Does It Really Take A Village?

Ambient Air Quality Response to Clean Cookstove Intervention

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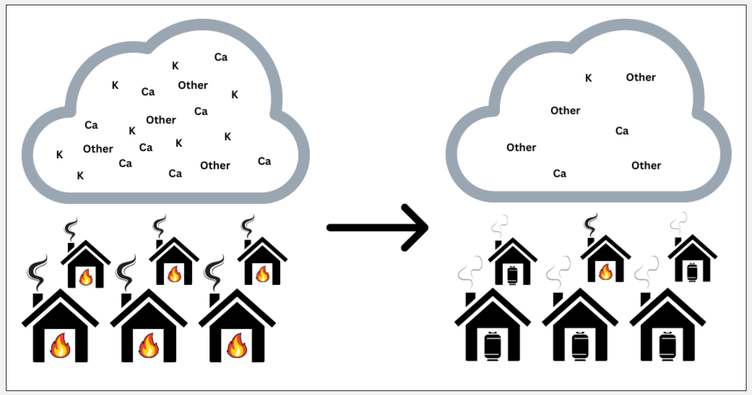
LPG intervention vs Ambient $PM_{2.5}$

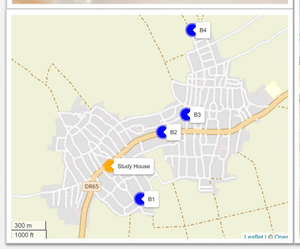
Project Aims:

- Determine the ambient $PM_{2.5}$ concentration response to a clean cookstove intervention.
- Determine if and how the chemical composition of ambient air $PM_{2.5}$ changes as residents increase use of LPG stoves.



The Clean Cookstove Intervention

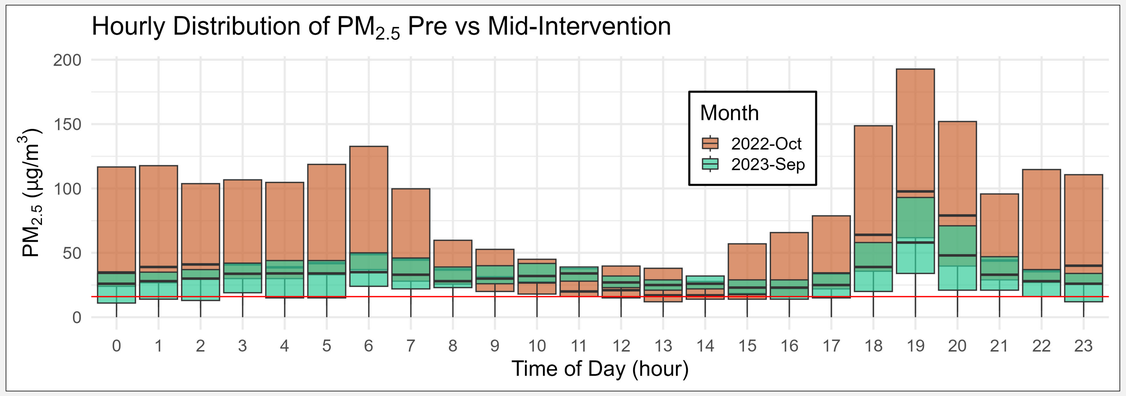
Bonnie Young



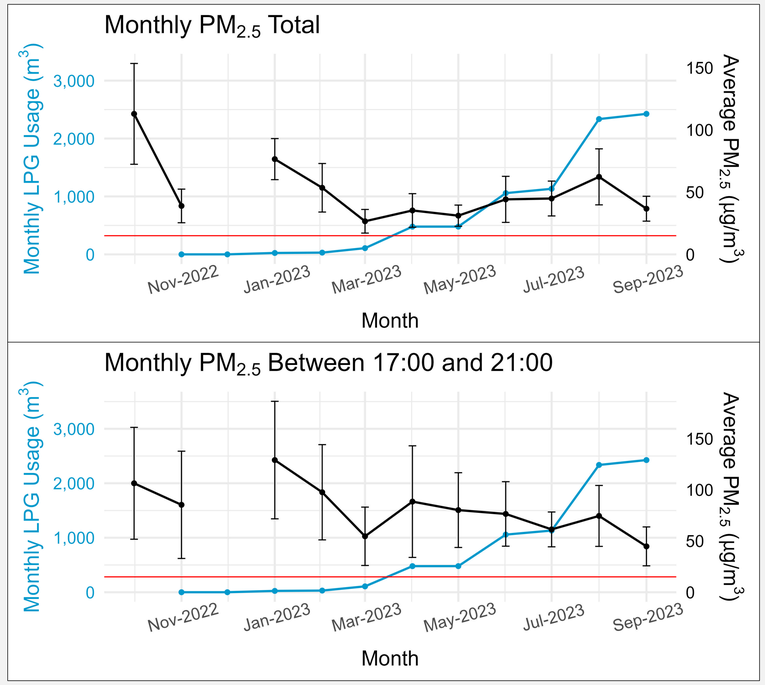
- **Location**: Eastern Rwanda (Ndego)
- **Size**: 400/~3,000 homes will receive LPG
- **Monitor**: AMOD (Wendt et al. 2022)
- **In country partner**: MeshPower

- **Traditional cooking** often takes place in poorly ventilated spaces with inefficient combustion chambers, often leading to **dangerously high levels of $PM_{2.5}$**.
- **Household air quality can only improve as much as the ambient**, due to a lack of air filtration systems in homes.
- At what level of LPG use are meaningful ambient air quality goals achieved?

$PM_{2.5}$ Response



- $PM_{2.5}$ concentrations **spike around dinner time**, potentially from biomass burning for cooking. The red line is the WHO daily average $PM_{2.5}$ threshold recommendation (15 µg/m^3).
- The dinner time spike is weaker in September 2023 than pre-intervention (October 2022), suggesting the intervention may produce a meaningful effect on the ambient air quality.



- Total average ambient air quality does not appear to improve much with the increased usage of LPG.
- However, when **isolating the dinner time spike, it appears $PM_{2.5}$ concentrations decrease with the increased usage of LPG**.
- Further analysis is needed to deconvolute this trend from seasonal variability and filter based gravimetric corrections are needed to determine accurate concentrations.
- The red line shows $PM_{2.5}$ concentration of 15 µg/m^3 and the error bars represent the interquartile range of $PM_{2.5}$ observed each month.

Conclusions

- Early trends suggest the LPG cookstove intervention may produce a significant effect on ambient $PM_{2.5}$ concentrations during peak cooking hours.
- Chemical Analysis ongoing.

Acknowledgments

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