Buying Time with Black Carbon Reductions

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Black carbon is a form of aerosol emitted as soot, both indoors and outdoors due to fossil fuel combustion, bio fuel cooking and open biomass burning. Black carbon exerts a large solar heating of the atmosphere, and thus contributes a net positive radiative forcing at the top-of-the atmosphere (i.e. a global warming effect). The estimates of BC heating by us, using observationally constrained data from satellites, ground stations and field observations is that the current global mean BC radiative forcing at the top-of-the atmosphere is as much as 40% to 60% of the current radiative forcing due to carbon dioxide greenhouse effect. Regionally aerosol induced radiative forcing is much larger than that of the greenhouse gases. The regional effects of BC are estimated to be particularly large over Asia, Africa and the Arctic. Recent studies estimate BC solar heating is having as large an effect as carbon dioxide increase in retreat of Arctic sea ice, melting of Himalayan glaciers, and decrease in monsoon rainfall in India and the Sahelian drought in Africa. Thus a drastic reduction in BC has the potential of offsetting the carbon dioxide induced warming for a decade to three and a possible mechanism for buying time to develop and implement effective steps for reducing carbon dioxide emissions. Surya targets reduction of soot emission resulting from cooking with solid fuels (wood; cow dung; coal etc.) by introduction of better cooking technologies for twofold reasons: 1) Cooking is a major source of soot emission to the atmosphere; and 2) Cooking indoors with solid fuels is the dominant source for indoor air pollution which contributes to numerous negative health effects among women and children. The unique feature of Surya that distinguishes it from numerous other cleaner cooking projects, is that it will undertake the most comprehensive and rigorous scientific monitoring of the impact of the deployment of cleaner and energy efficient cookers on the soot concentrations indoors as well as outdoors; radiative forcing of climate; and on health. Our visions for articulating Surya are the following: a) When success of Surya is demonstrated in a few rural regions in India, it will promote and guide policy actions in India to scale up Surya for the entire sub-continent. b) Surya will also be attempted in China and Africa (major sources of soot emission). c) By steering a large rural population away from fossil fuel, Surya will also contribute significantly towards reduction of carbon dioxide emissions. d) Thus Surya will have fundamental policy implications for the entire planet.