

Food Insecurity's Dirty Secret

Attempts to increase crop yields in sub-Saharan Africa have failed repeatedly since the 1960s because soil quality has been ignored. The Green Revolution of the 1970s bypassed sub-Saharan Africa, and is stalling in the rice-wheat system of South Asia and elsewhere because of soil degradation, organic matter and nutrient depletion, and excessive withdrawal of ground water. Average yields of grain crops in sub-Saharan Africa have stagnated below 1 ton per hectare since the 1960s, with dire consequences on human well-being and ecosystem services. The problem of food insecurity, affecting 854 million people, is worsened by increases in the price of rice, wheat, and other food staples (1–6) and by global warming (7).

Proven soil management technologies, to be promoted in conjunction with improved varieties, include (i) no-till farming with mulch, cover crops, and complex rotations; (ii) water conservation, harvesting, and recycling with efficient irrigation including drip and furrow methods; and (iii) integrated nutrient management with compost, biochar, N fixation, and supplements of nano-enhanced and slow-release fertilizers. The yield potential of improved varieties can only be realized if grown following optimal soils and agronomic management. Rather than giving handouts as emergency aids, resource-poor farmers must be compensated for ecosystem services (e.g., trading C credits) to promote technology adoption and soil restoration.

Food insecurity is exacerbated by emphasis on biofuels (1, 8, 9). We must establish energy plantations (10, 11) (grasses, trees, algae, and cyanobacteria) using soils and waters that do not compete with food production. This energy can be used to provide modern cooking fuels to rural communities in sub-Saharan Africa and South Asia, in a way that will minimize health hazards, promote use of crop residues and dung as soil amendments, and mitigate the Asian soot cloud.

The strong relationship between soil degradation and survival of the past civilizations (12) cannot be ignored. If soils are not restored, crops will fail even if rains do not; hunger will perpetuate even with emphasis on biotechnology and genetically modified crops; civil strife and political instability will plague the developing world even with sermons on human rights and democratic ideals; and humanity will suffer even with great scientific strides. Political stability and global peace are threatened because of soil degradation, food insecurity, and desperation. The time to act is now.

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