

Securing Soil



Rattan Lal

Improving water security & efficiency on a global scale

The health of soil directly impacts the health of water. *SWS* Associate Editor Amy McIntosh spoke with Rattan Lal, distinguished professor of soil science at The Ohio State University, about soil security and the relationship between soil and water.

Amy McIntosh: How are water and soil intertwined?

Rattan Lal: Soil is a major reservoir of freshwater on a global scale and can store as much as 50% of its volume in water. All living terrestrial plants get their water through soil; by supplying water, soil supports all terrestrial life.

Soil also recycles and purifies water. Its constituents, such as clay and organic matter, will absorb physical, chemical or biological pollutants.

When soil is properly protected, it is a perennial source of spring water to all rivers and streams. The soil and water nexus is a strong one and very closely interlinked: If we degrade one, the other degrades; if we improve one, the other improves. If we improve the land use and restoration management of soil, we automatically improve the land use and efficiency and quality of water.

McIntosh: What is water security and why is it important for crop production?

Lal: Water security is similar to the concept of food security: Both must be available in adequate amounts for human beings and be accessible. People who have to buy water must be able to do so, both financially and logistically. Its quality must be good; the water must not have any pollutants in it. And, of course, it must be safe. Safety in water may mean chemical and biological safety in terms of health, but safety also may mean that people are not threatened when they want to access water.

In semi-arid regions, decreasing per-capita resources of available water is going to be a problem. Many people

believe that the security of and access to water is going to be a major political and confrontational issue for several global hot spots in the future. It already is, in some areas. Therefore, developing policies for sustainable management of water resources at a regional, national and global scale is a high priority.

McIntosh: How can crop production and agriculture be sustainable and water conscious?

Lal: We have different types of water. We can have blue water, green water, greywater, black water or virtual water. Virtual water is water that is embedded in agricultural or industrial produce. For example, the U.S. exports soybeans to China. To produce one ton of soybeans the U.S. has to use about 1,000 tons of water. The water is embedded in the production of a commodity that is being traded across international borders.

In terms of agriculture, [we should consider] how the water utilization can be improved. The idea is to maximize green water, and reuse and recycle the grey and black water, so that we can improve production efficiency. Irrigation is important to current and future food production.

Future laws may focus more on issues related to water than on issues related to energy and oil, because water has no substitute. **SWS**

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