Examples and Case Studies of Beneficial Reuse of Beef Cattle By-Products

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By-products are an inescapable part of a beef-production system. These include manure and by-products from slaughter and meat processing. The primary focus of this chapter will be on manure from confined animal feeding operations. These by-products are often considered a problem because of the cost and management requirements for controlling and disposing them. F.J. Sievers (Azevedo & Stout, 1974) stated “A well-kept manure pile or improved methods of handling this product on the farm are not only a sign of thrift, but also an indication that the farmer is an intelligent operator who understands his problem and is interested in the permanency of agriculture”. Sievers recognized the problem, but more importantly, he recognized that problem by-products were extremely important for sustaining agroecosystems. Salter and Schollenberger (1938) also recognized the importance of manure. They stated in the 1938 Yearbook of Agriculture that the potential value of the 1 billion Mg (1 billion tons) of manure produced on American farms was three times that of the nation’s wheat (Triticum aestivum L.) crop and that its organic matter content was double the amount of soil humus annually destroyed in growing the nation’s grain and cotton crops. The value of this manure was largely ignored following World War II when numerous factories built by the federal government to manufacture fixed N for munitions became available to make relatively low price farm fertilizers. Although N fertilizers have been very effective for crop production, there is growing evidence that soil quality is poorer where N fertilizers are used compared to use of animal manures. Eck and Stewart (1995)—based on a review of the literature—stated that animal manure increased soil organic matter content, soil aggregate stability, water-holding capacity, water infiltration, and hydraulic conductivity, and decreased bulk density and evaporation rate. Beneficial effects of applying animal manures to cropland are long-lasting. Data from the Hoosfield Barley Experiment at Rothamsted (Jenkinson, 1991) demonstrated that effects of animal manure additions (35 Mg ha⁻¹ yr⁻¹ for 20 yr) on soil organic matter were still measurable more than 100 yr after applications were discontinued. It is interesting to recall the countless number of times that farmers have wanted to show or discuss fields that had either been treated with animal manure or where alfalfa had