



## STATE OF THE WORLD 2011 Innovations that Nourish the Planet



### *State of the World Brief Series*

## Chapter 6. Africa's Soil Fertility Crisis and the Coming Famine

### Key Messages

- Africa is facing a soil fertility crisis, and a continent-wide famine could be imminent in the absence of viable solutions.
- Green manure/cover crops can improve crop yields while building farming systems that reduce costs and labor, increase incomes, improve nutrition, and build up rather than destroy natural resources.
- An independently developed green manure/cover crop system used by the Dogon people of Mali is proving that this approach is an appropriate and feasible method of staving off impending famine.

### The Problem

Sub-Saharan Africa faces an unprecedented soil fertility crisis. In two major studies assessing soil fertility and crop productivity in six African countries in 2009–10, local farmers repeatedly reported that people could no longer maintain fertility in their soils and that harvests were declining 15–25 percent a year. Most farmers expected that within the next five years their harvests would drop by half, and some villages already depend permanently on food aid. Availability of new farmland is often next-to-none, and the population is growing. The continent faces an imminent tragedy: a Great African Famine.

Four main factors are contributing to a continent-wide “perfect storm” that will affect Africa’s subhumid and semiarid lowlands most severely. First, animal manure, used widely as soil fertilizer, is in insufficient supply. Due to land constraints, families do not have enough animals to come close to having enough manure to meet fertility needs. Second, farmers are less able to fallow land to naturally rebuild soil organic matter and fertility, due to rising demands for cropland and food. Fallow periods for most African farmers dropped from about 15 years in the 1970s to at most two years today.



Local farmers report that declining soil fertility is causing harvest productivity to drop by 15–25 percent, and they expect it to drop by 50 percent in the next five years.  
(Bernard Pollack)

Third, increased prices of nitrogen-based fertilizers, due to rising energy costs, have put these inputs out of reach for many small-scale producers. The majority of Africa’s subsistence farmers who use chemical fertilizers will have to give them up over the next few years. Fertilizer subsidies would mask the problem temporarily but would result in even more degraded soils in the long term. The fourth factor is climate change, and the rising unpredictability of rainfall is especially damaging to farmers’ productivity.

### Innovations/Solutions

Four proposed solutions to the fertility crisis are: chemical fertilizers, animal manure, compost, and green manure/cover crops. The first three are labor-intensive, and their costs generally exceed the value



*Tephrosia villosa*, growing between row crops, acts as a green manure and cover crop in Africa, improving the fertility of the soil, controlling weeds and adding moisture.  
(*Trees for the Future*/ Michael Randall)

of the increases they bring in yields. The fourth is far more feasible and is also available in the short-term. Green manure/cover crops are inexpensive and bring various environmental and social benefits.

Unlike traditional green manures, which are plant cuttings that are intentionally turned under in the soil, green-manure/cover crops are living trees, bushes, and vines that are used to improve the fertility of soils and to control weeds. In lowland Africa, a three-tiered system is most often appropriate. The first tier is a layer of locally

appropriate beans, such as cowpeas. The second tier, planted above, comprises traditional subsistence crops such as maize, sorghum, and cassava. The third tier is a thin dispersed canopy of trees that provide light shade and improve soil fertility and moisture.

By adopting the use of green manure/cover crops, Africa's subsistence farmers will not only be avoiding famine, but also establishing whole new farming systems that reduce costs and labor, increase incomes, improve nutrition, and build up rather than destroy the world's natural resources.

### Looking Ahead

In the Sahel, one of the most drought-prone areas of Africa, the Dogon people of Mali provide good reason to be optimistic. They have developed a very simple green manure/cover crop system, proving that this approach is both appropriate and feasible. They plant leguminous trees, such as acacias, throughout their fields, and then trim them annually to regulate the shade and to fertilize the fields with the cuttings. They also intercrop their subsistence millet with cowpea, which produces its grain and is buried by termites before the millet is harvested. Many Dogon farmers now obtain three times the average harvest of Sahel areas with similar rainfall. They are not worried about famine, because they have already addressed the problem.