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Summary of Aprovecho's Summer Stove Camp, 2006

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Stove Camp 2006 was extremely interesting, especially because we had experts here who could help define what is known, figure out what needed to be done to expand the state of knowledge, and then, most importantly, have the tools to accomplish the experiments.

For Dean, the best moments happened around the table above when Chris Roden, Jonathan Lewis, the Aprovecho staff and everyone tried to get a general feeling for wood-burning stoves effect on global warming. Aprovecho's recent tests at CSU of greenhouse gas emissions such as CO2, Methane, N2O, NOx, etc. helped to predict the gaseous emissions from the following stoves:

- Three stone fire
- Rocket stove

- Karve Gasifier stove
- Philips fan stove
- Charcoal Jiko stove
- Mayon rice hull burning stove

The gases, however, are only a part of the picture: particles also play an important role in the atmosphere. We learned that elemental (black) carbon particles produced in flames have a warming effect 1000 times greater than CO2 per gram, while organic carbon (white) particles produced by smoldering have a cooling effect 150-200 times stronger than CO2. Thankfully, Chris Roden had brought his and Dr. Tami Bond's ARACHNE system which could measure the composition of the total PM to determine what percentage of black or white particles were produced by the stoves above. Chris, Damon and Nordica were at the lab till 11pm having a great time testing these stoves. Results should be available soon.

Doing this kind of research in a small lab in Creswell, Oregon for no money is what ETHOS stove camp is all about!

The publicized theme of this year's camp was a competition to design the cleanest-burning fan stove. Two categories, side feed and top feed were awarded prizes. The top feed prize went to Dr. Paul van der Sluis for the Philips fan stove. The side feed Rocket stove with fan developed by Roger and Sule of Colorado State was the cleanest burning side feed stove. Congratulations to the winners!

This Philips stove is not a T-LUD. It was continuously fed and the clean-burning is probably the result of improved mixing by the jets of air. Tom Reed's stove was essentially as clean-burning, but again, it was operated as a continual feed. Fan stoves can be made very inexpensively. It is probably the mixing and increased velocity in a well-designed fan stove that result in exceptionally clean burning.

The problem with top-fed fan stoves is that the fuel has to be cut really small and fed a bit at a time into the fire through the gap under the pot. Would a cook want to do this? The side feed fan stoves tested at stoves camp were an attempt to solve this problem, but more work must be done. The top fed stoves are still cleaner burning, but we are sure it is possible to make an equally clean side feed with the proper air flow.

We hope that you will create the world's best $5 side-feed fan stove and send it to us for testing under the emissions hood! We offer a prize of $250 to be given to the inventor of the best (clean, low fuel use, inexpensive) side feed fan stove sent to us two weeks before ETHOS 2007. The prize will be awarded at ETHOS in Seattle, January 26-28, 2007.

Thanks very much to Charlie for his wonderful comments found on his blog at http://ewbappropriatetechnology.blogspot.com/. Also thanks to Dr. Paul van der Sluis for requesting the following correction to a statement about the Philips stove on the blog: "He (Charlie) states that 'the emissions were so low that you could breathe their fumes indefinitely'. While the stove is really cleaner tests in the Aprovecho test kitchen also show that the PM emissions from a fan stove in a closed kitchen might exceed the WHO 24-hour interim standard of

75 ug/m3. Burning biomass without a chimney in a poorly ventilated room will exceed the levels deemed “safe” for the ‘developed’ world. Ventilation of a room is as important as the stove being used.

Results of testing under the emissions hood, one abbreviated water boiling test per stove: