Testing Improved Household Biomass Cookstoves
Ruhiira Millennium Village, Uganda

Erika Tyler: NSF Research Fellow
Vijay Modi: Director, MVP Infrastructure Program
Ugandan research staff: M. Nuwagaba; M. Kibosi; N. Tugume
Edwin Adkins: Research Coordinator

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Typical Ugandan foods and stoves:

- Matoke (plantains)
- Beans
- Posho (maize flour)

School & Household three-stone fires
Stove Research

- Why is stove research needed?
  - Past stove designs have often performed poorly (efficiency, quality control)
  - Acceptability of stoves to cooks is essential

- How should stove research be conducted?
  - “paired” testing is essential:
    - Controlled Cooking Test (CCT) compares fuel use for same food, cook & fuel; only difference is the stove
  - Statistical power is essential, variance is high

- Preliminary tests by Erika Tyler
  - Protocol modeled on UC Berkeley CCT by Rob Bailis for the Shell Foundation
  - Early results from 6 homes, 36 data points (2x3x6)
Variance by food type, cooking time

log food/fuel ratios for various foods
(with confidence intervals)

-0.2  0.0  0.2  0.4  0.6  0.8  1.0

Posho
Beans + maize
Kale / greens
Beef
Rocket Stove tests in Ruhiira Households

Stove Tec rocket stove (manufactured in China)  Ugastove rocket stove (made locally in Kampala, UGA)
Each error bar represents a 95% confidence interval.
Fuel Consumption for Three Stove Types

Each error bar represents a 95% confidence interval.

low n, confidence intervals nearly overlap
Yearly fuel savings: ~1 ton / HH

Each error bar represents a 95% confidence interval.
Conclusions

- Surveys showed strong preference for the Stove Tec stove over the Ugastove
  - based primarily on perceptions of quality, craftsmanship and durability.

- Fuel savings:
  - ~1 ton / HH = ~1.5 tons of CO2 / year
  - This is ~ $30 worth of carbon credits

- These results included only 36 data points.
  - 6 homes (2x3x6)

- Future tests will have > 200 data points.
  - 24 homes (2x3x24 = 204)
  - Testing in progress, results expected mid-March
From L to R: Moses Nuwagaba, Energy Technician; Mathias Kibosi, Enumerator; Nelson Tugume, Enumerator; Erika Tyler, NSF Graduate Research Fellow.