

An assessment of biofuel use and burning of agricultural waste in the developing world.

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Abstract

We present an assessment of biofuel use and agricultural field burning in the developing world. We used information from government statistics, energy assessments from the World Bank, and many technical reports, as well as from discussions with experts in agronomy, forestry, and agroindustries. We estimate that 2060 Tg biomass fuel was used in the developing world in 1985; of this 66% was burned in Asia, and 21% and 13% in Africa and Latin America, respectively. Agricultural waste supplies about 33% of total biofuel use, providing 39%, 29%, and 13% of biofuel use in Asia, Latin America, and Africa, and 41% and 51% of the biofuel use in India and China. We find that 400 Tg of crop residues are burned in the fields, with the fraction of available residue burned in 1985 ranging from 1% in China, 16 - 30% in the Middle East and India, to about 70% in Indonesia; in Africa about 1% residue is burned in the fields of the northern drylands, but up to 50% in the humid tropics. We distributed this biomass burning on a spatial grid with resolution of 1 deg x 1 deg, and applied emission factors to the amount of dry matter burned to give maps of trace gas emissions in the developing world. The emissions of CO from biofuel use in the developing world, 156 Tg, are about 50% of the estimated global CO emissions from fossil fuel use and industry. The emission of 0.9 Pg C (as CO₂) from burning of biofuels and field residues together is small, but non-negligible when compared with the emissions of CO₂ from fossil fuel use and industry, 5.3 Pg C. The biomass burning source of 10 Tg/yr for CH₄ and 2.2 Tg N/ yr of NO_x are relatively small when compared with total CH₄ and NO_x sources; this source of NO_x may be important on a regional basis.

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