GREAT IDEA

Graduate Research and Education for Appropriate Technology: Inspiring Direct Engagement and Agency

Developing Haiti: Reflection and Action

Christopher Papadopoulos
Marcel Castro Sitiriche
William Frey

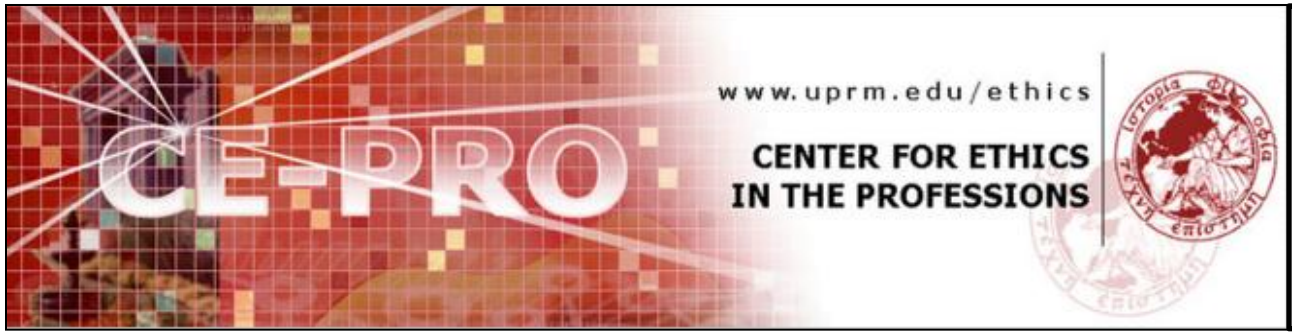
May 2, 2011

Graduate Research and Education for Appropriate Technology
Inspiring Direct Engagement and Agency

Overview

1. Background of GREAT IDEA
2. Present Work in Haiti
3. Discussion
4. Establish Working Groups

Roots of GREAT IDEA



Ethics Across the Curriculum (EAC)

Strategic Engineering Education Development

SEED

FROM RESEARCH TO PRACTICE

Social, Ethical and Global Issues (SEGI) in Engineering Program

Engineering Education Community Forum (EECF)

Grupo Interdisciplinario de Filosofía, Ingeniería y Tecnología

Foros y tertulias

Next one: May 5

GREAT IDEA

GREAT *IDEA* Key Objectives:

- "foster self-reflection among graduate students and faculty"
- encourage graduate students and faculty "to devote their professional and academic services toward humanitarian causes and appropriate technology"

Paul Farmer (Partners in Health): "This is not a hobby"

GREAT IDEA

Project Elements:

- Develop new courses and seminars to inspire and train graduate students to pursue research and careers related to AT
- Research Survey of attitudes
- Sponsor or coordinate relevant research projects, particularly in the Caribbean, with collaborator

More info: **greatidea.uprm.edu**

Collaborations

- **Instituto Universitario para el Desarollo de las Comunidades**
  - Luisa Seijo and Francisco Maldonado
- **Centro Universitario para el Acceso**
  - Rima Brusi and Lisette Rolón
- **Youthaiti** Gigi Pomerantz

Our Host

Gigi Pomerantz, Director
Youthaiti.org, Milwaukee, WI
Youth Organization United to Transform Haiti

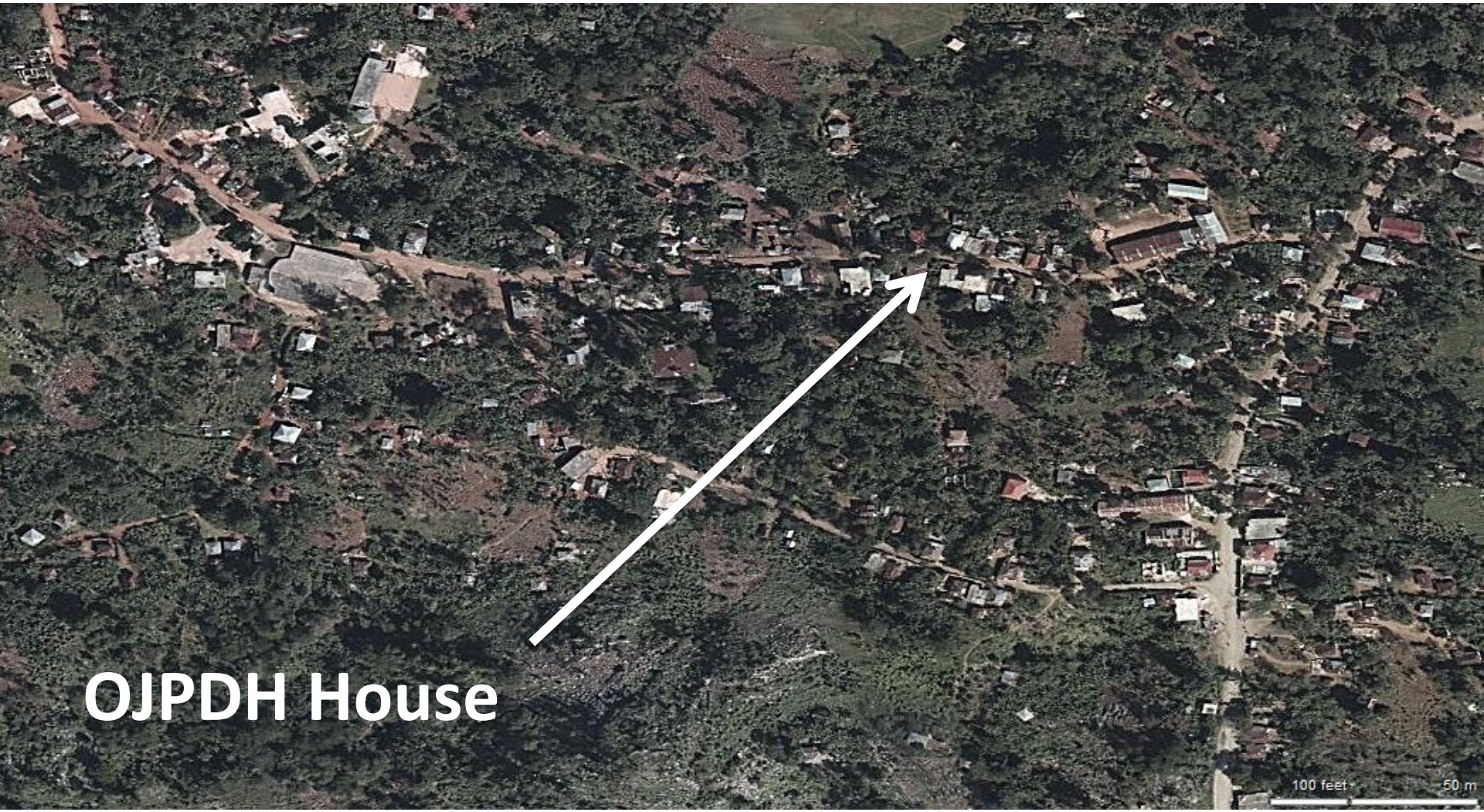
Duchity Partner: OJPDH
Organization des Jeunes Progressistes pour Development d'Haiti

- Founded 2006
- Promotes Health, Sanitation, and Agriculture
- Provides logistical support for visitors (food, transportation, lodging, translation, receipt of donations)
- 501(c)(3) organization

Duchity

220 km, 6-12 hours

Duchity Center



Scenes From Duchity

Distance and Nearness

Technology can create nearness or distance between people and …

- other people
- their basic needs/immediate sources of livelihood
- their awareness of the real costs of their material consumption

Example: Communications

Large Distance from Essential Needs

Large Distance from Real Costs

Haiti: Nearness to Basic Cooking

Haiti: Nearness to Basic Transportation

Haiti: Nearness to Basic Sanitation

Distance from Real Cost: Deforestation?

… but not all is deforested

Assessing experiences of international students in Haiti and Benin:

Challenges in meeting the project objectives, however, were related to three issues: i) the presence of missionary repair teams in the same region who complete pump repair without financial contribution from the local population (making it difficult for the Haiti team to request payment for repairs).

Source: Silliman, S., **Assessing experiences of international students in Haiti and Benin**, Page(s): 16-24, 31 **Volume 28, Number 4, Winter 2009: Special Issue Volunteerism and Humanitarian Engineering (I)**

Critical Perspective

- Ivan Illich: ***To Hell with Good Intentions***
  - “I am here to challenge you to recognize your inability, your powerlessness and your incapacity to do the "good" which you intended to do.”

Meeting with OJPDH

Existing Duchity Electric Power System

1. Unreliable electric power for 3-4 hours a day, usually from 7PM-10PM

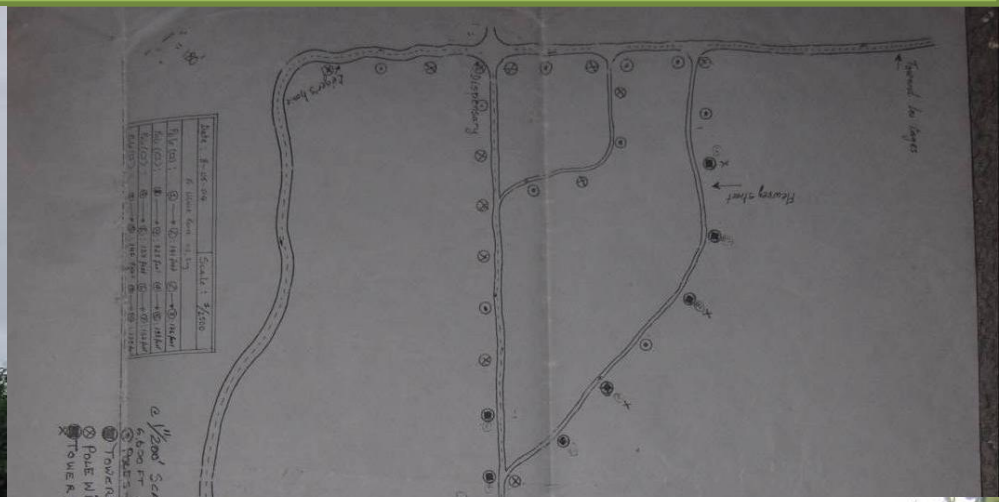
2. Diesel Generator of 17 kW

3. Approximate Electric Power Demand
   5.2 kW (227 V, 23 A)

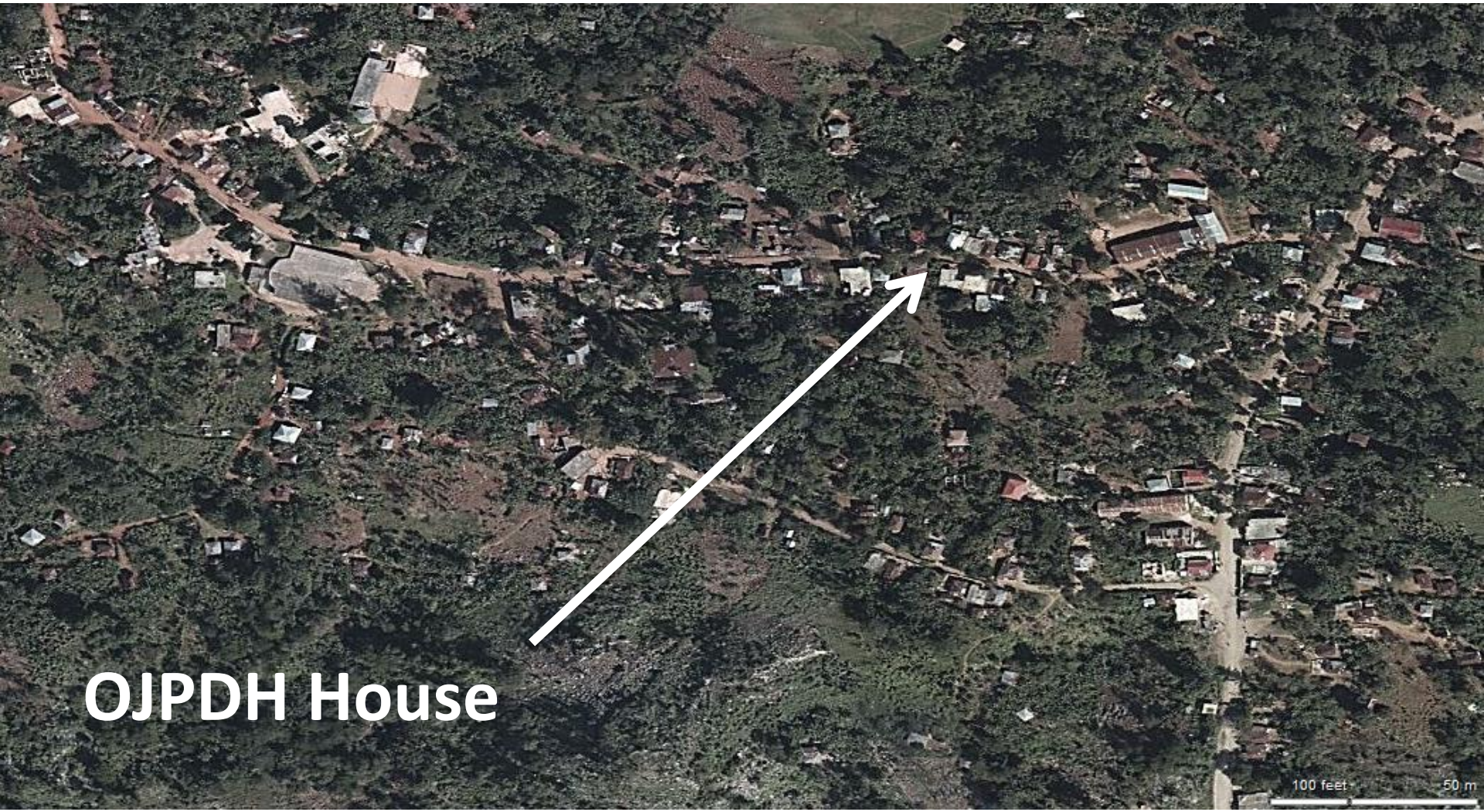
4. Number of households connected to the system is close to 30

Existing Duchity Electric Power System

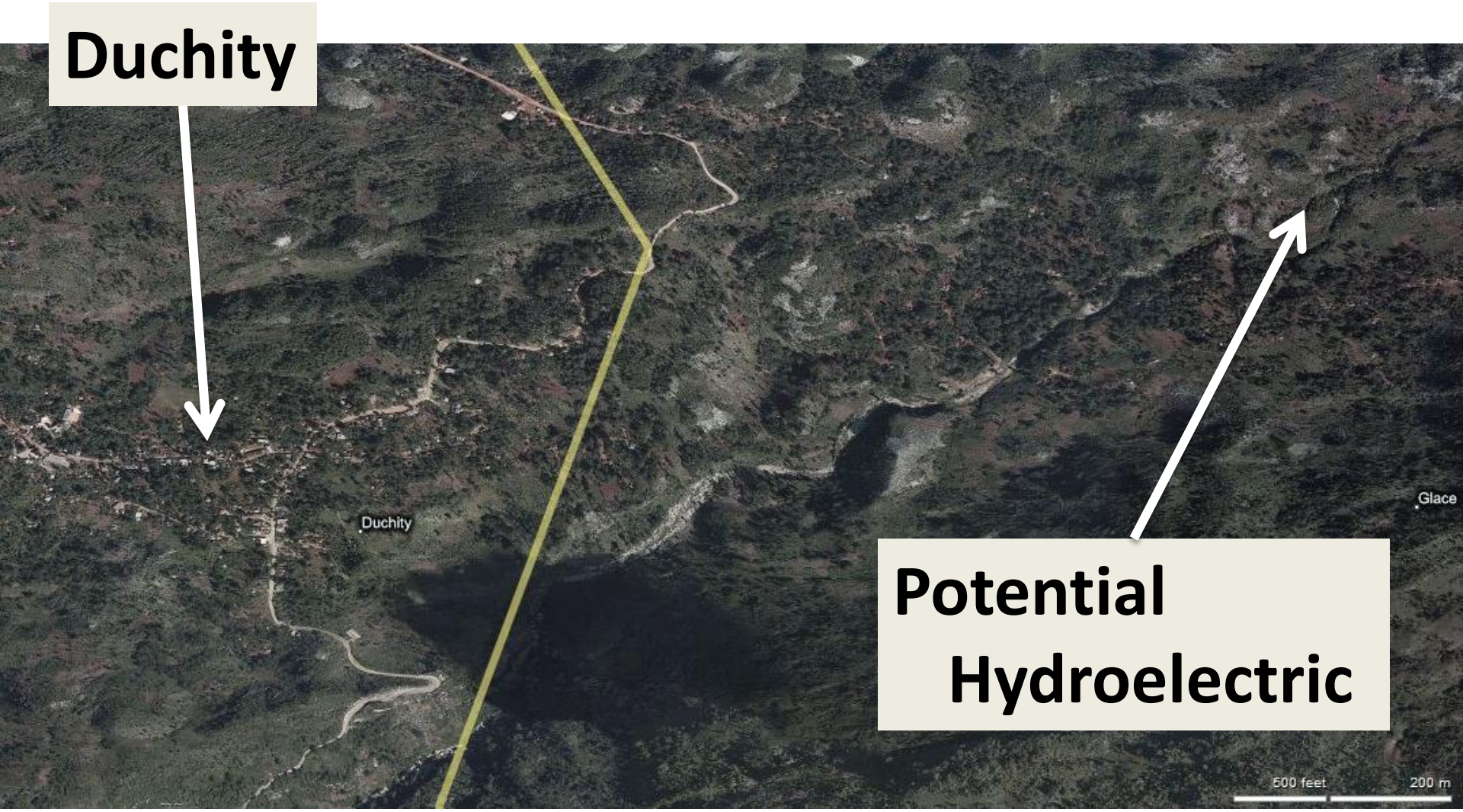
Existing Duchity Electric Power System



Duchity Center



Duchity Region



Glace River

Glace River

Glace River

Glace River: Hydro Power

Glace River: Hydro Power

Hydro Power Calculations

1. Electric Power Potential

   $P = \eta \, \mathbf{h} \, \mathbf{Q} \, \rho \, g = \mathbf{300\ kW}$

2. Head Estimate (**h**)

   39 meters

3. Water Flow Estimate (**Q**)

   1 m^3/s

Hydro Power: Environmental and Social Impact

Hydro Power: Environmental and Social Impact

Duchity Hydro Electric Project: Challenges

1. Rigorous Measures and Estimates of:
   Water flow, head height, and cost

2. Capacity Building Required to Maintain System:
   Potential to train local student in Electrical Engineering (M.S.)

3. Environmental and Social Impact

4. Unknown Process for Construction Permits and Water Resource Management

5. Social Acceptance of Hydro Electric Project

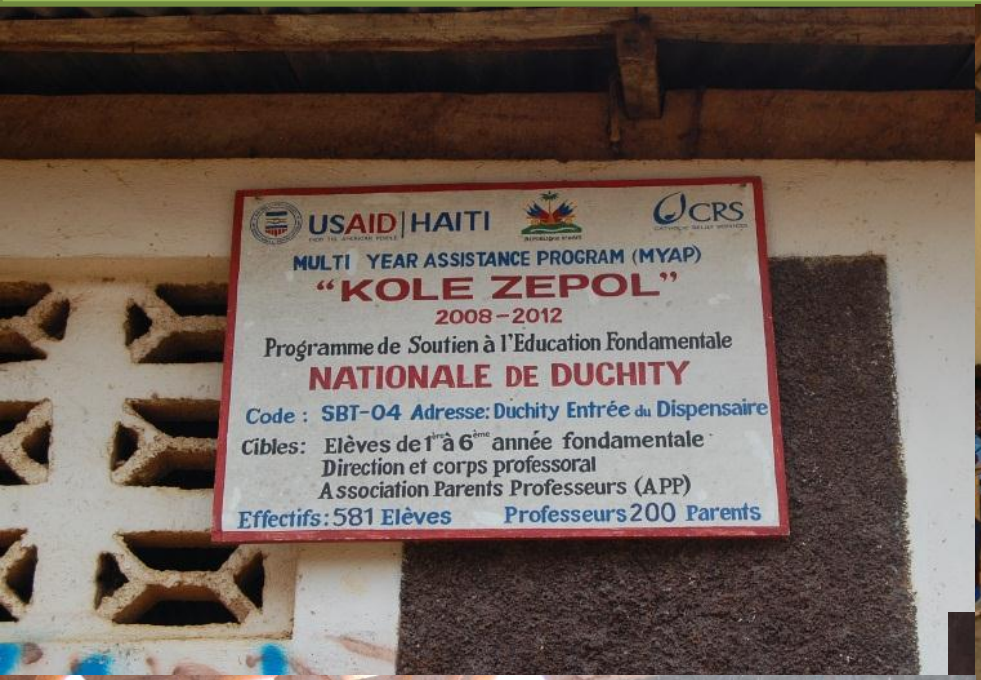
Dry Toilets: Youthaiti

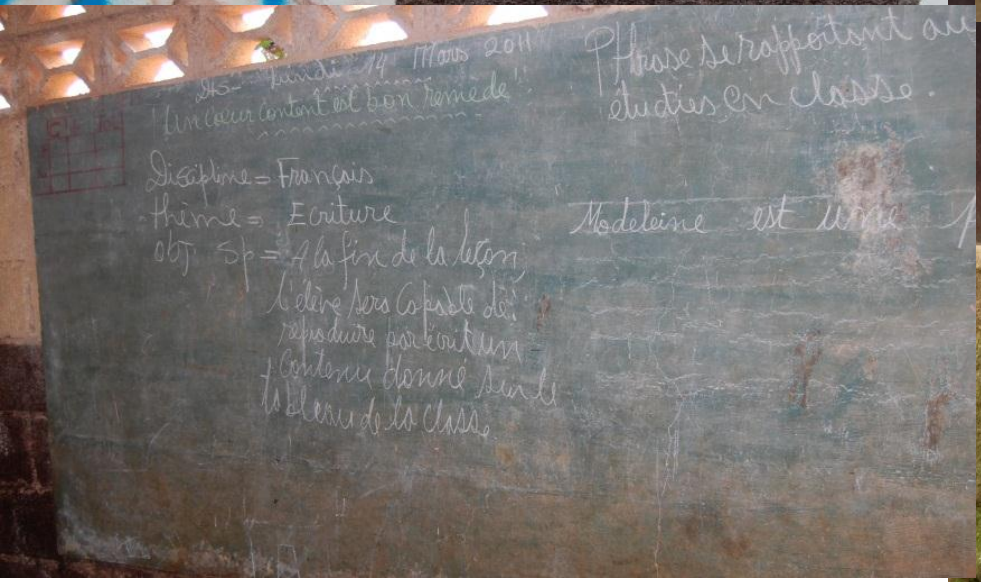
Agriculture: ÑAME

Sustainable Agriculture: Les Cayes

Sustainable Agriculture: Les Cayes

Education in Duchity





Education in Duchity

1. Rote style based on repetition and recitation

2. Limited teacher skills: any student passing a given grade is eligible to teach through prior grades

3. Limited physical resources: no electricity, computers, books, etc.

4. Principal willing to reform

Education in Duchity

To do:

1. Develop new course materials, e.g., related to the mathematics underlying the design of the proposed hydroelectric plant (need to be translated into Kreyol, maybe French)

2. Develop potential teacher training workshops focusing on critical thinking and active learning

Donations

Cash donations are being collected to support immediate needs of Duchity:

* generator repair
* school supplies
* orphanage
* support local efforts from Mayagüez

→ money handled through **youthaiti.org**
→ hard goods can be delivered with future visit from the Mayagüez groups

Possible Working Groups

- **Overall Coordination**
- **Access to Electric Power**
  - Hydroelectric Power in Duchity (July 2011 Trip)
- **Education and Orphanages**
  - Learning modules in Duchity
- **Water and Waste Management**
  - Dry toilets and composting in Duchity
- **Agriculture and Cooking**
  - Sustainable agriculture in Les Cayes, efficient cookstoves

Global Initiatives & Possible Funding

Possible Strategies

- Engineering Capstone Projects
  - Collaboration of UPRM teams with Haitian teams
- Distance Learning Project
- Graduate research/thesis projects
- Schedule a trip with your working group, either through youthaiti or another local organization (e.g., Jesuit Refugee Service)
- Approach your work with critical reflection

Thank You

- **Those that gave donations**
  - 270 lbs of donated items, $330 in cash
  - 3 laptop computers (UPRM)
- **Electrical and Computer Engineering Staff & UNICEF-UPRM**
  - Collected, coordinated, and packed donations.

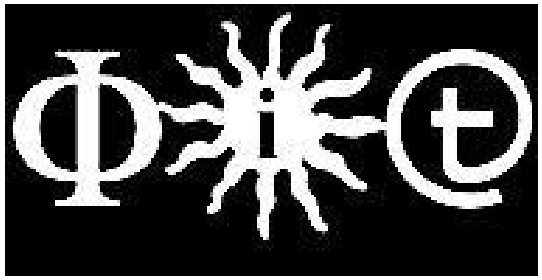
New Resources

Morgan & Claypool eBooks now available at the Library (more than 30 titles)

- **Humanitarian Engineering,** Carl Mitcham and David Muñoz
- **Engineering and Sustainable Community Development,** Juan Lucena, Jen Schneider, and Jon Leydens
- **Engineering and Social Justice,** Donna Riley
- **A Philosophy of Technology: From Technical Artefacts to Sociotechnical Systems,** Pieter Vermaas, Peter Kroes, Ibo van de Poel, Maarten Franssen, Wybo Houkes

Special Thanks: Jaqui Alvarez, General Library

GRUPO DE FILOSOFÍA, INGENIERÍA Y TECNOLOGÍA



TERTULIA DE FILOSOFÍA

The Business of Being Born

dirección de Abby Epstein

Jueves 5 de mayo, 2011, 8:00pm

Física 310

http://blogs.uprm.edu/gift/tertulias/

Techno-social Sensitivity

- Ed Harris: “Core virtue in engineering ethics”

- Formulated as a **rule**—better formulated as a **virtue**
  - a disposition “that manifests itself in certain types of behavior when the appropriate circumstances arise”
  - An aspiration as opposed to a base-line, threshold moral standard (the minimum you can get away with)

- Specifically, techno-social sensitivity is the “**critical awareness of the way technology affects society and the way social forces in turn affect the evolution of technology**.”

Harris, Charles. (2008) “The Good Engineer: Giving Virtue its Due in Engineering Ethics.” Science and Engineering Ethics, 14: 153-164.

What is a Social Technical System?

- **Our social and technical surroundings form systems composed of interrelated parts**
  - Because these interact, changes in one part often produce changes (reverberations) in others
- **The interacting components in these social-technical surroundings can be, generally, identified**
  - Hardware/software, physical surroundings, people, procedures, laws, information systems, markets and financial systems, ecosystems, etc
- **STSs changes and these changes exhibit trajectories**
  - Toward or away from certain values (They can become more or less just)
  - Trajectories are influenced by centers of influence and power
- **The overall normative objective is to place a STS on a positive trajectory of change**
  - Can this be done by building a micro hydroelectric facility in Duchity?

Hardware / Software	Physical Surround-ings	People, Groups, & Roles	Procedures	Laws	Cultural Matters
Diesel Generator Electricity Wiring (inside and outside) Individual Generators	Mountains (stripped and unstripped of vegetation) School: (natural lighting, benches, and blackboards)	Orphanage YouthHaiti Global Initiatives (Rotary Club, UNICEF, etc.) NSF UPRM (land grant university)	Measuring water flow Using/Repairing generator Measuring water fall Making Charcoal (inspecting new school)	Eng Codes (Parish will not fund rebuilding school in Pleasance) Regulating the generation of electricity (public, private, utility)	French Colonialism Language: French and Creole
Computers? Cell Phones? Transportation technology	Earthquake and Tsunami Zones Highways (paved, unpaved)	Universities Primary and Secondary Schools Governments (international context)	Pedagogical Approaches (parochial non-parochial) Student Assessment	Environmental standards and enforcement Land use	