Savanna study highlights African fuelwood crisis

January 17 2013

(Phys.org)—The dwindling reserves of fuelwood in Africa have been illuminated in a new study published today, which shows a bleak outlook for supplies across savannas in South Africa.

Presenting their findings in *Environmental Research Letters*, researchers have found that at current consumption levels in the communal areas of Lowveld, South Africa, reserves of fuelwood could be totally exhausted within 13 years.

The consequences are significant, with around half of the 2.4 million rural households in the country using wood as their primary fuel source, burning between four and seven million tonnes per year.

Consumption of fuelwood is greater across the rest of sub-Saharan Africa, which includes countries significantly less developed than South Africa – around 80 per cent of households rely on fuelwood as their primary energy source.

The researchers measured the amount of biomass currently covering the study areas using the Carnegie Airborne Observatory (CAO) – an aircraft loaded with state-of-the-art imaging systems (funded by the Andrew Mellon Foundation).

The CAO was flown at an altitude of 2000 metres across 30 000 hectares of land and a light detection and ranging (LiDAR) system was used to calculate tree height by firing millions of laser pulses down to the

ground and measuring the time it takes for the light to return to the aircraft.

The study area included Kruger National Park, Sabi Sand Game Reserve and communal areas in the Bushbuck Ridge municipality. The result was a set of tree height maps from which biomass maps were generated.

The researchers selected the village of Justicia as a model for calculating how reserves of fuelwood could be reduced under different consumption scenarios. They found that under current consumption rates, the fuelwood around this area would be totally exhausted within 13 years; however, locals could stop collecting at least two to three years in advance of this if the quality and density of fuelwood becomes too low.

They also showed that households using fuelwood would need to be reduced by 15 per cent a year for eight years, until only 20 per cent of total households are using it, before biomass stabilises to a sustainable level.

"Despite significant electrification of rural households in South Africa, large amounts of fuelwood are still being extracted from savannah woodlands," said lead-author of the letter Konrad Wessels.

"Rural households need to reduce fuelwood use in favour of other energy alternatives. Currently the only viable alternative is electric stoves, but the switch to electric stoves has been slow, apparently due to the cost of stoves and electricity, as well as cultural preferences. Furthermore, since unemployment is high, there is ample labour to collect free fuelwood, even as it becomes scarce."

"The use of alternative sources of energy for cooking should be promoted to balance out the current unsustainable rate of fuel wood extraction; however, it will still require interventions aimed at general

poverty reduction, and culturally acceptable energy alternatives."

More information: 'Unsustainable fuelwood extraction from South African savannas' K J Wessels et al 2013 *Environ. Res. Lett.* 8 014007. iopscience.iop.org/1748-9326/8/1/014007/article

Provided by Institute of Physics