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ATSAF - CGIAR++ Junior Scientists Program Final Report

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Masters` Thesis: Ghana Cocoa Field Report

Morphological characterization of cocoa varieties in different socio-ecological settings in Ghana

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Introduction

This report covers the activities carried-out during the master thesis research field trip to six (6) regions, Eastern, Bono, Ahafo, Ashanti, Central and Western of Ghana between November 2020 and March 2021. The successful research work was possible through the partnership of ATSAF funding organization, Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics (OPATS), University of Kassel and IITA-CGIAR Ghana.

Objectives

- To assess varietal richness per farm and level of homozygosity of cocoa varieties on farms field through morphological analysis.
- To identify existing cocoa varieties in the agroforestry system.
- To compare the impact of technical support from IITA on IITA farmers with non-IITA farmers across cocoa agroforestry system and the role of organic cocoa certification on diversity in cocoa.

Research support of ATSAF

ATSAF funding organization provided the financial support of 4,600 Euros for this research project in Ghana.

Research support of Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics (OPATS), University of Kassel

Deogratias, a PhD student of Organic Plant Production and Agroecosystems Research in the Tropics and Subtropics (OPATS), University of Kassel introduced me to four (4) cocoa growing communities in Suhum Municipality, Eastern Region, Ghana within the first week of my arrival in Ghana. Two (2) communities comprised of organic farms and the other two (2) communities were conventional cocoa farms.

Research support of IITA

IITA-CGIAR Ghana provided the research, logistics and technical support for the field work. Additionally, twelve (12) field technicians of IITA-CGIAR linked me to the farmers in the various regions. These field technicians were employees of different organizations along the cocoa value

chain such as OLAM, Mondelez (Cocoalife), Kuapa Kokoo, and Rockwind/TransRoyal who have direct relationship with cocoa farmers under their supervision.

Dr. Richard Asare, head of IITA-CGIAR Ghana also provided me a working space and support team under the CocoaSoil project at the head office in Accra.

Sampling of farms and farmers

At the end of the field work, 120 cocoa farms and farmers were surveyed in 6 regions of Ghana. Out of the 120 farms and farmers, 40 were organic farms (non-IITA), 40 conventional cocoa farms (non-IITA) and 40 conventional cocoa farms (IITA). IITA farmers were randomly selected from the CocoaSoils farmer list who were distributed in five (5) regions, Bono, Ahafo, Ashanti, Western and Central, Ghana comprising 36 villages. The other organic and conventional non-IITA farmers were also randomly selected within farming communities in Suhum Municipality, Eastern Region, Ghana.

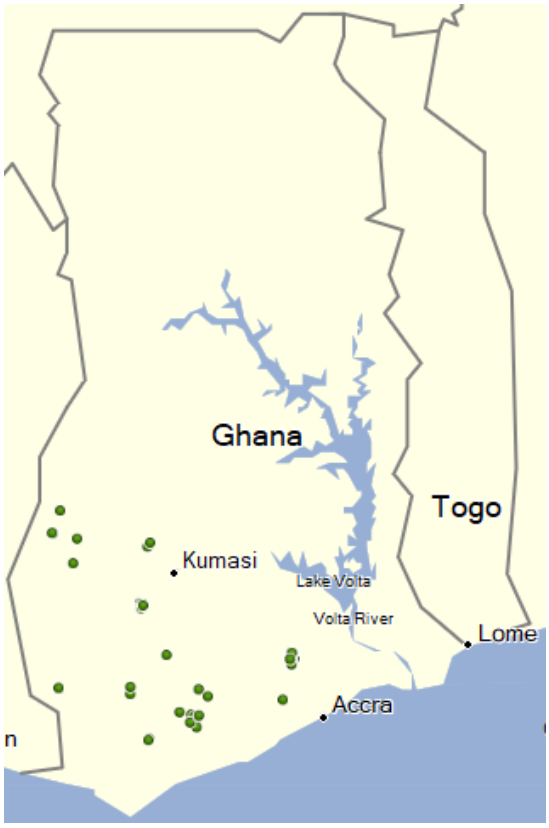


Figure 1: Distribution of cocoa farms visited in Ghana.

Results

In each farm, cocoa varieties were characterized based on their morphological feature such as shape of pod, color of pod, average pods per tree, length and width of pods. In addition, leaf

samples of the various varieties on each farm were sampled, stored in tea filter bags for future genetic analysis to identify the true genotype of diverse cocoa varieties in Ghana. Three (3) replications were used in characterization and sampling of cocoa varieties. Furthermore, farmers were interviews via face-to-face communication either at their homes or on the farms for farmers who were interested in our activities on their farms. Mobile phone communication was implemented for other farmers especially those in gold mining communities like Abore, Ashanti Region, Ghana who were not physically available for the face-to-face interviews. KoboCollect mobile app was used in administering the questionnaire.

(a)

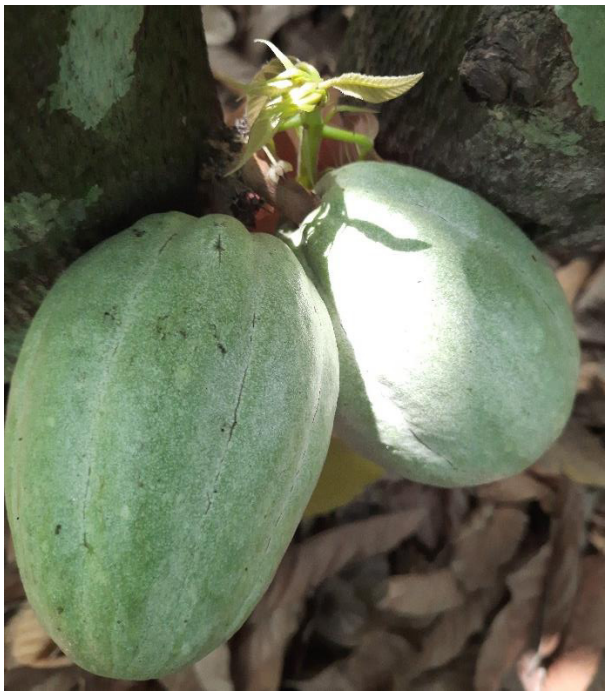
(b)

Figure 2: (a) Interview section with a farmer at Adiepena-Nyametse, Bono Region (b) Characterizing cocoa trees at Supong, Bono Region.

a

b

c



d

Figure 3: Images of four different cocoa varieties based on their morphological characteristics a, b, c, d in Ghana.

Figure 4: Characterized cocoa seeds.

a

b

Figure 5:Cocoa leaf samples a, b.

Conclusion

The on-farm research objectives which were to characterize the different cocoa varieties and sampling of leaf samples across different agroecological zones of Ghana were met. I was also able to familiarize myself with the different aspects of on-farm field work, condensed scientific knowledge to the understanding of cocoa farmers in Ghana who are not highly educated to understand complex scientific terminologies and experienced hand-on activities undertaken in farms. The experiences gain during the field research has given me a better perspective of the

opportunities and challenges within the cocoa sector due to poor characterization of cocoa varieties.

Acknowledgement

I would like to express my sincere gratitude to Prof. A. Bürkert and Dr. M. Wiehle my master thesis supervisors who gave me the golden opportunity to do this wonderful cocoa research. Secondly, I would like to thank Dr. C. Hülsebusch and ATSAF team for the funding. Thirdly, I would also like to thank Dr. R. Asare, Mr. M. Dalaa, Ms. A. Tettey, Deogratias, field technicians and the farmers who supported in finalizing this research work within the time frame.