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Editorial

Harmattan Haze and Environmental Health

It is the season to cover up. Beginning in November of every year and ending around March, fine particulate matter (typically 0.5 – 10 micrometers) emanating from the Sahara desert blow south, obscuring vision and laboring breathing for everyone (Figure 1). In addition, the dry dusty winds cause a variety of domestic inconveniences because of the layers of dust that envelope everything both outdoors and indoors. This is harmattan season, and it is ingrained in all West

Figure 1. The mosque in Abuja Nigeria, seen through the harmattan haze. Photograph by courtesy of Kipp Jones[1].

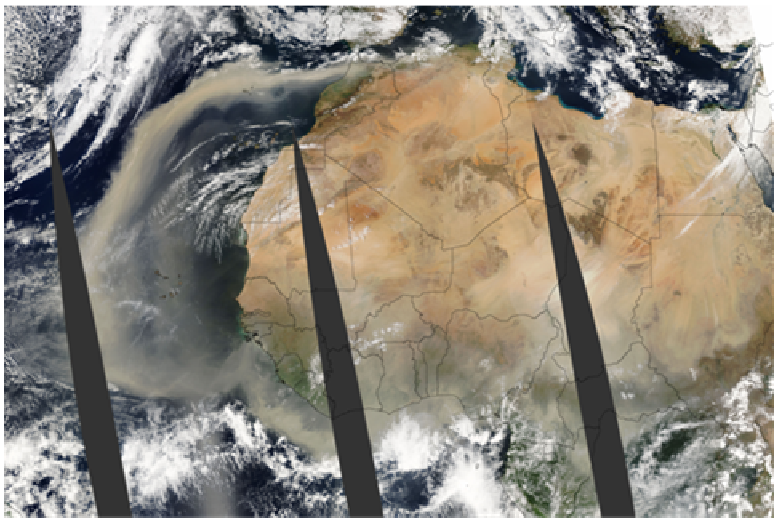

Figure 2. Harmattan dust storms from the Sahara desert as captured by NASA's MODIS satellite reaches across to the Atlantic Ocean in the South, and all the way to South America and the Caribbean islands[2].

[1] http://en.wikipedia.org/wiki/Image:MosqueinAbuja.jpg.

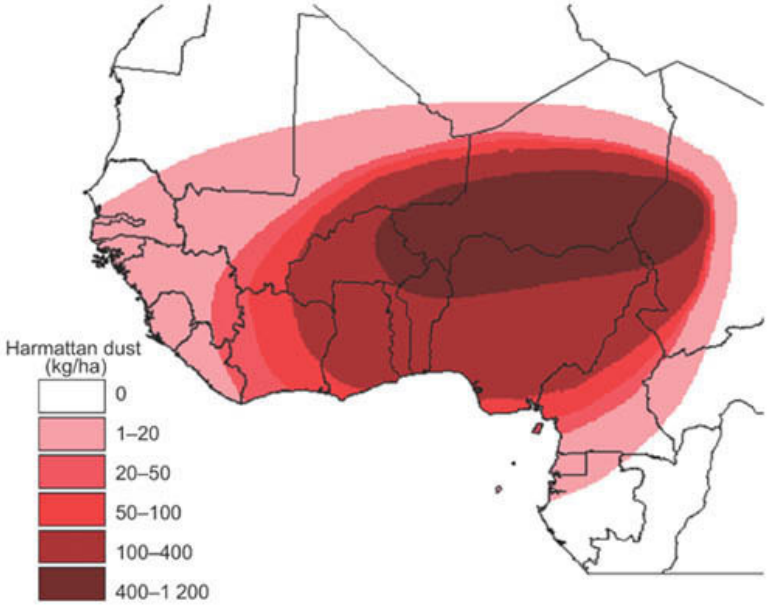

Figure 3. Distribution of Harmattan dust particles in West Africa.

African cultures as something to look forward to, or to dread, depending on local circumstances. Dust from the Sahara desert has global environmental effects, as documented by NASA's satellite images showing that the dust reaches as far as South America and the Caribbean[3] (Figure 2). Transcontinental and over-seas transport of Sahara dust carries fungal spores, potentially affecting agricultural productivity in distant land, enriching biological diversity. Furthermore, iron-rich Sahara dust is associated with fertilizing the oceans, leading to phytoplankton growth and carbon seq-uestration, and influencing the Earth's radiative balance[4,5,6]. The award of this year's Nobel Peace Prize to the Intergovernmental Panel on Climate Change (IPCC) and former Vice President Al Gore solidifies the international con-sensus on global climate change and its projected impacts on human societies everywhere[7].

Although African countries are not major contributors of green house gases, their citizens are likely to suffer major consequences of shifting global climate conditions[8]. It is crucial, indeed urgent, to better understand the recursive influence of Sahara dust on global climate and the impacts of greenhouse gases on the warming trends that may exacerbate desertification, and thereby increase dust output. Locally, the effects of harmattan dust on human health and agriculture needs to be explored more closely. About two decades ago, Adepetu and colleagues reported the elemental composition of harmattan dust[9]. The used neutron activation analusis to determine the concentrations of 29 elements, with iron and aluminum being among the highest at 61 and 431 mg g^{-1}, respectively. Respiration of parti-culate matter less than 2.5 micrometers in size is recognized as a health hazard, especially at ambient concentrations reported for many West African countries (Figure 3). In the U.S., the Environmental Protection Agency is responsible for enforcing legislation on the limits of fine particulate matter (P.M. 2.5) exposure. On 29 March 2007, the EPA issues final guidelines

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[2] Image by courtesy of Image courtesy Jacques Descloitres, MODIS Land Rapid Response Team at NASA GSFC: http://earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img_id=16480

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for regions to “clean up their air”[10]. According to the EPA, “Fine particles or "PM2.5" can aggravate heart and lung diseases and have been associated with premature death and a variety of serious health problems including heart attacks, chronic bronchitis and asthma attacks.” How much of the African Burden of Disease is associated with harmattan haze? How much is the greenhouse gas emission from industrialized countries contributing to the change in dust output from the Sahara desert? These remain hazy questions, and we must pursue them with utmost vigor to remove one more threat to the health and welfare of African populations.

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