

Biomass fuel combustion and health*

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Biomass fuels (wood, agricultural waste, and dung) are used by about half the world's population as a major, often the only, source of domestic energy for cooking and heating. The smoke emissions from these fuels are an important source of indoor air pollution, especially in rural communities in developing countries. These emissions contain important pollutants that adversely affect health—such as suspended particulate matter and polycyclic organic matter which includes a number of known carcinogens, such as benzo[a]pyrene, as well as gaseous pollutants like carbon monoxide and formaldehyde.

Exposure to large amounts of smoke may present a health risk that is of a similar order of magnitude to the risk from tobacco smoke. The effects on health arising from exposure to air pollution are reviewed, based on what has been reported in the literature so far. Further and more detailed information on exposures and on the epidemiological aspects is urgently required.

The persons most frequently affected are women who do the cooking for households in rural villages; they suffer from impaired health due to prolonged and repeated contact with these harmful pollutants. When they are pregnant, the developing fetus may also be exposed and this leads to the risk of excess deaths. In the developing countries, exposure to biomass fuel emissions is probably one of the most important occupational health hazards for women. A conservatively estimated 300–400 million people worldwide, mostly in the rural areas of developing countries, are affected by these problems.

To many people air pollution is associated only with urban combustion of fossil fuels in industrial countries where the high level of economic development has led to a high consumption of energy per capita. The present review, however, is directed at the opposite situation: rural agricultural communities in the developing countries, where biomass is the principal fuel and where both income and energy consumption are among the lowest in the world.

The principal biomass fuels are wood, crop residues or agricultural waste, and manure (1), the last coming mainly from domesticated animals such as cows. These fuels are composed of complex organic matter—vegetable proteins and carbohydrates incorporating carbon, nitrogen, oxygen, hydrogen, and certain other elements in trace amounts. Their combustion often produces substances harmful to human health, such as a range of polycyclic hydrocarbons not found in the fuels themselves.

This review discusses the broad question, “What is the severity and extent of health problems associated with pollution from biomass combustion in the rural areas of developing countries?” To deal with this question, certain issues are examined that do not fit neatly into traditional disciplines of inquiry. They could be classified as problems concerned with economic development, environment, energy, housing, and health, to

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