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“Filling gaps and removing traps
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Evaluation of Efficiency of two Local Improved Stove Models in Honduras and Panama

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Abstract

Around the world almost two billion people depend on biomass as their fuel source for cooking. The intense use of biomass puts pressure on the biomass sources of the world including forests. In Central America rural households depend almost entirely on wood as its cooking fuel. An inefficient wood combustion on traditional stoves emits smoke containing Particulate Matter (PM), CO and CO₂. Continued exposure to the smoke contributes to respiratory diseases. Women and children spend the most significant amount of time in the kitchen, and are therefore the most vulnerable people for contracting these diseases. Due to these two reasons a) environmental pressure, b) health hazards, an effort to develop improved stoves with better combustion that consume less wood and emits less smoke have been a constant in the region since the 1980's. This study evaluated two improved stove models (DAMAK and Mani). For the laboratory evaluation the Water Boiling Test (WBT) was used with a Portable Emissions Measurement System (PEMS), allowing measurements of CO, CO₂ and PM. Wood consumption was also evaluated using a volume method. The results then were compared to the ones obtained by other two commonly used improved stoves models in the region, the Patsari and the Perfection. The performance results of the DAMAK model were 63% less wood consumption and 50% less CO emissions, but with 9.4% more PM emissions when compared with the Patsari. There were not statistically significant differences in CO₂ emissions. These laboratory tests were also compared with data obtained on field evaluations. Using an Indoor Air Pollutant Meter and a wood volume method, a total sample of 174 stoves were evaluated on stoves used by final users in their own kitchens, 92 improved models (DAMAK and Mani) and 82 traditional stoves in rural communities of Panama and Honduras. The three measured variables (CO, PM and wood consumption) had a statically significant difference between the two groups. Improved stoves emitted less CO and PM and consumed less wood. Local improved stove models have a history of better acceptance and adoption by final users when compared to models imported from other regions.

Keywords: Biomass, Central America, improved stoves