Composting: A Post-Flood Crop Management Alternative

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A rapid and cost-effective strategy to manage flood-damaged fields is to till the crops (corn, hay, vegetables, grains) into the soil. In post-flooding conditions, silt, debris, oils, pathogens and other deposits may also be covering the fields or be mixed in with the crops. Incorporation of these crops and residues from recent flooding should allow for the use of these fields by spring 2012 in most situations. The Center for Sustainable Agriculture cites studies indicating that adding compost to flooded soils may decrease the levels of microbial pathogens. This practice introduces beneficial microorganisms and improves the soil's physical structure.

The beneficial organisms and organic matter in finished compost can stimulate the soil's biology. This results in improved soil structure, improved rainfall infiltration and enhanced moisture retention in dry periods. Active soil biology is also beneficial for decomposing crop residues that have been incorporated through tillage.

Composting damaged crops and residues is an alternative management strategy that provides added benefits. Composting can also be an effective option in fields or portions of fields with large amounts of plant residue that exceeds the soil's ability to decompose the plant matter. With the tillage approach, clumps of plant matter left decomposing in the field can host certain harmful soil organisms and pest insects. While they may be part of the ecosystem breaking down the plant residue, they may also become hosts, egg-laying sites or habitat for plant and insect pests the following year. Removal of excessive residue to a nearby site for composting allows farmers to control the decomposition process that can destroy pathogens and contaminants. When the process is complete, the finished product can return beneficial, composted organic matter to crop fields.

Composting practices must follow a few basic principles to be effective in destroying pathogens and converting flood-damaged input materials into usable compost.

- The compost pile should take the shape of a loaf of bread or "windrow," where new materials are added to the end of the windrow. This is different than a large stack or pile, where oxygen and airflow is limited to the outside edge of the stack.

- Materials to be composted should be mixed to balance moisture and nutrients. 60% moisture content is a good target-about the consistency of a damp sponge that doesn't drip.

- Carbon (C) (or "brown" materials) should be 30 parts to one part Nitrogen (N) (or "green" materials) by dry matter proportions if an analysis is done. This can be an estimate of 3 parts brown to 1 part green by volume. Chopped corn silage approximately fits this desired ratio by itself, as does bedded calf manure. Typically a mix of materials is needed to meet this target blend.
- The size of the windrow can range from 6 feet wide and 4 feet tall for dense materials, to 15 feet wide and 10 feet tall for lighter, fluffier mixtures. These adjustments to dimension will help promote air movement through the piles that is necessary for maximum aerobic microorganism activity in the decomposing material.
- Expect actively composting windrows to shrink at least 50% in volume within a few weeks. A shrinking pile is a good sign.

Windrows with adequate oxygen, carbon to nitrogen (C:N) balance and moisture should reach temperatures of 135°F to 160°F (Fahrenheit degrees) and should not release offensive odors. Many techniques can be used to completely compost materials effectively. These include turning or flipping materials with a bucket loader to expose all areas to the heating (thermophilic) portions of the windrow and, actively aerating the windrows with blowers or fans (through perforated piping at the base of each pile) to promote airflow. For example, Vermont Organic Farmers (VOF) requires as a *minimum* that windrows reach 131° for 3 days, and that piles are mixed to ensure that all feedstock heats to the minimum temperature.

Additional resources about farm-scale composting are available at the Composting Association of Vermont website, www.compostingvermont.org, and at the Highfields Center for Composting, www.highfieldscomposting.org.

Annual flooding can provide organic matter and silt to replenish floodplain soils. On the other hand, extreme destructive flooding and excessive deposition of debris and silt pose multiple challenges for farmers. Composting is a practice that can provide multiple benefits to farmers with flood damaged fields and crops.

These composting recommendations are intended for larger-scale piles. Backyard composting typically does not achieve temperatures that exceed 131 F. High temperatures and rapid decomposition are necessary to destroy pathogens such as E. Coli and Salmonella. There may be nearby composting sites that are large enough and capable to handle debris if on-site composting is not sufficient. Check with your local solid waste district for a nearby composting site.

This document is a resource from the Composting Association of Vermont (CAV) Technical Advisory Committee (TAC)

For more info contact Brian Jerose, CAV TAC chair (802) 933-8336/ jerose@together.net, or Pat O'Neill, CAV Director (802) 744-2345, pats@gaw.com, or visit www.compostingvermont.org