Modeling the Dynamics of the Energy, Environment & Poverty Nexus: A Study of Biogas Unit Diffusion in Andhra Pradesh, India

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Background

➢ Households in rural India depend on traditional fuels – primarily fuelwood - for meeting their daily energy needs.

➢ Fuelwood combustion creates emissions that pose a significant threat to human health and ecological wellbeing.

➢ In times of scarcity, fuelwood dependence can cause inefficiencies in household economy.

➢ Foundation for Ecological Security (FES), a rural development NGO in India, disseminates biogas units as a more efficient, emission-reducing cooking technology.

Data Sources

➢ A household survey was administered in 113 households across 30 hamlets.

➢ Survey data and field experience were used to inform model construction.

Sponsors

Figure 1: Transition from Traditional Cooking Stoves and Fuelwood to Biogas Stoves

Dynamic Hypothesis

➢ The adoption of biogas units with low implementation stems from perceived benefits of multiple use (black)

➢ Scarcity of fuelwood contributes to low socio-economic status, which drives household cooking needs and preferences. This increases household energy demand and perceived benefit of multiple stove use. (red)

➢ Additional adoption of biogas units constrained by low socio-economic status and not enough livestock to support biogas units (blue)
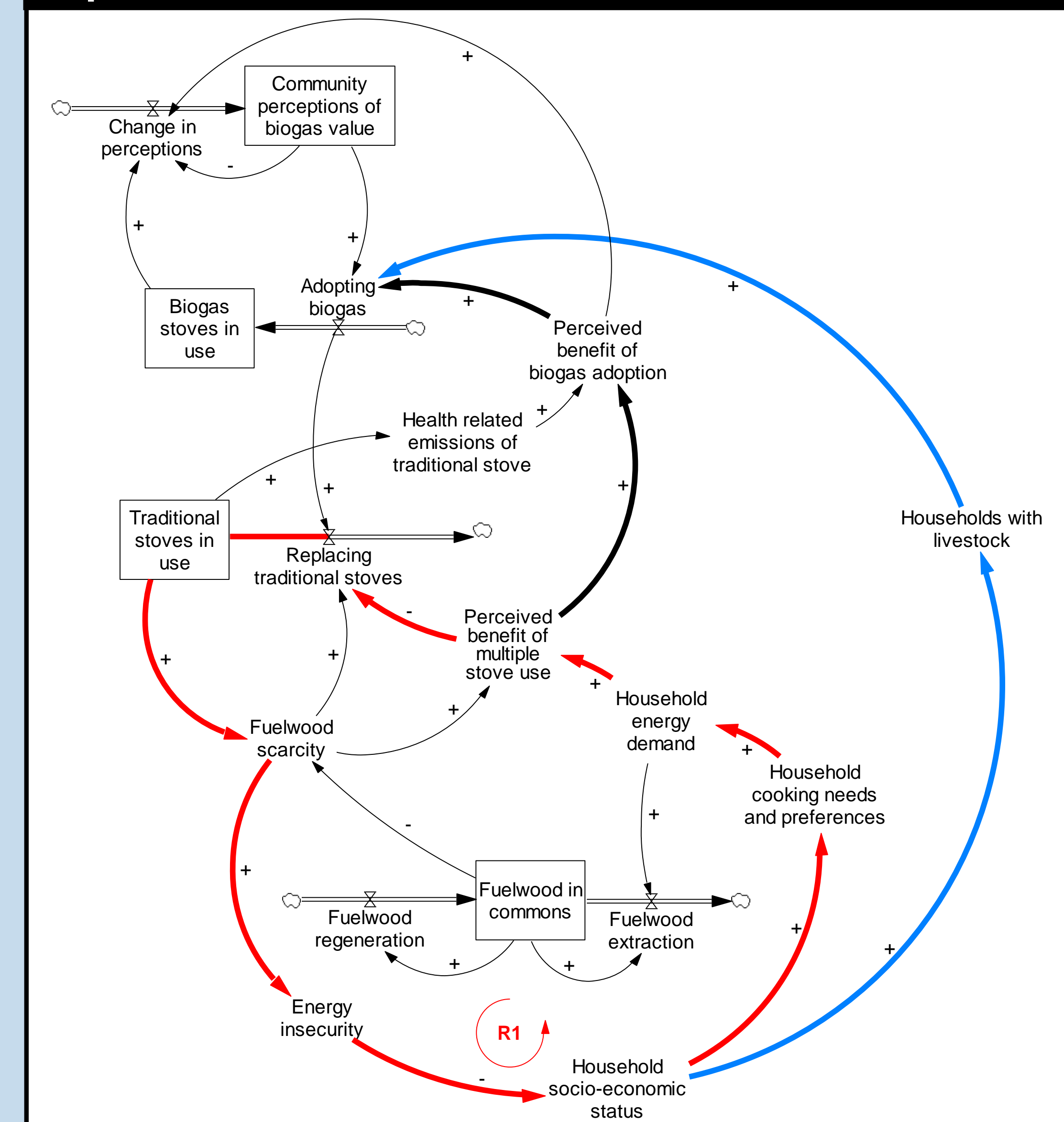
Figure 2: Implementation Gap

Adopted
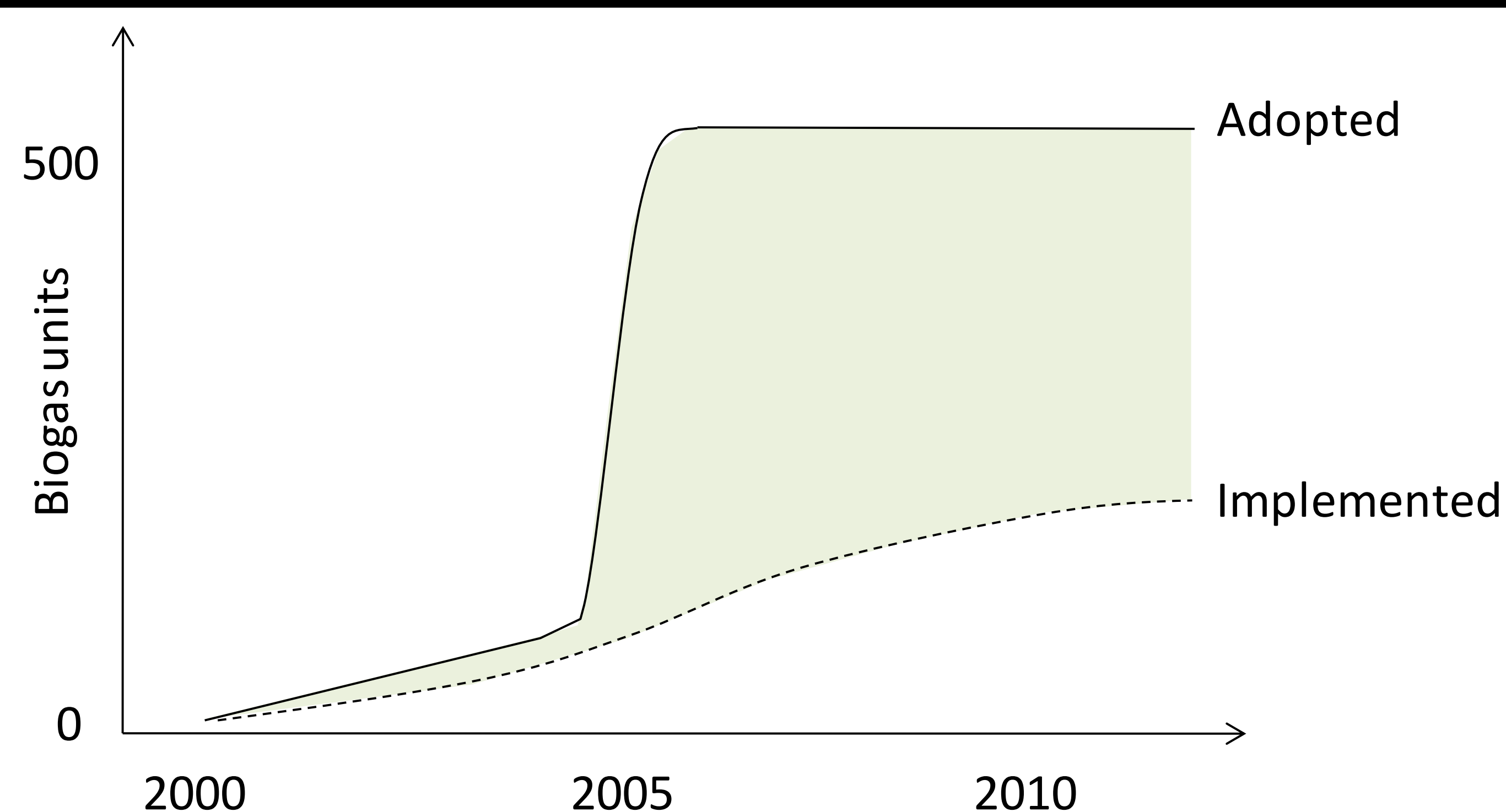
Implemented

Adoption refers to the household decision to acquire and use a biogas unit.

Implementation refers to the household using the biogas unit as intended, i.e., as the only stove used for cooking.

Figure 3: Biogas Unit Diffusion, Adoption and Implementation

Next Steps

Initial Fieldwork	Initial Analysis	Return Fieldwork	Final Analysis & Recommendations
Household Surveys, Informal Interviews, Observation	Preliminary Model Building, Quantitative Analysis	Group Model Building, More Detailed Household Surveys	Model synthesis & simulation
May-August '08	Sept. '08-April '09	May '09 – Oct. '09	Nov./Dec. '09

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