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Subject: Drylands

Fellow Soil Scientists,

The U.N. declared 2010-2020 as the Decade for Deserts and the fight against desertification. World's drylands represent 41.3% (60.9 million km^2) of Earth's land area, and comprise of desert (6.6%), semi-desert (10.6%), grassland (15.2%), and rangeland (8.7%). Drylands are home to about 2.7 billion people representing 35.5% of the world's population in 2018. Drylands, being strongly impacted by desertification, have already expanded by 4-8% over the 20th century and may continue to expand by an additional ~10% compared with the baseline of 1961-1990, and probably cover ~50% of the Earth's land area by 2100. Drylands contain 46% of global carbon stocks compromising of 53% of global soil C stock and 14% of global biotic carbon stock. Among 10 known centers of the origin of agriculture, around circa 10,000 BC, domestication of plants and animals began mostly in World's drylands (e.g., the Fertile Crescent, Indus Valley, Southwest Asia, Southwest U.S., Central America). These eco-regions, characterized by long drought events, supported plants with large annual seeds (e.g., wheat, einkorn, barley, peas, lentils, chickpeas, flax) which survived during the long dry periods and germinated whenever it rained. Presently, ~50% of world's productive land is dryland and 50% of world's livestock is in drylands. With increase in population and change in climate, however, drylands are increasingly prone to desertification. The projected climate change would lead to increasingly drier deep soil layers during the growing season and adversely impact the provisioning of critical ecosystem services (e.g., water, biodiversity, food, feed). The reduction in soil moisture storage would aggravate warming, increase evapotranspiration, exacerbate depletion of soil water reserves, and severely reduce the grain yield of cereals. On the contrary, restoration of degraded/desertified drylands and ecosystems can sequester carbon in biomass and soil, contribute towards mitigating anthropogenic climate change, enhance socio-ecological resilience and improve the environment. The carbon sequestration potential of soils of drylands is estimated at 0.7-1.3 Gt C/yr., equivalent to~ 10% of the global fossil fuel emissions. However, the available soil moisture content in the root zone, the so-called "green water," is the most critical factor to restoring degraded drylands and strengthening ecosystem services, especially the net primary productivity. Similarly, dryland farming based on conservation and judicious management of rainwater in the root zone, is essential to improving and sustaining productivity. Restoration of soil health in drylands is also essential to advancing SDGs of the U.N. especially #2 (end hunger), #6 (clean water), #13 (climate action), and of course #15 (life on land). If degraded soils are not restored, water scarcity, already affecting 1-2 billion people of which most live in drylands, may be aggravated by climate change and desertification. **Because "the rebellious dwell in a dryland" (Psalm 68:6), restoring desertified lands and conserving water in the root zone is "like a cold water to a thirsty/weary soul." Furthermore, "do not waste water even if you were at a running stream"(Prophet Mohammad).**

Sincerely,

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International Decade of Soils 2015-2024