



## Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program

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### **Trip Report: Haiti** Aug. 9, 2011 – Aug. 20, 2011

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- Purpose of Trip:**
1. To pre-test soil sampling methodologies for soil survey of 100 km<sup>2</sup> area of Central Plateau and eventual development of soil fertility/fertilizer recommendations for the area; and
  2. To assess logistical requirements and develop strategies for implementing the aforementioned soil survey.

**Sites visited:** Cange, Corporant, Lachateau, and Bois Joli, Haiti.

#### **Executive Summary:**

Soil sampling methodologies were pre-tested for future soils research to determine soil fertility status on smallholder farms in Haiti's Central Plateau. It was determined that methods developed prior to arrival were inappropriate for the soils present in Haiti. Because soils were extremely rocky, it was decided that composite soil samples will be obtained by excavation with hand-shovel to a depth of 10 cm, while the "clod" method will be used for bulk density samples. Data will also be acquired on field area, slope, field aspect, as well as crop species density and diversity. Implementation of pre-tested methods is scheduled to begin in May 2012.

#### **Description of activities**

Upon arrival in Haiti on August 9, we were transported immediately from the airport, just north of Port-au-Prince, to Cange in the Central Plateau. We arrived at the Partners in Health (PIH) facility in Cange and were met by Nathan Kennedy, GRA at Virginia Tech and leader of the household economic survey, with which we are collaborating on the soil survey. We also met with Gillaine Warne, Director of Zanmi Agrikol, and discussed our plans for the soil survey. Gillaine was supportive of our plans to develop fertilizer recommendations and suggested that after the survey was conducted, each farmer included ought to receive a report on their fields'

fertility status and perhaps fertilizer recommendations. The need to eventually make fertilizer more available in the Central Plateau was also discussed. We discussed our concerns regarding project oversight and the need to have competent agronomists overseeing the project in our absence. Gillaine also briefed us on Zanmi Agrikol's activities in the Central Plateau, which include the building of a school for agriculture and construction, an irrigated vegetable garden that Gillaine requested we analyze for water quality, and collaboration with UGA (David Kissel) to help build a soils lab in Cange.



Figure 1. Evidence of 2:1 clays.

We travelled with Gillaine to the aforementioned school (under construction) in Corporant, which is also the site of the one of the maize variety trials run by Virginia Tech in the Central Plateau. We visited another VT maize trial in Lachateau. Both maize plots appeared to be doing well. Gillaine also indicated that the black beans from the Virginia Tech-implemented trials were in demand by local farmers.

After visiting the school and maize trials, we pre-tested our methods in the fields of households included in the VT household economic survey in the Corporant area. The pre-test soil sampling made it clear that our methods would need to be altered in order obtain accurate data in a reasonably expedient manner. Originally, we had planned to composite soil samples to a depth of 10 cm using probes. Bulk density samples were to be obtained using three-inch steel rings, driven into the ground with a hand-sledge on plastic cutting boards to cover the rings. Other data to be collected included field location and area (using GPS), slope (%), aspect, soil conservations utilized, and a total carbon budget for all fields.

However, the rockiness made it impossible to probe to 10 cm without hitting rocks. We therefore decided to employ the “trowel and slice” method for composite soil sampling, which involved excavating the soil to a depth of 10 cm using a hand trowel, then a 2.5 x 2.5 x 10 cm section of soil was removed from the excavated face with a knife. Bulk density should be obtained using the “clod,” which similarly involves excavating the soil to the appropriate depth and removing intact clod of soil from ~5 cm deep in the soil profile. We also determined that developing total carbon budgets for fields in Haiti would be excessively time-consuming and therefore not feasible. We decided to instead include measures of crop density and diversity, which will be ascertained by taking five 4 m<sup>2</sup> transects from random locations in a given field. Transect locations will be determined by sampling in a ‘W’ pattern, as with composite soil sampling.

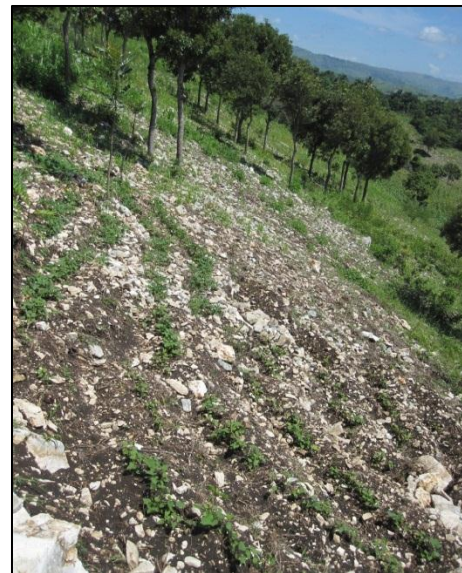


Figure 2. Example of typical field slope and stoniness. While some fields are better than this, others are far worse.



**Figure 3. Example of soil conservation practices, called 'mi-sek', near Bois Joli.**

Subsequently, we travelled with Nathan Kennedy to Bois Joli for reconnaissance in advance of Nathan's economic survey of households in the area. Nathan spoke with community members and arranged for food and lodging to be provided at a local school. In tandem with Nathan and his team of enumerators, we also participated in a community meeting, explaining the objectives of the economic and soil surveys. We stayed for two nights at the school in Bois Joli, and conducted sampling for two fields from a household in the area. However, one of the two fields was fairly remote and we were unable to obtain all our data due to time and weather constraints.

Ultimately, we were able to obtain composite and bulk density samples for two households in the Central Plateau for five total fields. We were also able to take point samples from eight locations, obtaining bulk density samples for all but one of these. Subsamples of the 13 composite and point

samples will be shipped to Dr. David Kissel at the University of Georgia in order to compare analytical results.

It should be noted that conducting a soil survey in Haiti's Central Plateau represents several logistical difficulties. First among these are topography and climate - the Central Plateau is characterized by extremes in relief that make certain areas physically difficult to access, with temperatures in the area averaging 35° C (95° F) in the shade. Therefore, in order to conduct field work in remote parts of the Central Plateau, one must be in good physical health and should bring sleeping pad, blanket or sleeping bag, mosquito coils or net, iodine tablets, warm clothes, and oral rehydration salts. The latter cannot be over-emphasized. Also, as English is rarely spoken amongst Haitians, knowledge of Haitian Creole is a necessity for communicating with both farmers and personnel from collaborating institutions.

Due to the foregoing logistical concerns, it will be necessary to send Mike Graham, GRA in OIRED/CSES to provide oversight on the soil survey and ensure the scientific integrity of data collected. Mike will need to learn Creole and will be charged with managing the soil survey, as well as a potential cover crop trial. We will recruit a field team of at least three people to conduct the soil survey, while a fourth person may be hired to perform laboratory work (soil sieving, particle-size analysis, bulk density, and nutrient analysis, if possible). Specific people that may be considered for these positions include Jean-Philippe Dorzin of Zanmi Agrikol and Maderas, a FAMV student and member of Nathan Kennedy's economic survey team. We are also considering hiring Zanmi Agrikol-affiliated farm hands and agricultural extensionists. Laboratory analyses will be conducted in country to the extent possible, depending on the status of the lab under construction by affiliates of the University of



**Figure 4. 'Mi-sek' up close.**

Georgia, with whom we will be in close contact going forward. As previously mentioned, Dr. Kissel, from UGA, is working with Graham Huff (League of Hope) to build a soils lab in Cange, and we are assisting with this effort. Once complete, we hope to build in-country capacity by running as many analyses as possible in Cange. A lab technician has not yet been identified, but Jean Philippe Dorzin is currently a leading candidate.

**Suggestions, Recommendations, and/or Follow-up Items:**

- We will send subsamples to Dr. David Kissel at University of Georgia.
- Mike Graham will need to learn Haitian Creole and may need to travel to Haiti or elsewhere for language “immersion” prior to conducting the soil survey.
- We will need to be in contact with the University of Georgia team to coordinate efforts and determine status of the laboratory under construction.
- We will run routine soil analysis and calculate bulk density values for samples collected.
- We will be in contact with Gillaine Warne and Nathan Kennedy to coordinate field activities and recruit personnel for soil survey and lab work in Summer 2012.
- Water samples for the Zamni Agrikol drip irrigation system will be analyzed.
- We emphasize that to conduct field work in remote parts of the Central Plateau, one must be in good physical health and should bring sleeping pad, blanket or sleeping bag, mosquito coils or net, iodine tablets, warm clothes, and oral rehydration salts. The latter cannot be over-emphasized.

**Training Activities Conducted**

None.

**List of Contacts Made:**

Name	Title/Organization	Contact Info (address, phone, email)
Gillaine Warne	Director, Zanmi Agrikol	<a href="mailto:ggghaiti@yahoo.com">ggghaiti@yahoo.com</a> , 509-38-74-4410 (Haiti), 864-232-8274 (US)
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Dr. David Kissel	UGA Soils Lab Director	706-542-2550, <a href="mailto:dkissel@uga.edu">dkissel@uga.edu</a>

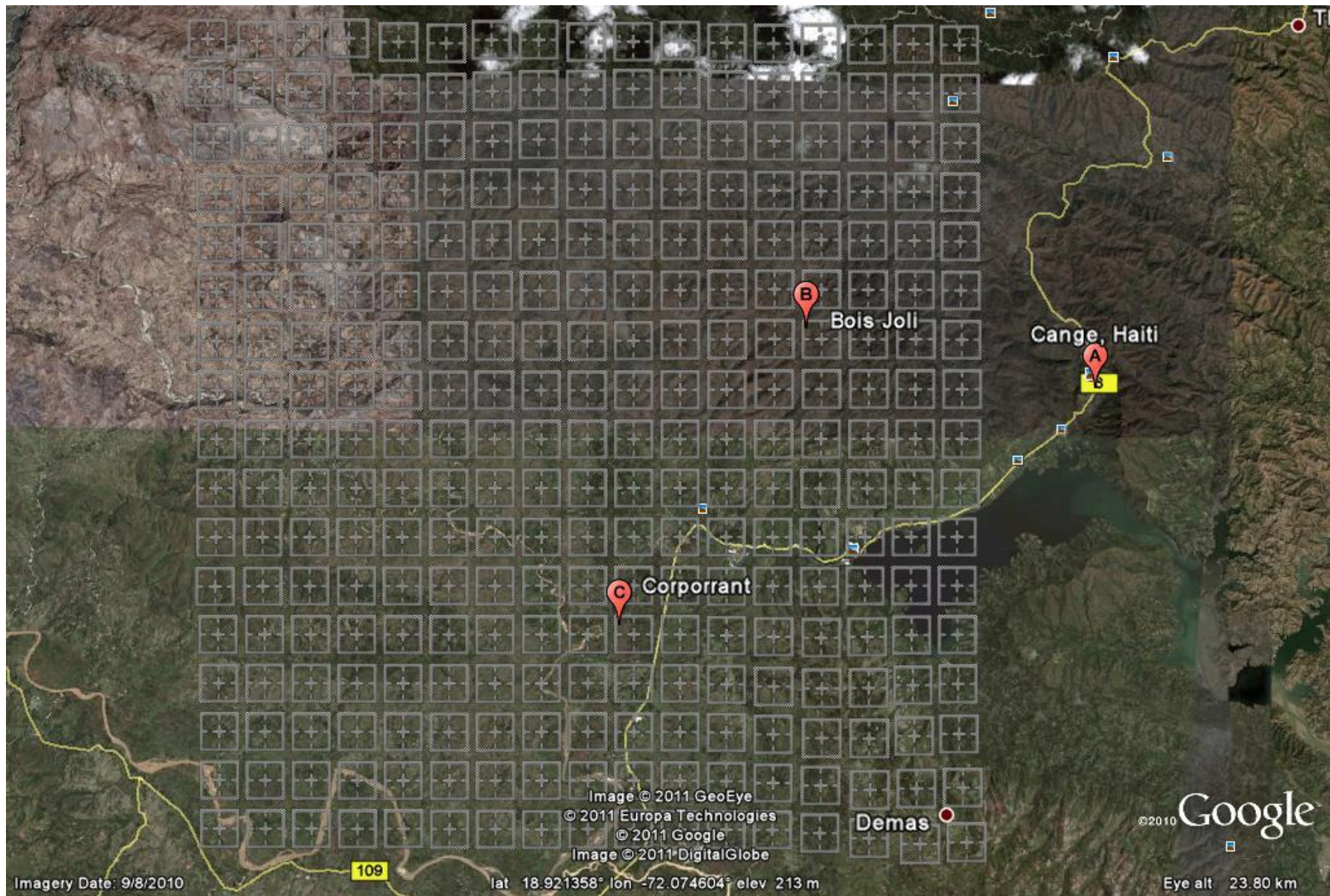


Figure 5. Overview of the Cange, Bois Joli, and Corporant relative to the 100 km<sup>2</sup> grid employed in economic survey. Sampling occurs on 1 km<sup>2</sup> quadrats.

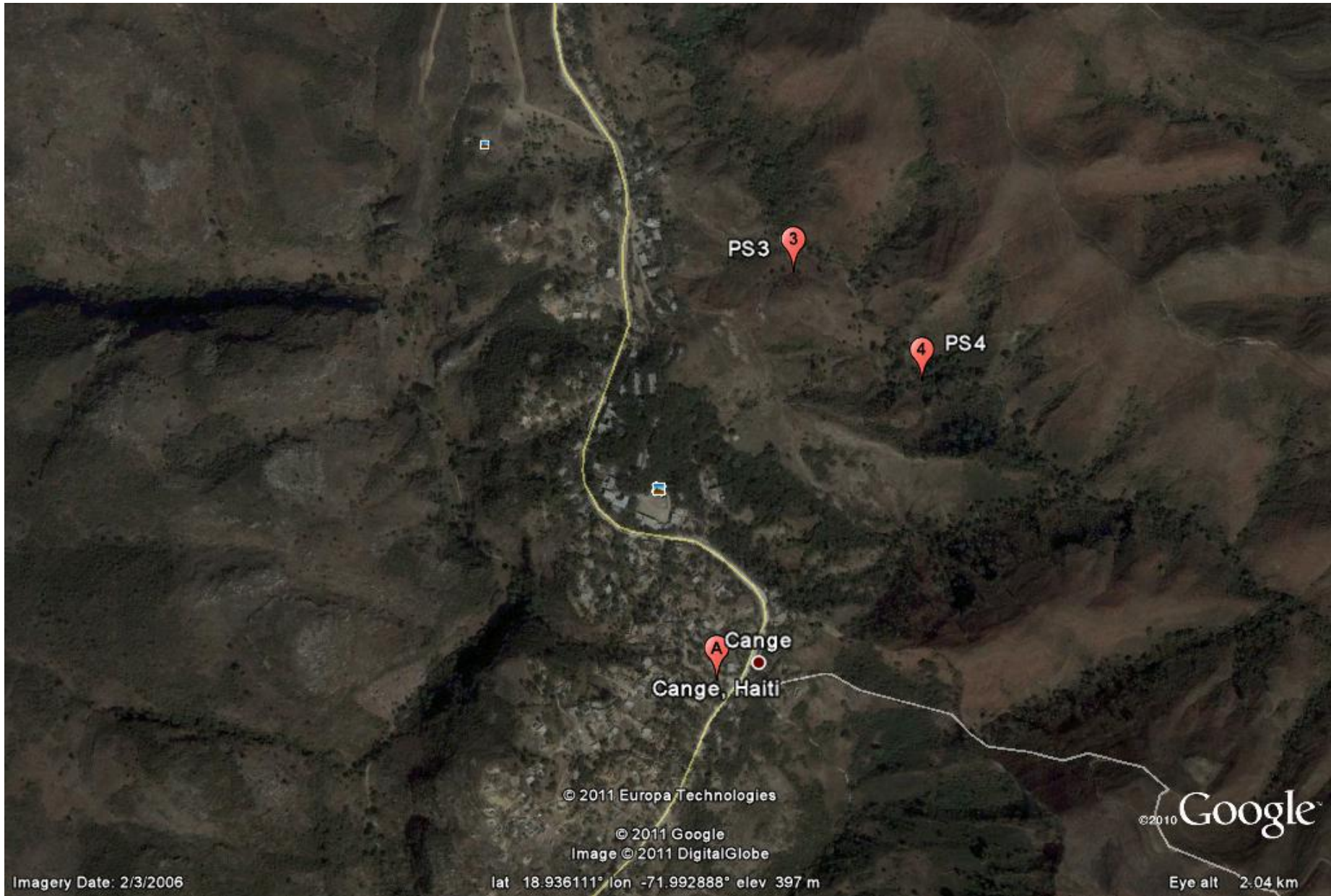


Figure 6. View of Cange, Haiti with soil point sample locations nearby.

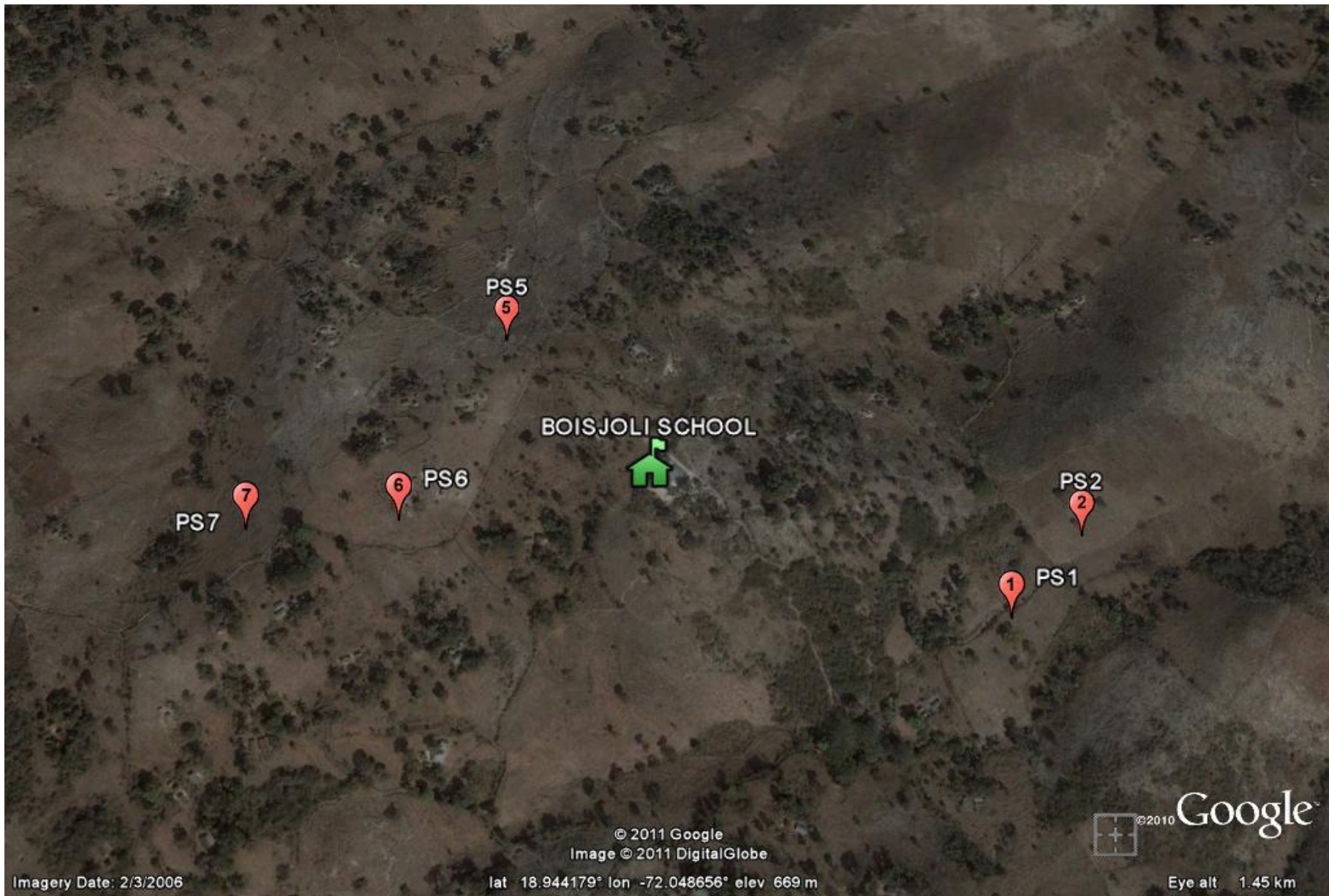


Figure 7. View of Bois Joli Elementary School with soil point sample locations in surrounding area.

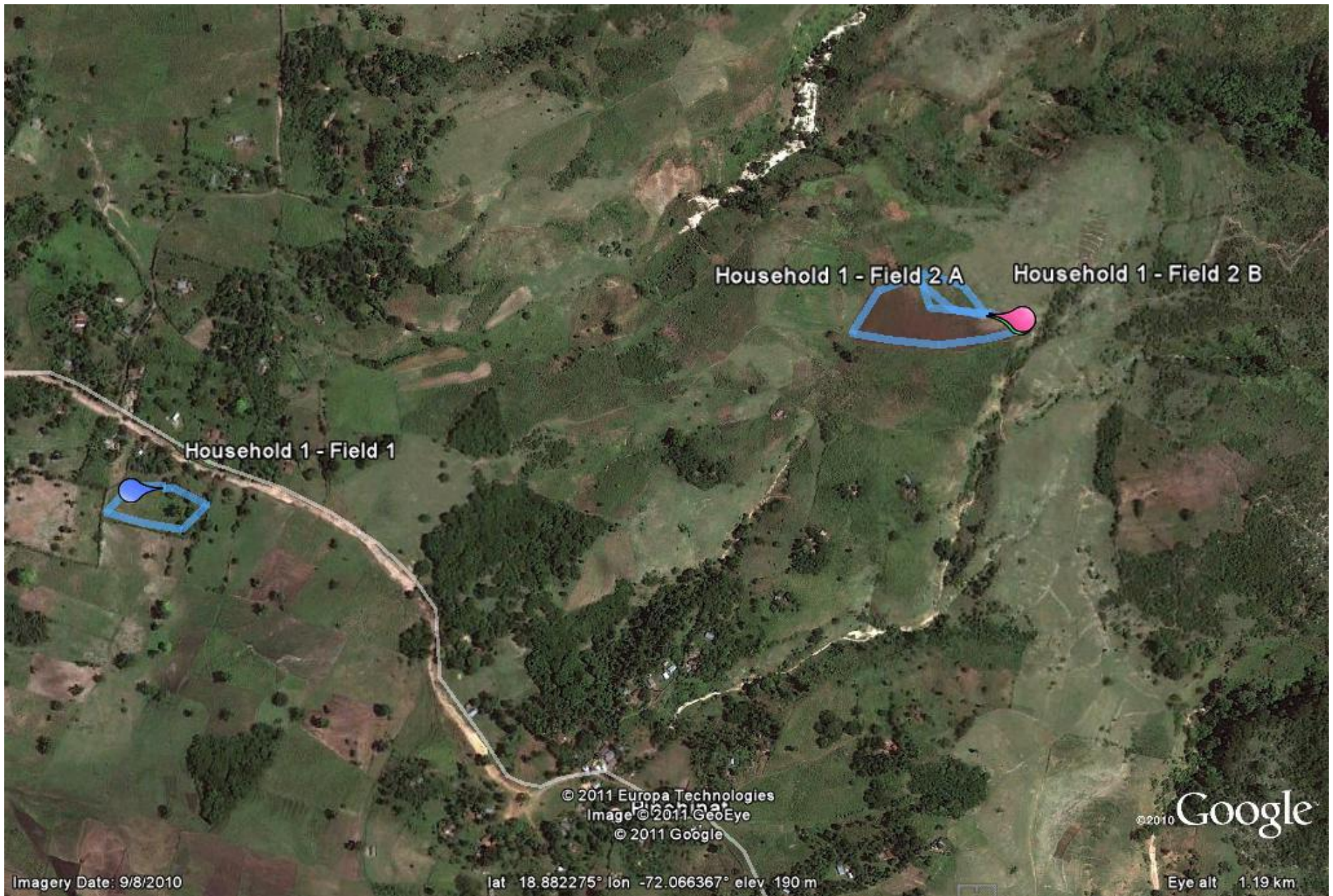


Figure 8. View of Household 1 Field 1 and Field 2 (A, B) for which soil samples were collected near Corporant, Haiti.



Table 2. GPS and other field data for soil samples collected in the Central Plateau, Haiti.

<b>Sample ID#</b>	<b>Date sampled</b>	<b>Elevation (m)</b>	<b>N coordinates</b>	<b>W coordinates</b>	<b>Field area (ha)</b>	<b>Slope (%)</b>	<b>Aspect</b>	<b>Landscape position</b>
PS1-CS	8/12/2011	652	N 18.94315	W 072.04634	N/A	38	SSE	Backslope
PS2-CS	8/12/2011	650	N 18.94369	W 072.04581	N/A	45	S	Backslope
PS3-CS	8/14/2011	358	N 18.93847	W 072.99118	N/A	27	N	Backslope
PS4-CS	8/14/2011	320	N 18.93704	W 072.98932	N/A	3	SE	Toe slope
PS5-CS	8/15/2011	687	N 18.94496	W 072.04980	N/A	35	N	Shoulder
PS6-CS	8/15/2011	698	N 18.94371	W 072.05045	N/A	21	E	Shoulder
PS7-CS	8/15/2011	688	N 18.94366	W 072.05147	N/A	41	NW	Backslope
PS8-CS	8/17/2011	648	N 18.93835	W 072.04094	N/A	4	NE	Shoulder
HH1-F1-CS	8/10/2011	160	N 18.88242	W 072.07083	0.28	6	SW	Toe slope
HH1-F2A-CS	8/13/2011	223	N 18.88322	W 072.06422	0.44	4	SW	Foot slope
HH1-F2B-CS	8/13/2011	225	N 18.88351	W 072.06411	0.14	8	SW	Foot slope
HH2-F1-CS	8/16/2011	644	N 18.93787	W 072.04473	0.1045	52	NW	Backslope
HH2-F2-CS	8/16/2011	652	N 18.93627	W 072.05688	0.7289	79	W	Backslope