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Effect of Improved Stoves on Wood Consumption and Particulate Matter and Carbon Monoxide Production

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Abstract

In rural Central America the dominant source of fuel for cooking is biomass. This practice triggers two significant problems in the region: 1) health issues for users and household members; and 2) deforestation caused by the quantities of wood required to maintain the practice. Sustainable Harvest International, a USA-based nonprofit organisation, has been developing and promoting different models of efficient wood-conserving stoves in Panama, Belize, Nicaragua and Honduras since the year 2000. In collaboration with EARTH University (Costa Rica) and Aprovecho Research Center (USA), a systematic evaluation of two improved stove models — ‘Damak’ in Panama, and ‘Mani’ in Honduras — was performed. The evaluation used a state-of-the-art portable Indoor Air Pollution Meter (IAP) 5000 series. Using the IAP, the collaborators took 30-minute air samples of stoves at maximum cooking temperatures. The sample consisted of 40 improved stoves and 34 traditional stoves being measured in Honduras; in Panama the sample comprised 24 improved stoves and 22 traditional ones. The results indicated that in comparison to their traditional counterparts, the improved stoves consumed 58 % less wood and an impressive 278 % less particulate matter, as well as an astonishing 8137 % less carbon monoxide. In conclusion, adapted, improved stoves made from local materials are proving to consume less wood and produce better air quality for rural families in Central America. Larger samples examining field conditions and measurements under laboratory conditions are needed to corroborate the significantly large differences. However, this first systematic assessment gives us enough information to affirm that these locally developed stoves are an inexpensive solution that is improving the lives of tens of thousands of rural families in the region.

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