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Soil carbon for multiple ecosystem benefits: Positive examples from Brazil

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Agriculture provides food, fibers and energy, which have been the foundation for the development of societies. Soil Organic Carbon (SOC) plays an important role in providing essential ecosystem services that historically have been reduced to plant nutrient availability, and agricultural management was driven for obtaining maximum benefits of this soil function. SOC, as part of the soil organic matter, comprises several fractions, such as the light fraction, microbial biomass, water-stable organics, and humus. It is considered one of the most useful indicators of soil quality, because it interacts with other numerous soil components, affecting water retention, aggregate formation, bulk density, pH, buffer capacity, cation exchange properties, mineralization, sorption of pesticides and other agrichemicals, color (facilitate warming), infiltration, aeration, and activity of soil organisms. It is the interaction of the various components of a soil that produces the net effects and not organic matter acting alone. According to recent concepts, sustainable land use must be assessed in terms of its impact on the SOC pool. There are several examples for SOC management for multiple benefits in Brazil, with new soil management techniques attempting to reverse this trend by increasing SOC stocks. One example is the zero tillage which has the advantage of reducing CO_2 emissions from the soil and thus preserving or augmenting SOC stocks. Another positive example is the adoption of no-burning harvest of the vast sugarcane area in Brazil, which also contributes to reduced CO_2 emissions, leaving crop residues on soil surface helping the conservation of essential plant nutrients and improving water storage.

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Speculation during the rare earth crisis – Implications for Nd recycling

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Rare earth elements are often considered critical materials for high-tech products such as wind turbines, electric vehicles or cell phones. In 2010 China strongly reduced its export quotas on rare earths. As a result, the share prices of mining companies and the prices of rare earths increased about thirty times in 2010 and 2011 compared to their values before 2010. Since then rare earth prices have nearly returned to their pre-crisis level. Despite the predicted growth of the market, global rare earth production has virtually stagnated since 2009 according to USGS data. The amount of rare earths in many products decreased due to improved product design while in other products rare earths may be completely substituted by other materials. This paper examines if speculation has played a role during the rare earth crisis or if the crisis may even be termed a speculative bubble. Scientific literature indicates that four conditions are usually met during a speculative bubble. (i) The existence of an exogenous event that raises growth expectations for a certain market, (ii) positive feedback processes during the crisis, (iii) expansion in loan financing and (iv) asymmetric information between insiders and outsiders. The implications of low metal price for rare earth recycling, particularly Nd recycling are discussed. Even at low price level, recycling from end-of-life products containing large amounts of rare earths can be economically viable. Rare earth recycling from cell phones, earphones and similar small products may be difficult to realize as the value of rare earths per product is relatively low.

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