



Sustainable Agriculture in the Context of High Burden of Disease: A One Health Approach

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**PUBLIC SCIENCE
COLLABORATIVE**



EXECUTIVE SUMMARY

Mapping Cocoa Farms to Support Health and Sustainability in Eastern Uganda

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In July 2025, our research team conducted two weeks of fieldwork in the Busoga region of Eastern Uganda to investigate how cocoa farming practices intersect with environmental and health risks related to mosquito-borne diseases such as malaria. This work builds on a growing body of research that links landscape features and agricultural practices to the transmission of vector-borne diseases, aligning with the One Health framework promoted by the World Health Organization.

We visited 16 farms affiliated with the CSRL farmer network, each with active cocoa production, and conducted semi-structured interviews with farmers and household heads. Our fieldwork revealed that cocoa farmers primarily leave husks to dry or decompose in the fields, where they pose a disease risk to cocoa production and rural families. Farmers reported crop diseases such as black pod rot, and the dispersion of infected husks within the gardens threatens yields. Husk piles expand mosquito breeding and increase the risk of viral diseases such as Zika, Dengue Fever, and West Nile Virus. Farmers have a low awareness of these risks but a high interest in extracting additional value from husks, which indicates a demand for training on alternative disposal methods and husk uses.

We also mapped each of the farms and the Mpirigiti Rural Training Centre. Using ESRI's Field Maps and ArcGIS, we collected geospatial data on farm boundaries, building locations (including homes, latrines, and animal shelters), field characteristics, and potential mosquito breeding sites, such as cocoa pod husk piles and standing water. These data were processed using ArcGIS, R Studio, and Excel to generate detailed maps of each farm.

The 17 maps included in this report visualize key features of each farm, including total acreage, cocoa cultivation area, and proximity of homes to potential health risks. These maps are intended as practical tools for CSRL agronomists, extension agents, and educators. They can support targeted outreach, inform training on sustainable post-harvest practices, and guide the development of demonstration farms that integrate regenerative agriculture and public health principles.

This research initiative demonstrates the potential of social science and data-intensive research to strengthen CSRL programs. By employing participatory, data-informed approaches, such as those enhanced in our field research, we can improve rural livelihoods while also reducing health risks.



Photo of Part of the Field Team

Questions about this project can be directed to the Principal Investigator, Dr. Shawn Dorius:
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FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Mpirigiti Rural Training Centre - 33.1194652°E, 0.9323973°N

Summary: MRTC is a 12.3 acre training centre with a diverse variety of demonstration gardens and livestock. CPH is scattered in the cocoa area.

Site Information

Property area	12.3 acres
Total Farmland area	4.6 acres
Land including cocoa	0.4 acres
Cocoa as % of Property	3.3%
Other crops include maize, grain amaranth, sweet potato, kale, carrots, bananas, mango, eggplant, cassava, jackfruit, coffee, tomato, etc.	

Built Features and CPH disposal

Main house to latrine	110 m
Main house to livestock	70 m
Main house to nearest CPH	120 m
CPH post-harvest Practice	Scattered
Built features include 2 housing facilities, an office, a kitchen, water and waste management systems, storage, livestock pens, garages, etc.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0001 - 33.1325746°E, 0.9751517°N

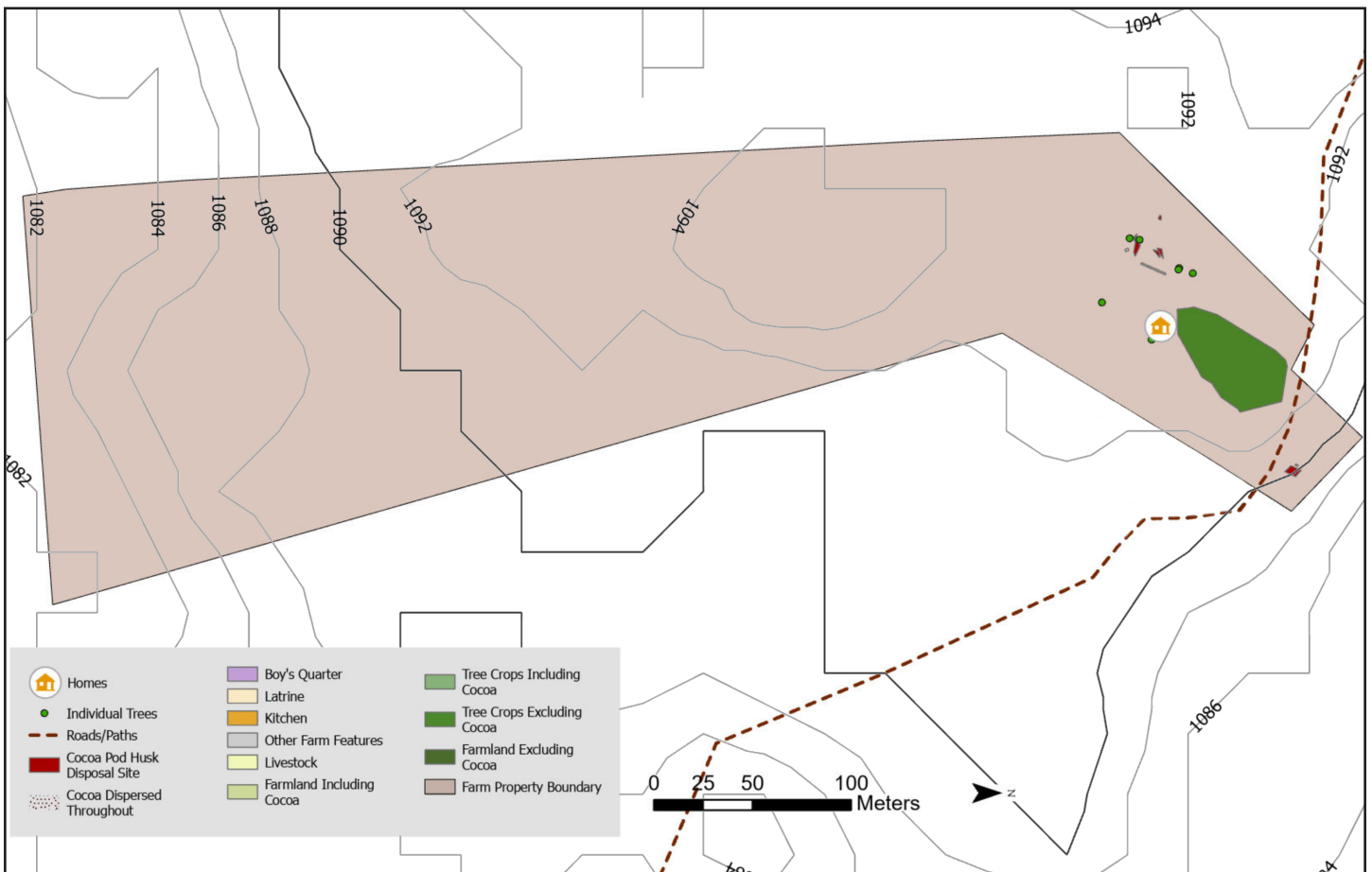
Summary: Site 0001 is a large farm, 24 acres in total. Due to the size of the farm, much of the site is unrecorded, so the data provided may be misleading.

Site Information

Property area	24.0 acres
Total Farmland area	0.4 acres
Land including cocoa	N/A
Cocoa as % of Property	N/A
Other crops include maize, yams, rice, cassava, sweet potatoes, mango, pomegranate, tangerine, avocado, eggplant, orange, coffee, guava, etc.	

Built Features and CPH disposal

Main house to latrine	N/A
Main house to livestock	N/A
Main house to nearest CPH	30 m
CPH post-harvest Practice	Piled
Built features include a house, biogas producer, drying rack, and a cocoa bean grinding machine.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0002 - 33.1333861°E, 0.9746765°N

Summary: Site 0002 is a small farm, largely dedicated to cocoa and coffee production with food intercropped. CPH is piled in one place.

Site Information

Property area	2.0 acres
Total Farmland area	1.7 acres
Land including cocoa	0.88 acres
Cocoa as % of Property	43.5%
Other crops include maize, soybean, yams, cassava, sweet potatoes, pomegranate, mango, avocado, cowpeas, eggplant, etc.	

Built Features and CPH disposal

Main house to latrine	N/A
Main house to livestock	5 m
Main house to nearest CPH	20 m
CPH post-harvest Practice	Piled
Built features include a house, kitchen, goat pen, drying racks, manure shed, animal feeders, washing stand, and a chicken cage.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0003 - 33.1359336°E, 1.0048236°N

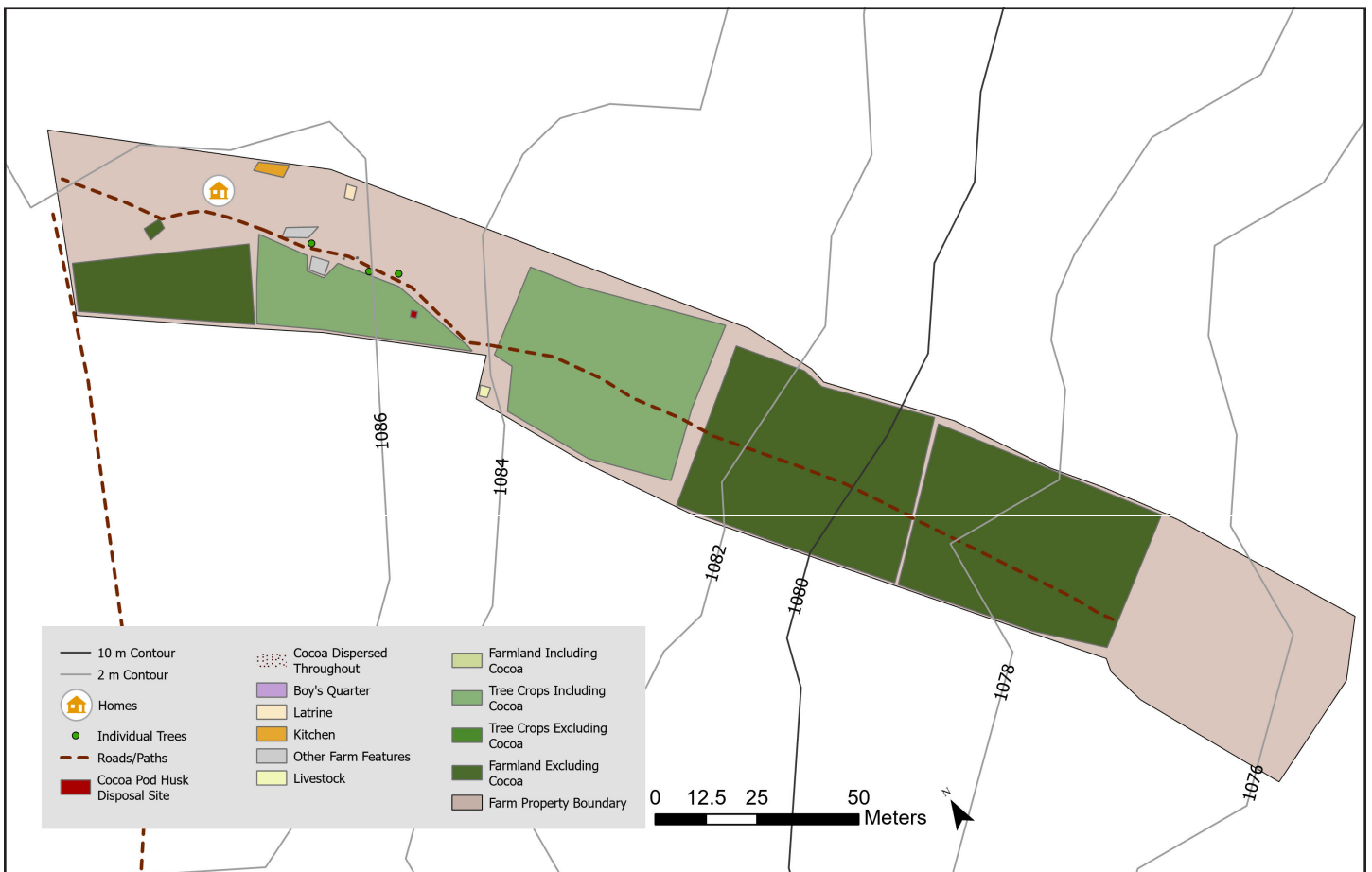
Summary: Site 0003 is a small farm of 3.5 acres. Three CPH piles were recorded on site.

Site Information

Property area	3.5 acres
Total Farmland area	1.9 acres
Land including cocoa	0.6 acres
Cocoa as % of Property	17%
Other crops include maize, sweet potatoes, avocado, coffee, pawpaw, banana, and beans.	

Built Features and CPH disposal

Main house to latrine	30 m
Main house to livestock	80 m
Main house to nearest CPH	30 m
CPH post-harvest Practice	Piled
Built features include a house, kitchen, latrine, mulching and composting, and a pig sty.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0004 - 32.9850229°E, 0.9286443°N

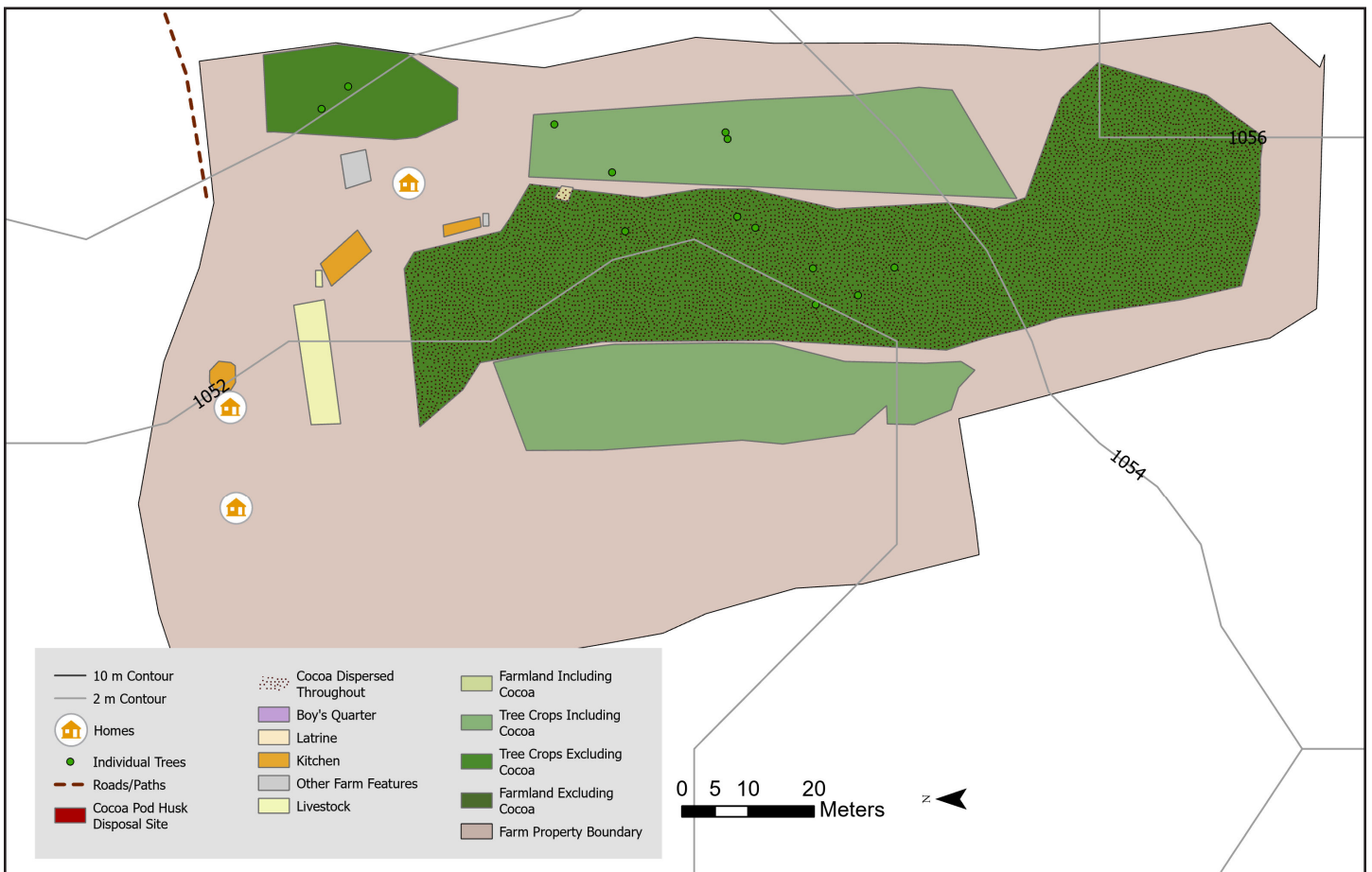
Summary: Site 0003 is a small farm of 3.4 acres. The site has three kitchens, one for the farmer's personal use and two for the CSRL nutrition programme.

Site Information

Property area	3.4 acres
Total Farmland area	1.3 acres
Land including cocoa	0.4 acres
Cocoa as % of Property	12%
Other crops include maize, millet, grain amaranth, yams, cassava, sweet potatoes, mango, avocado, collards, cowpeas, and eggplant, etc.	

Built Features and CPH disposal

Main house to latrine	20 m
Main house to livestock	20 m
Main house to nearest CPH	10 m
CPH post-harvest Practice	Scattered
Built features include 3 houses, a latrine, 3 kitchens, a storage shed, and a bathroom.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0005 - 32.9863743°E, 0.9611997°N

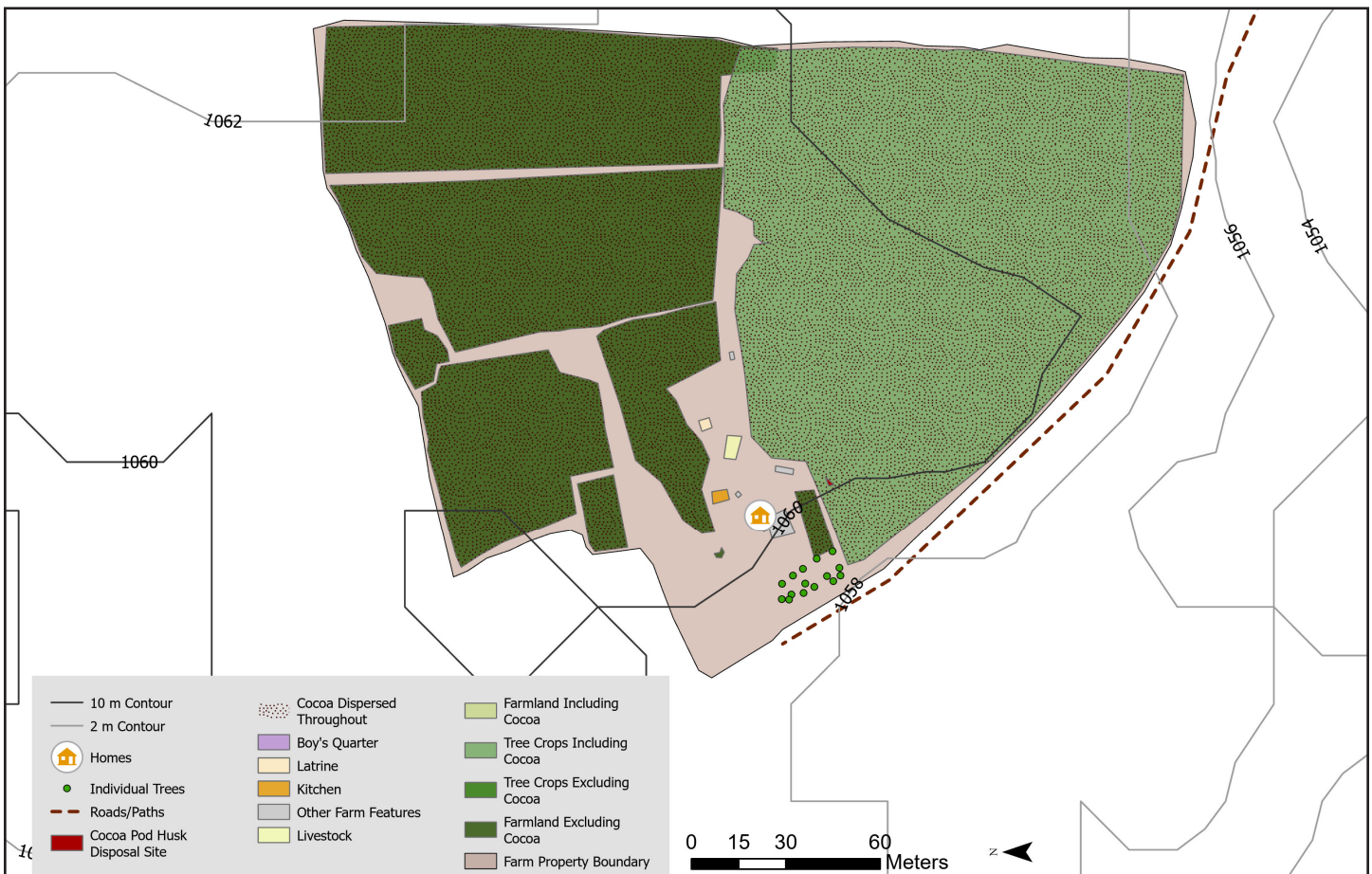
Summary: Site 0005 is a medium to large farm of 9.8 acres. The farm features solar power, wells, irrigation, and a grain-cleaning machine.

Site Information

Property area	9.8 acres
Total Farmland area	8.1 acres
Land including cocoa	4.3 acres
Cocoa as % of Property	44%
Other crops include maize, soybean, amaranth, cassava, mango, avocado, eggplant, orange, coffee, guava, pawpaw, tomato, etc.	

Built Features and CPH disposal

Main house to latrine	30 m
Main house to livestock	20 m
Main house to nearest CPH	10 m
CPH post-harvest Practice	Scattered
Built features include a house, kitchen, latrine, solar-powered water well, water tanks, grain-cleaning machine, and a food distribution shed.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0006 - 33.0029788°E, 0.9536176°N

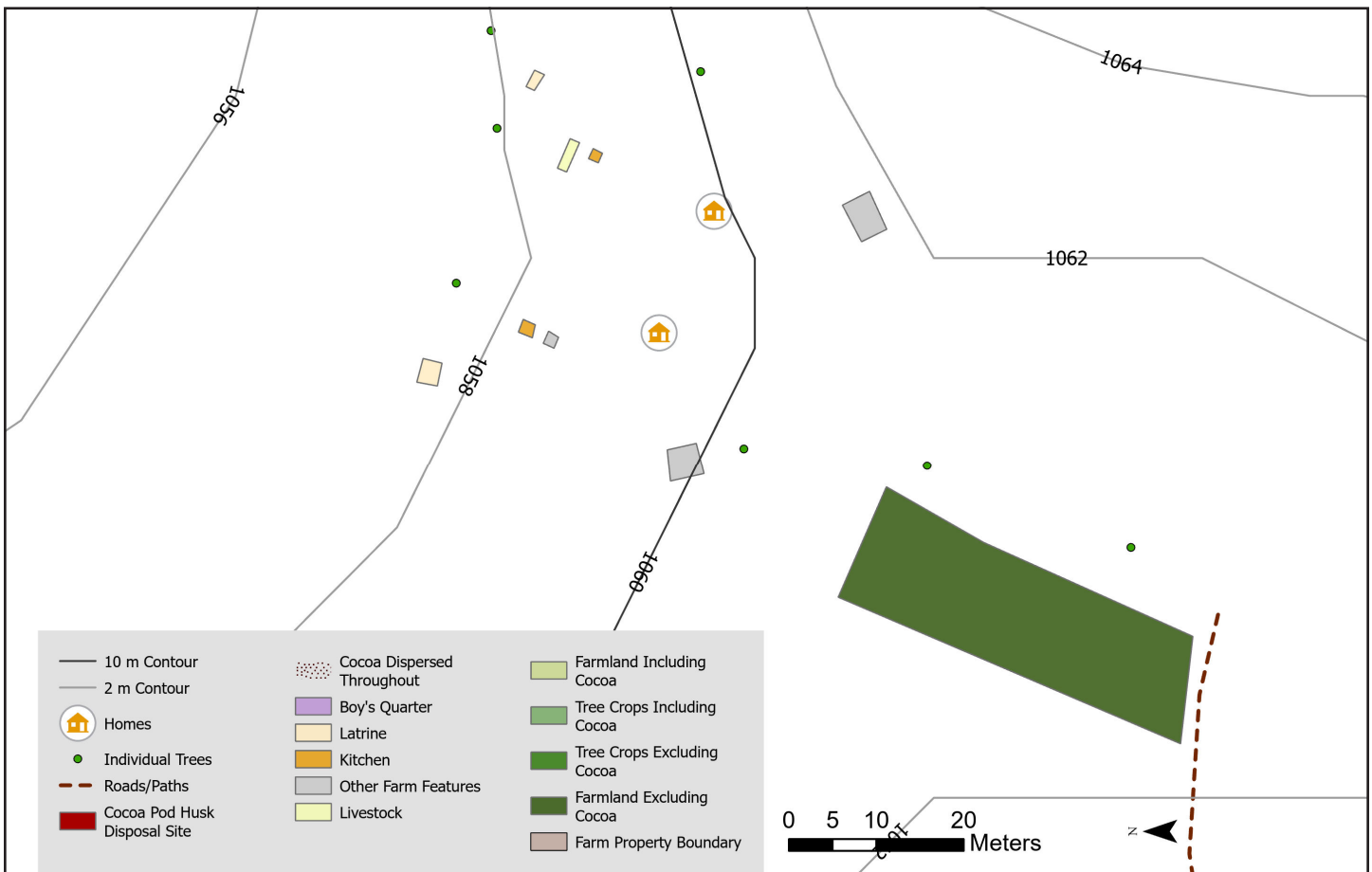
Summary: Due to technical difficulties, site 0006 is largely unrecorded. Much of the data presented was digitized from on-site sketches.

Site Information

Property area	N/A
Total Farmland area	0.1 acres
Land including cocoa	N/A
Cocoa as % of Property	N/A
Other crops include maize, millet, yams, cassava, sweet potatoes, mango, mushroom, avocado, orange, coffee, sugarcane, etc.	

Built Features and CPH disposal

Main house to latrine	20 m
Main house to livestock	20 m
Main house to nearest CPH	N/A
CPH post-harvest Practice	N/A
Built features include 2 houses, goat sty, 2 kitchens, 2 latrines, wash stand, and storage.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0007 - 33.0834815°E, 0.9348887°N

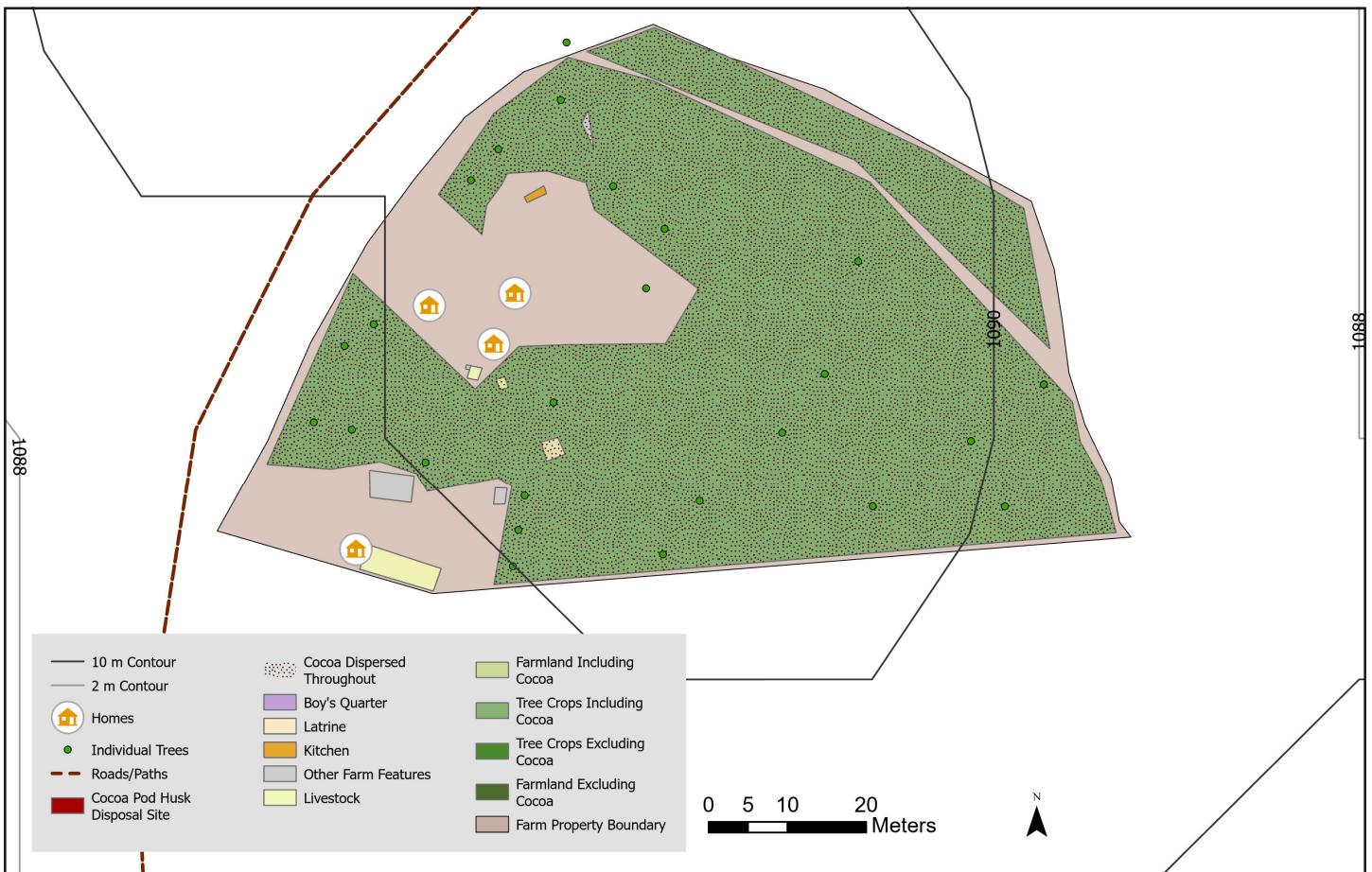
Summary: Site 0007 is a small farm of 1.4 acres, largely devoted to intercropped cocoa and coffee production.

Site Information

Property area	1.4 acres
Total Farmland area	1 acre
Land including cocoa	1 acre
Cocoa as % of Property	71%
Other crops include maize, soybean, yams, cassava, sweet potatoes, amaranth, pomegranate, mango, avocado, eggplant, collards, etc.	

Built Features and CPH disposal

Main house to latrine	20 m
Main house to livestock	10 m
Main house to nearest CPH	5 m
CPH post-harvest Practice	Scattered
Built features include 4 houses, fermentation shed, kitchen, latrine, washroom, chicken coop, storage, rubbish pit, and pigeon/duck coop.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0008 - 33.0626194°E, 0.9245233°N

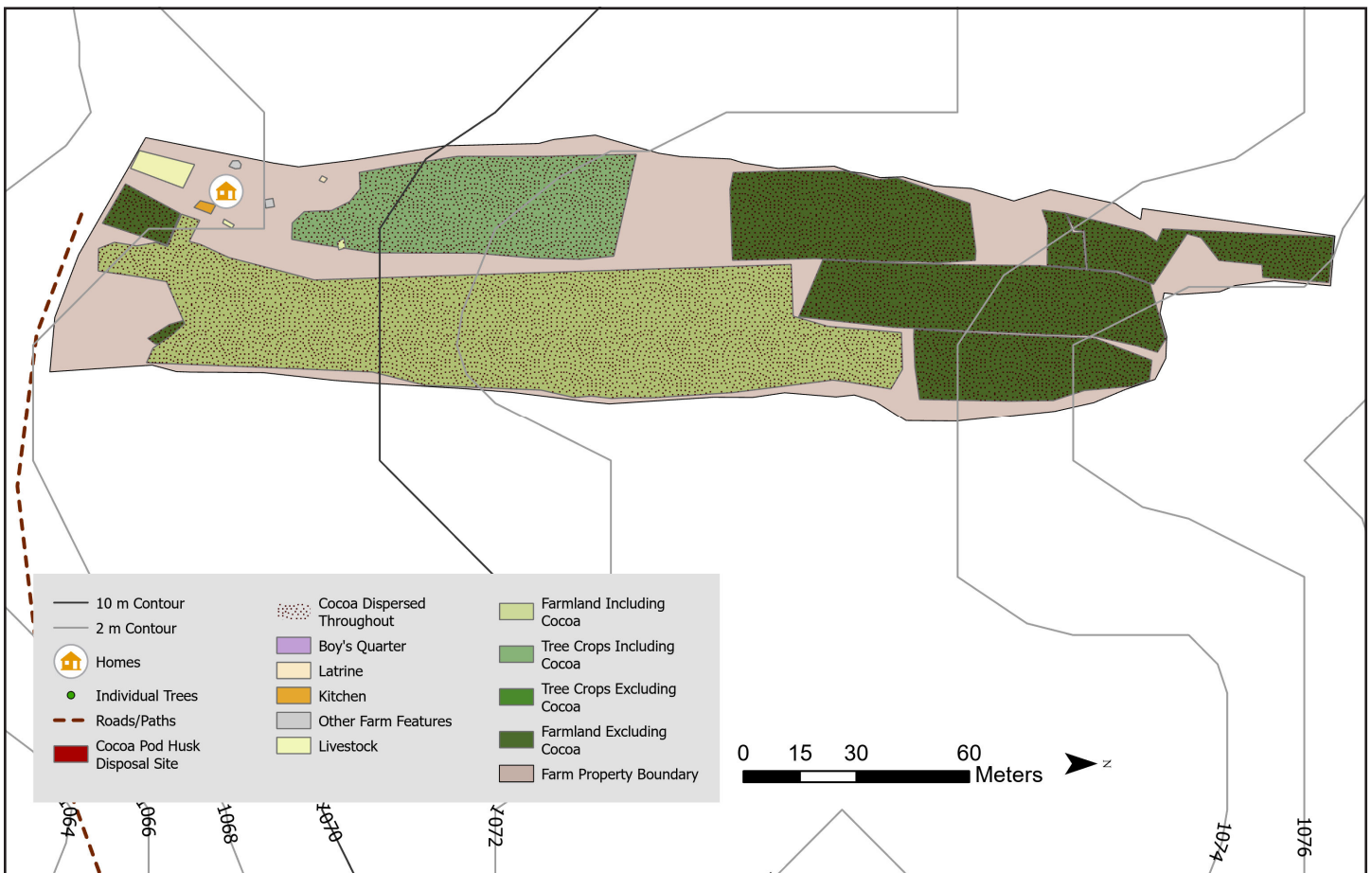
Summary: Site 0008 is a small farm of 4.5 acres, with a wide variety of food and cash crops.

Site Information

Property area	4.5 acres
Total Farmland area	3.1 acres
Land including cocoa	1.9 acres
Cocoa as % of Property	42%
Other crops include maize, soybean, millet, amaranth, sweet potatoes, cassava, yams, rice, mango, cowpeas, avocado, orange, etc.	

Built Features and CPH disposal

Main house to latrine	20 m
Main house to livestock	5 m
Main house to nearest CPH	10 m
CPH post-harvest Practice	Scattered
Built features include a house, kitchen, goat pen, wash room, water tank, latrine, and a pig sty.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0009 - 33.0471715°E, 0.9554336°N

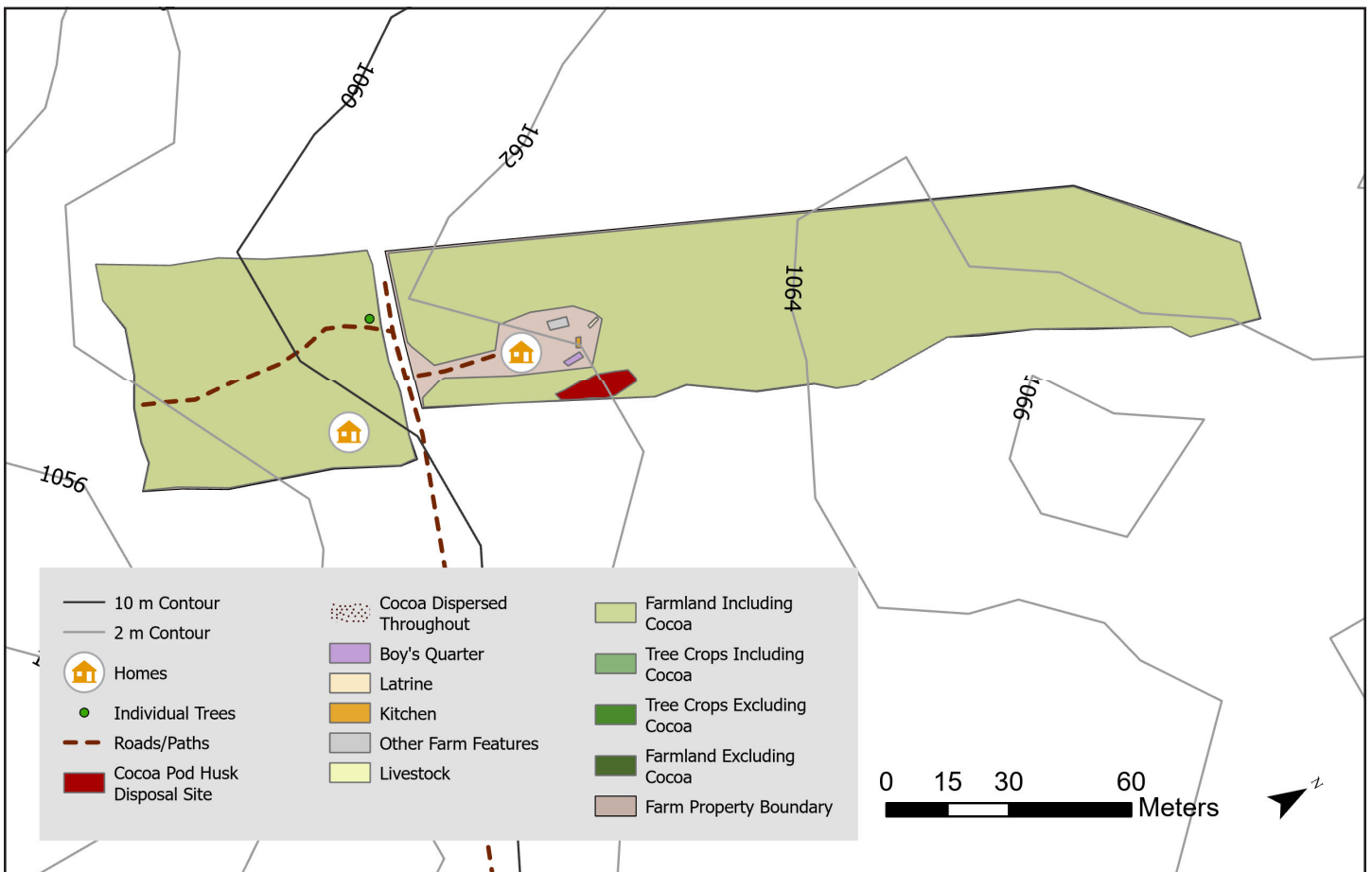
Summary: Site 0009 is a small farm of 2.8 acres. CPH are gathered into a large pile near the home.

Site Information

Property area	2.8 acres
Total Farmland area	2.6 acres
Land including cocoa	2.6 acres
Cocoa as % of Property	93%
Other crops include maize, cassava, sweet potatoes, yams, rice, mango, avocado, orange, coffee, sugarcane, guava, pawpaw, pineapple, etc.	

Built Features and CPH disposal

Main house to latrine	20 m
Main house to livestock	N/A
Main house to nearest CPH	10 m
CPH post-harvest Practice	Scattered
Built features include a house, boy's quarter, latrine, storage, and a kitchen.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0010 - 33.1225864°E, 1.0376009°N

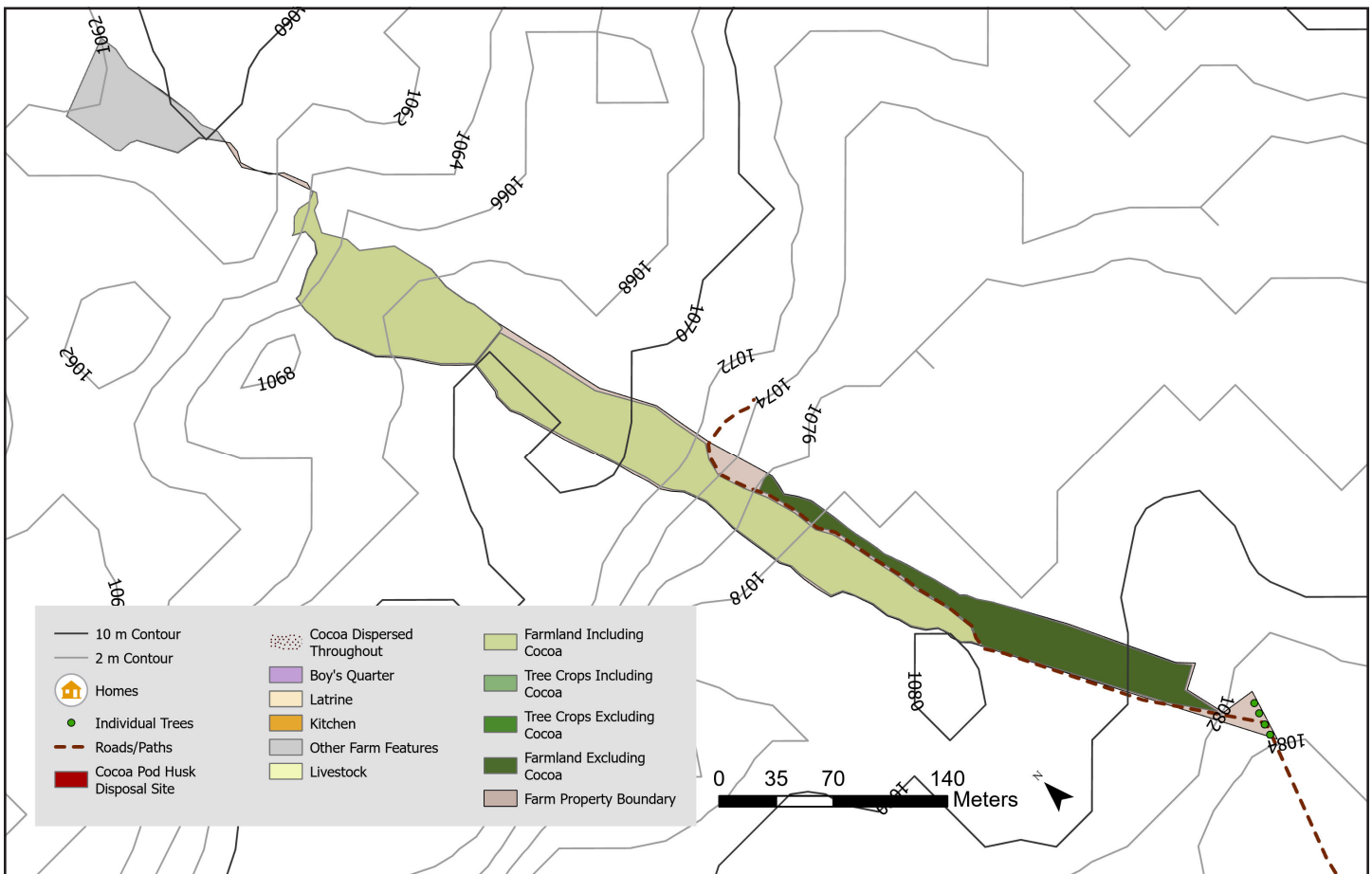
Summary: Site 0010 is a medium farm of 5.9 acres. The farm documented and homestead are on separate plots.

Site Information

Property area	5.9 acres
Total Farmland area	5.9 acres
Land including cocoa	4.1 acres
Cocoa as % of Property	70%
Other crops include maize, soybeans, yams, cassava, sweet potatoes, rice, avocado, mango, tangerine, cowpeas, orange, coffee, etc.	

Built Features and CPH disposal

Main house to latrine	N/A
Main house to livestock	N/A
Main house to nearest CPH	N/A
CPH post-harvest Practice	N/A
Built features include irrigation.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0011 - 33.1335237°E, 0.6439735°N

Summary: Site 0011 is a small farm of 1.9 acres. CPH is dispersed throughout the entire site, including near the home.

Site Information

Property area	1.9 acres
Total Farmland area	1.7 acres
Land including cocoa	1.7 acres
Cocoa as % of Property	89%
Other crops include yams, cassava, sweet potatoes, mango, avocado, coffee, banana, jackfruit, and garden egg.	

Built Features and CPH disposal

Main house to latrine	30 m
Main house to livestock	N/A
Main house to nearest CPH	5 m
CPH post-harvest Practice	Scattered
Built features include a house, wash room, and a latrine.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0012 - 33.1351130°E, 0.6384694°N | 33.1366837°E, 0.6435815°N

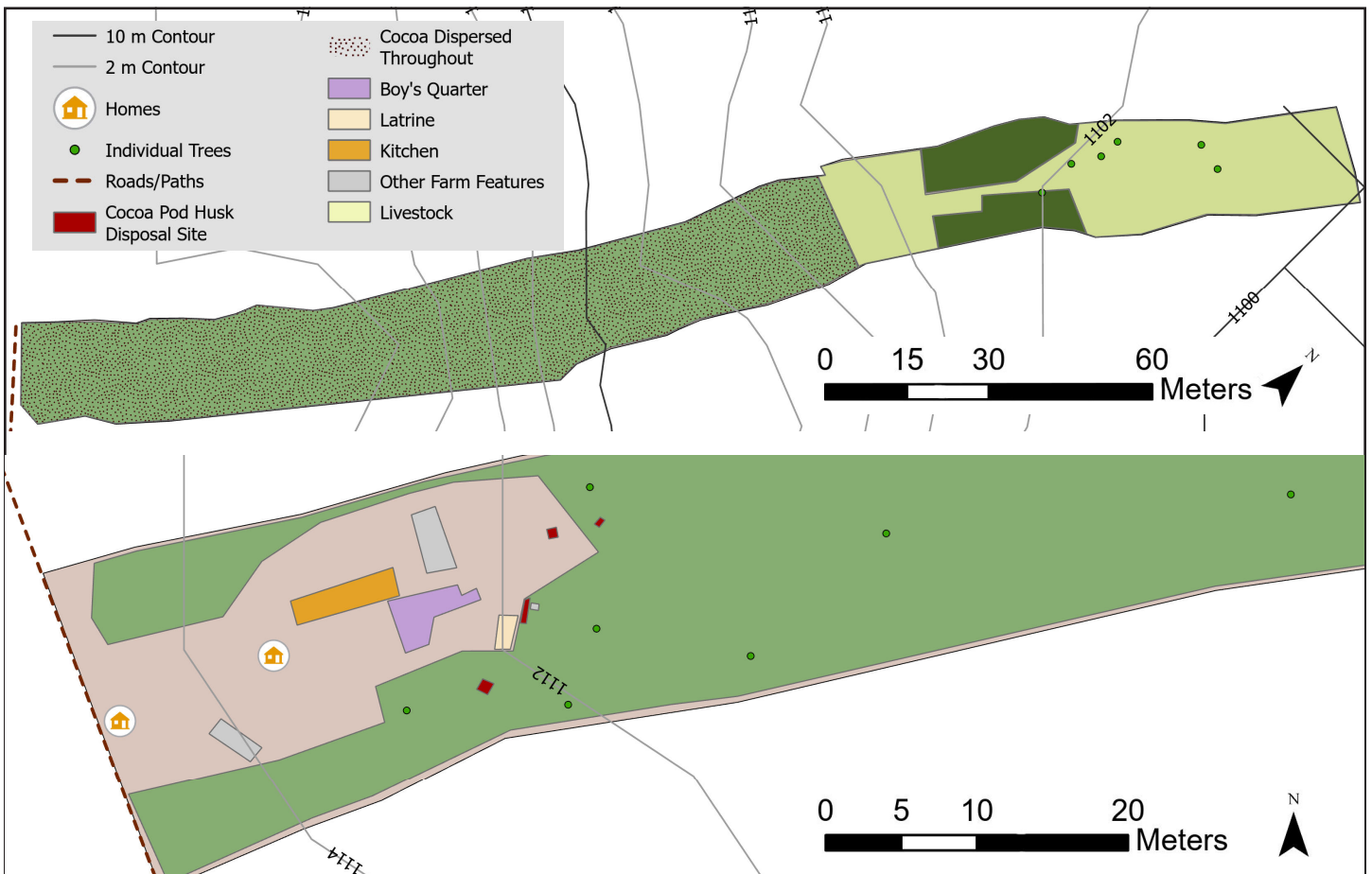
Summary: Site 0012 is a small farm, split between two plots. All data given below is an aggregate of both plots. CPH is both piled and scattered.

Site Information

Property area	4.9 acres
Total Farmland area	4.6 acres
Land including cocoa	3.6 acres
Cocoa as % of Property	73%
Other crops include maize, millet, cassava, sweet potatoes, rice, mango, avocado, orange, coffee, sugarcane, banana, etc.	

Built Features and CPH disposal

Main house to latrine	20 m
Main house to livestock	500 m
Main house to nearest CPH	20 m
CPH post-harvest Practice	Both
Built features include 2 houses, kitchen, latrine, brick oven, boy's quarter, and a boiler.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0013 - 33.1117395°E, 0.8839555°N

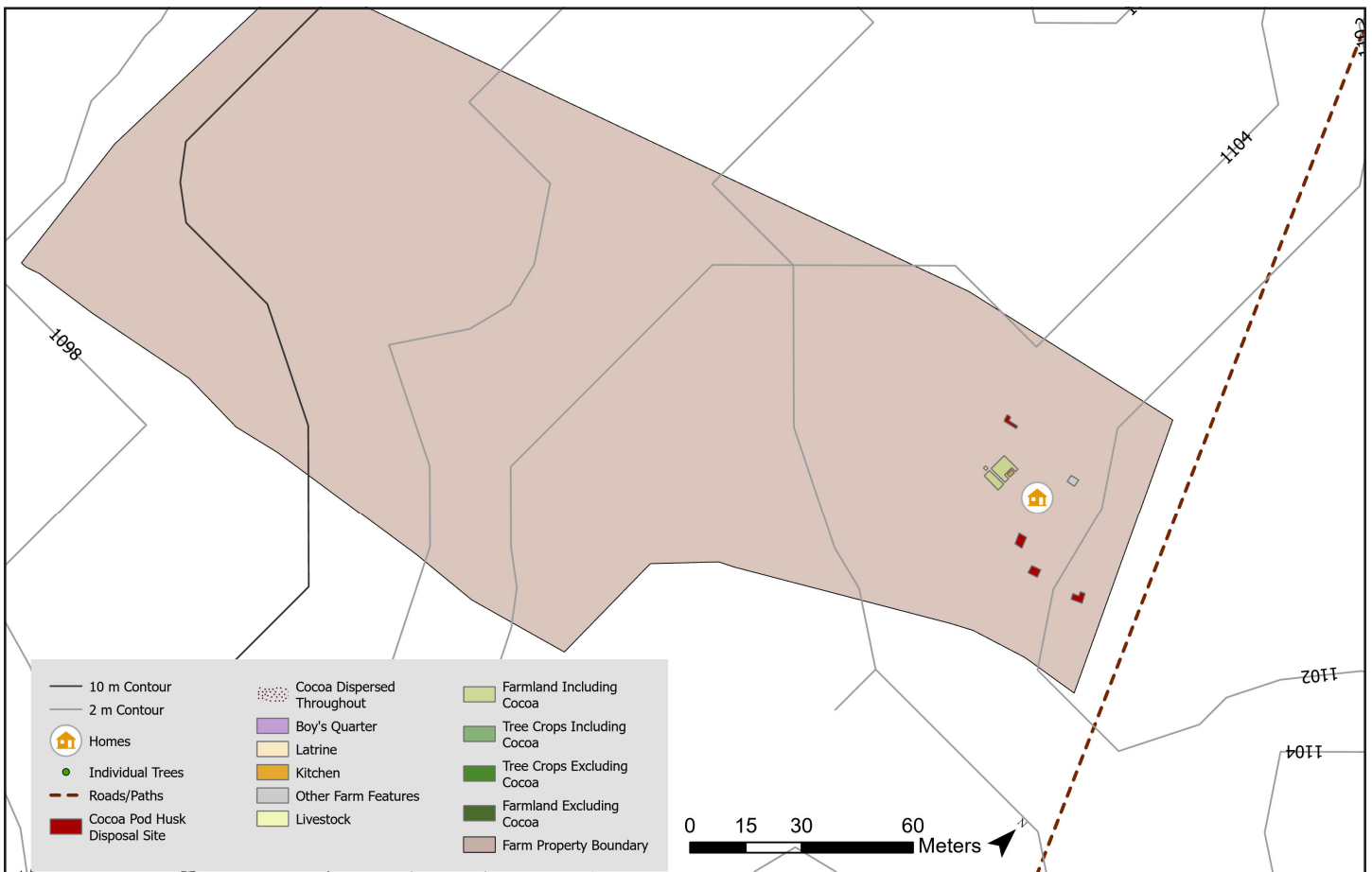
Summary: Site 0013 is a medium site of 7.6 acres. This site is a nursery, growing cocoa seedlings. Due to technical difficulties, the site is mostly undocumented.

Site Information

Property area	7.6 acres
Total Farmland area	N/A
Land including cocoa	N/A
Cocoa as % of Property	N/A
Other crops include cassava, mango, avocado, eggplant, orange, coffee, guava, pawpaw, banana, and groundnuts.	

Built Features and CPH disposal

Main house to latrine	15 m
Main house to livestock	N/A
Main house to nearest CPH	10 m
CPH post-harvest Practice	Piled
Built features include cocoa seedling nurseries, house, latrine, sugarcane manure production, and kitchen.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0014 - 33.3124282°E, 0.5737239°N

Summary: Site 0014 is a medium farm with many unique operations, including biogas production, irrigation, and raising cattle, rabbits, goats, and chickens.

Site Information

Property area	5.5 acres
Total Farmland area	4.6 acres
Land including cocoa	0.3 acres
Cocoa as % of Property	5.5%
Other crops include maize, soybean, amaranth, yam, cassava, sweet potato, pomegranate, rice, mango, avocado, eggplant, orange, etc.	

Built Features and CPH disposal

Main house to latrine	15 m
Main house to livestock	30 m
Main house to nearest CPH	15 m
CPH post-harvest Practice	Scattered
Built features include a house, garage, office, cattle pens, chicken coops, goat pens, biogas production, water tanks, irrigation, kitchen, etc.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0015 - 33.1254087°E, 1.0719291°N

Summary: Site 0015 is a medium farm of 7.6 acres. CPH is scattered throughout all cultivated land.

Site Information

Property area	7.6 acres
Total Farmland area	6.2 acres
Land including cocoa	1.2 acres
Cocoa as % of Property	16%
Other crops include maize, amaranth, yams, cassava, sweet potatoes, pomegranate, mango, tangerine, avocado, cowpeas, eggplant, etc.	

Built Features and CPH disposal

Main house to latrine	N/A
Main house to livestock	N/A
Main house to nearest CPH	20 m
CPH post-harvest Practice	Scattered
Built features include a house.	





FARM CHARACTERISTICS

COCOA FARMS IN BUSOGA SUB-REGION

Site 0016 - 33.0619726°E, 0.9326373°N

Summary: Site 0016 is a small farm of 4.3 acres. CPH is collected into one pile near the home.

Site Information

Property area	4.3 acres
Total Farmland area	3.4 acres
Land including cocoa	3.4 acres
Cocoa as % of Property	80%
Other crops include maize, soybean, amaranth, sweet potatoes, rice, mango, tangerine, avocado, collards, cowpeas, eggplant, orange, etc.	

Built Features and CPH disposal

Main house to latrine	30 m
Main house to livestock	20 m
Main house to nearest CPH	30 m
CPH post-harvest Practice	Piled
Built features include a house, latrine, water tank, gazebo, storage, wash room, doghouse, chicken coop, and pig sty.	

