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### **Manure legacy effects on sugarbeet production and quality.**

This long-term study assessed the effects of fertilizer and past manure applications on soil nutrient cycling and soil microbial function in the irrigated semiarid climate of southern Idaho. This data can help guide future nutrient inputs for subsequent crop production. In this paper we focus on crop (including sugarbeet) production and soil health indicators. From 2004 to 2009, solid dairy manure treatments were applied to plots at cumulative rates of 0, 134, and 237 dry Mg ha<sup>-1</sup> (34-56 dry Mg ha<sup>-1</sup> yr<sup>-1</sup>) in a randomized complete block with three replicates from 10 to 15 years post manure application, soil samples were taken from each treatment at 0-15 and 15-30 cm depth, and sugarbeet, corn, and barley yields and quality factors were determined. In general, the 237 Mg ha<sup>-1</sup> treatment had greater yields compared to the 0 Mg ha<sup>-1</sup> treatment. Many of the soil chemical and biological indicators were different between the manure and control treatments. In general, soil organic carbon (SOC) and biological indicators were significantly greater in the 134 Mg ha<sup>-1</sup> and 237 Mg ha<sup>-1</sup> treatments as compared to the 0 Mg ha<sup>-1</sup>. Manure had a legacy effect on crop and soil health factors up to at least 15 years.