



## Status update of Indonesia core trial

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### Abstract

The Indonesia core trial has made some land and nursery preparation related progresses during 2019. The existing work in progress now is planting maize to test the inherent soil fertility level of plot, and in parallel, the preparation of amount ca. 1500 banana seedling and ca. 5000 cocoa rootstock in the nursery for both temporary shade and top-grafting early of this year. The cocoa planting is estimated to be done around June/July 2020

**Keywords:** Indonesia core trial, inherent soil fertility, banana, rootstock

### Introduction

Indonesia Coffee and Cocoa Research Institute (ICCRI) in collaboration with Mondelez International Tbk take part in CocoaSoil project to study the nutrient response of cocoa. To follow-up general CocoaSoil consortium programmes, we have established detailed subprogrammes to put into action in our timeline.

Here we present, briefly, the progress of our works in 2019. Some non-technical problems may have occurred to delay couple or works such as the administrative processes in ICCRI, and the unexpected long drought condition occurred last year.



Figure 1. Mechanical land preparation

### Materials and Methods

CocoaSoil project Indonesia core trial is located in Indonesian Coffee and Cocoa Research Institute Kaliwining Experimental Station in Jember, East Java. With 2.1 Ha of irregular shape of area (Fig. 2, left), a 88 number of 15 by 15 m<sup>2</sup> subplots are available for trial.

Land preparation was done through mechanical processes. Deep ploughing was done through a breaking up subsoil structure down to ca. 40 cm depth, also to increase the oxygen access into subsoil. Additionally, a large-sized soil aggregates will be furthermore broken down to facilitate the top soil root growth through an extra top soil ploughing. The final step is harrowing to increase the amount of fine-sized soil structure in the topsoil.

Digital elevation model (DEM) was done to map the topographical variation of plot area. DEM was made by recording the GPS coordinate and altitude point in the plot. The data recorded was transferred into GIS software and interpolated to produce a DEM map. The soil fertility gradient related to soil variability in the field will be taken into account when designing the experiment plots statistically.

Soil sampling has been performed to core both top and subsoil from 88 plots arranged during plot mapping. All samples were brought to the Laboratory, and currently are subject to preparation and chemical analysis.



Figure 2. Digital elevation model of trial plot (left) and soil sampling activity (right)

A maize planting to evaluate the indigeneous soil fertility level of plot was performed. A sweet corn variety "sweet lady", produced by PT. BISI International, Tbk was used since it is more responsive to actual soil fertility level than a non sweet variety. The maize is scheduled to harvest in the early of February 2020, with yield parameters per plot will be recorded such as total cob yield, grain, and weight of stover.

A totally 1500 banana seedlings were prepared in the nursery. The mini-plant (planlet) was prepared through clonal SE propagation in Tissue Culture Laboratory, ICCRI.

The rootstocks ICCRI 08 are prepared in the nursery using a soil less media. Top grafting will be performed on March – April 2020 using MCC 02 as scion.



Figure 3. Rootstock ICCRI 08 (left) and maize crop in the plot trial (right)

### Results and Discussion

The DEM shows altitudinal condition of plot is ranging from 64.20 to 67.04 m a.s.l. The map indicates the highest point occurred in the northern part of plot. The elevation gradient is going from the north to the south. Field measurement demonstrates a less than 3° level of slope for the area in general.

In Indonesia, we experienced a long dry season ca. 7 months in the past year. Consequently, we have had a delay related to maize planting since in the absence of rain giving rise to irrigation water is not available.

Soil sampling was carried out during dry season before maize planting. The two type of sampling, i.e. core sampler for bulk density and bulk sampling for soil nutrient analysis, are performed according to plot layout. Core sampler was used by pressing it into the ground, and for bulk soil sample a soil auger with 1.5 m long was used. The core position from which all samples were taken followed chess-board logic based on consortium protocol. This way a sample group division, i.e. 50% group A (0-30 cm, subset 1), 25% group B (0-30 cm, subset 2), 25% group C (30-60 cm, subset 1), and 12.5% group D (60-90 cm, subset1) are obtained.

Following the maize planting, banana temporary shade will be transferred from the nursery to the field until the cocoa established, ca. 2 years. The rootstock ICCRI 08 is now ready in the nursery, and will be grafted with MCC 02 as scion around March this year. The incoming works include irrigation system installation and DNA test for clone identity confirmation.

### Conclusion

Indonesia CocoaSoil project status of trial now is in the progress of the final-stage for nursery and land preparation. Some delay of our works was happened in 2019 due to the administrative processes and the existence of long drought condition for ca. 7 months. We will continue our work in 2020 with banana shade planting, irrigation system installation, clone identity confirmation using DNA analysis, and top-grafting for seedling before cocoa planting scheduled on June/July.

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