



FROM THE DESK OF RATTAN LAL
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Sub: **In Soil We Trust**

Dear Fellow Soil Scientists,

Thomas Robert Malthus, author of *An Essay on the Principle of Population* (1798), was concerned about feeding the world when population reached 800 million. Malthus' views were echoed by Paul Ehrlich, author of *Population Bomb* (1968). Malthus could not have imagined the world with a population of 7.6 billion in 2017 (10 times) and destined to be 11.2 billion by 2100 (14 times), and especially the fact that the present lifestyle is more affluent than ever before. And then came along Ester Boserup, a Danish economist and author of the book *The Condition of Agricultural Growth* (1965). She advocated the concept: "Necessity is the mother of invention." The Boserupian theory states that the intensity of agricultural production is driven by the change in population and its demands through technological advances. Yes, indeed there has been 10-fold increase in food grain production over the last 200 years. However, while the total production has and is increasing, the rate of increase in grain yields of cereals is slowing down from 3%/yr in 1960-1970 to <1% in 1990-2000. Simultaneously, there is an increasing resources demands of developing countries (China, India, Brazil, Mexico, Russia, etc). Contrary to the Boserupian or Cornucopian views that the provisions of resources depend on advances in technology, some argue that the population bomb has been delayed and is awaiting to explode. While hoping that humanity will shrink its population voluntarily to a more management number (~4 billion) sometimes in the future, soil scientists should identify specific niche and blaze a new trail by identifying how to: (i) **save resources** by reducing losses and increasing eco-efficiency, (ii) **create resources** by making anthrosols, increasing biological N fixation, transforming blue and gray/black waters into green water, and recycling byproducts through a circular economy, (iii) **spare the land** by using the best and restoring the rest for nature, (iv) **make agriculture a solution** to the environmental problems, (v) **restore functionality** of degraded/desertified soils, (vi) **develop soil-centric** rather than anthropocentric programs to counteract the negative externalities of the geometric population growth during the 20th and 21st centuries, and (vii) **adopt the motto "In Soil We Trust."**



Sincerely,

Rattan Lal,
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