



## FROM THE DESK OF RATTAN LAL

Viewpoint 11.2018

1<sup>st</sup> November, 2018

### Sub: The Soil-Centric Agricultural Reformation

Dear Fellow Soil Scientists,

The world agriculture is at a crossroads. The Green Revolution (GR) of the 1960s and 1970s, based on improved varieties of rice and wheat and intensive use of agro-chemicals, saved hundreds of millions of people from starvation. Between 1961 and 2014, the cereal grain production in the world increased by a factor of 3.91 (from 643 Tg to 2514 Tg) while the land area increased by only 33.9% (from 425 Mha to 569 Mha), and the global average per capita grain production increased from 209 kg in 1961 to 346 kg in 2014. The average per capita grain production of 350 kg in 2017 indicates a uniquely impressive global success story. While the GR concept and its adoption served its purpose of bringing about a rapid increase in global food production, it also created some environmental consequences such as the pollution of air, contamination/eutrophication of water, and degradation of soil. Furthermore, the benefits of the GR were not availed in most of the sub-Saharan Africa where either the inputs were not available or the resource-poor farmer were not sure of their usefulness in fragile soils and the harsh environments. Elsewhere, the widespread problems of environmental pollution include: algal blooms; soil degradation, water depletion in regions of irrigated farm lands; and increasing emissions of greenhouse gases. Increasing use of agro-chemicals in soils depleted of their organic matter content, while killing pests and pathogens also adversely affects human health, and the health effects of pesticides are a major concern throughout the developing world. The contamination of water, however, can also happen from inappropriate use of compost and green manure. Whereas, soil degradation is exacerbated by agricultural expansion and excessive plowing, environmental pollution is caused by indiscriminate and excessive use of agrochemicals, secondary salinization and rise in water table by unnecessary flood-based irrigation, and air pollution by in-field and in-house burning of crop residues and other biomass. Yet, 821 million people are under-nourished and 1 to 2 billion are malnourished. While the agriculture of the future must be both food and nutrition-sensitive, the uncontrolled growth of human reproduction must be immediately curbed through universal education, especially of girls. These environmental problems are also exacerbated by the mindset of taking soil resources for granted. The severe problem of soil degradation, caused by land misuse and soil mismanagement, must be critically and urgently addressed. Thus, future agroecosystems must be soil-centric and conceptualized as: i) pedologically restorative, ii) agronomically productive, iii) environmentally regenerative, and iv) clinically healthy. **Simply put the need for eliminating hunger and malnutrition must be reconciled with the necessity for improving the environment and that of restoring the degraded and depleted soils.** Agroecosystems must be managed by practices which restore soil health, recycle nutrients, conserve and purify water, strengthen biodiversity, and produce nutrient-rich food. **Soils must never be taken for granted.**

Sincerely,

Rattan Lal,  
President, International Union of Soil Sciences