

COMPOSTING BEEF FEEDLOT MANURE: A SUSTAINABLE ELEMENT OF INDUSTRIALIZED AGRICULTURE^{MAS-CPR}

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Contemporary industrial scale grain and livestock production systems limit the wide-scale adoption of sustainable agriculture practices in the midwestern United States. Large scale grain producers no longer manage livestock and are entirely reliant upon external sources of nitrogen fertilizer. Economic and logistic realities make it unlikely that these midwestern grain producers will return livestock to their operations in the near future. Paradoxically, large scale livestock producers view manure as a waste handling problem rather than a fertilizer resource. Manure from beef feedlots with over 1,000 animals is often stockpiled, creating a point-source pollution problem. Livestock manure not handled as a fertilizer resource represents a significant waste management problem, because there are over 10 million cattle on feed in the U.S. The composting process stabilizes nutrients, kills pathogens and weed

seeds, reduces odor and moisture content, and improves physical properties, thereby improving the quality of the manure as a soil amendment. Although 20 - 50% of the nitrogen in manure may be lost during the composting process, nitrogen loss similar to stockpiling, the end product differs from fresh or aged manure in that it exhibits minimal loss of nitrogen to the environment following application and exhibits numerous other improved physical and chemical properties compared to raw manure. The slow nitrogen mineralization rate from composted manure allows for nitrogen fertility needs to be met with compost alone after 12 years of application. The reduction in nitrogen fertilizer consumption on irrigated corn in the state of Nebraska would result in an annual energy savings of over 3 million Btu/acre, which is equivalent to about 19.4 gallons of diesel fuel/acre.