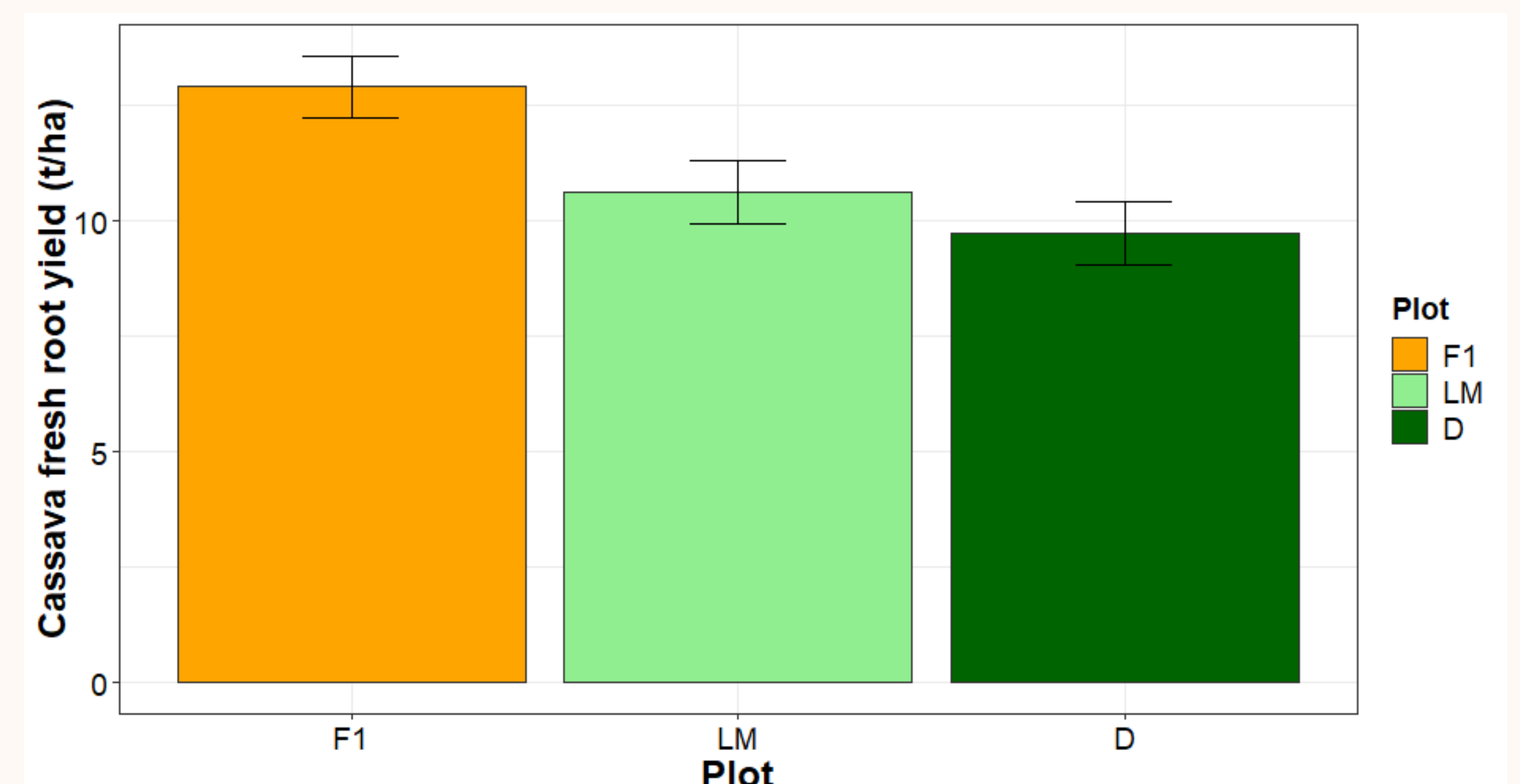
The current revised version of the DST advises planting maize at high density only at sites of high soil fertility or when fertilizer application is recommended. Fertilizer recommendation is coupled with an assessment of height and appearance (including greenness) of a would-be maize crop without fertilizer, fertilizer costs, price expectations for the maize produce and the farmer's risk assessment of the investment into fertilizer.



**Figure 3. Front and back side of the revised paper-based DST.**

## Results - Cassava

Cassava root yield was highest (on average 13 t/ha) at high maize density when fertilizer was applied. Increasing maize density alone reduced cassava root yield by almost 1 t/ha on average.



**Figure 4: Fresh cassava root yield (t ha<sup>-1</sup>) of 99 validation trials in Anambra, Benue, Cross River and Ogun states, harvested in 2019. Error bars indicate the standard error of the mean.**

## Acknowledgement

ACAI is funded by the Bill and Melinda Gates Foundation.

### ACAI Partners

