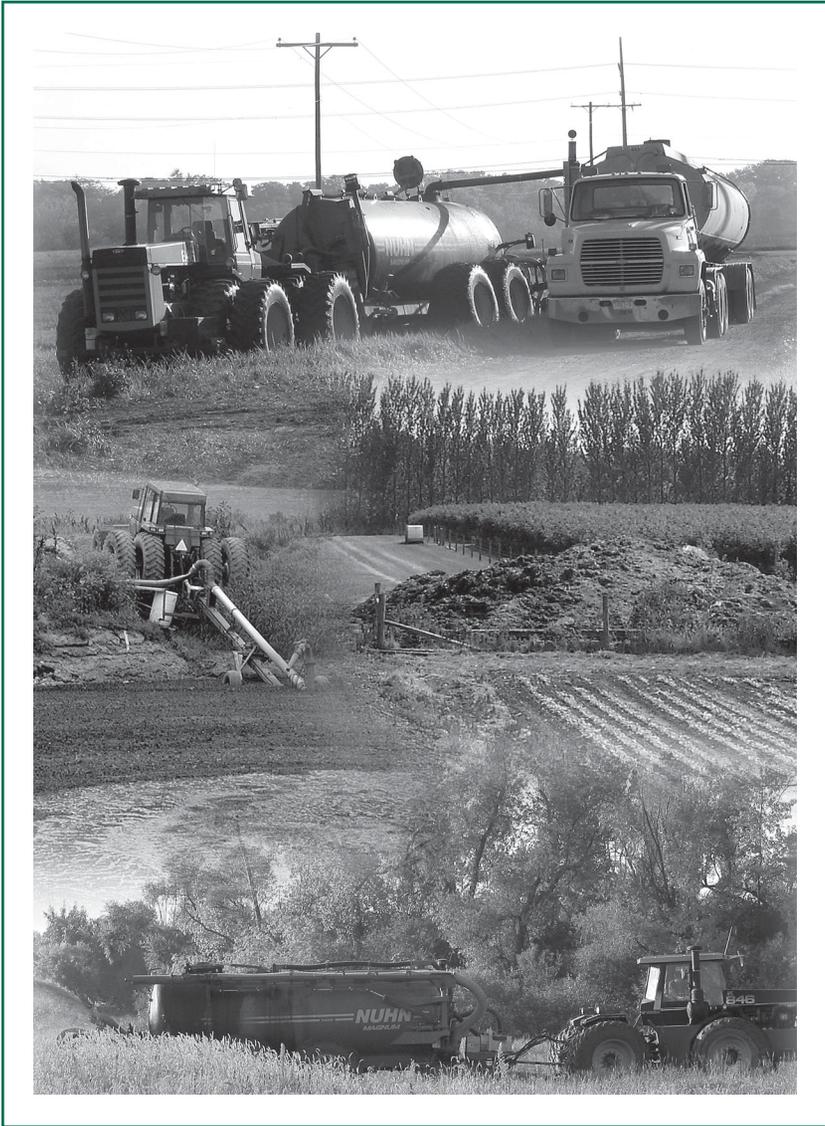


Food Safety Begins on the Farm: A Grower Self Assessment of Food Safety Risks



Manure Use



Manure Use on Produce Farms

Several harmful microorganisms (pathogens) found in livestock manure can cause illness in humans, but cause no symptoms in the carrier animal. If the vegetable or fruit crop is grown on recently manured land, there is some risk (level unknown) that the crop may become contaminated by these pathogens during the production cycle.

While washing produce after harvest may reduce surface contamination, most organisms are not effectively removed or killed by use of common disinfectants. If the produce item has a rough surface, sanitizing is more difficult. Therefore, preventing contamination of the crop on the farm and in the packing house is the goal.

As growers, you must consider both environmental and food safety risks in planning your manure applications. Manure management practices that reduce negative environmental impacts, such as runoff and odor, can also reduce risks for contamination of edible crops with human pathogens that might be in the manure. The use of buffer strips along water ways, and the application of manure

to land with a crop residue or cover crop are two examples of GAPs to reduce environmental risk by minimizing runoff. These practices will also reduce potential spread of pathogens to surface water. Minimizing runoff that could contaminate surface water also reduces poten-

tial contamination of fruit and vegetable crops because this surface water may be used for irrigation.

Incorporation of manure after land application can reduce chances of direct pathogen contamination by splash. In addition, by maximizing the time intervals between manure application to soil and crop harvest, pathogens levels in soil may be reduced, leading to lowered risk of crop contamination. The GAPs recommendation is to allow at least 120 days between manure application and crop harvest. This means that a manure sidedress or manure teas are never applied to the field once a produce crop is planted. Proper composting reduces pathogens that may be present and is a preferable alternative to raw manure application.

Dealing with food safety issues related to manure use are complex. To facilitate your review, this section is broken into two separate worksheets:

1. Manure Sources and Application Practices
2. On-Farm Manure Storage and Handling

Please complete all sections, if you use manure on your farm.



Manure Sources and Application Practices

Good Agricultural Practices

Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
Knowledge of manure handling from provider 	The manure source provides information on manure handling practices, including documentation.	Manure handling practices of the provider are known, BUT no documentation has been provided.		Little or nothing is known about manure handling practices of the source.
Manure segregation practices of young and adult animal manure	Manure is from a farm that always segregates manure of immature animals from manure of mature animals. Only mature animal manure is applied to produce fields.	Manure is from a farm that sometimes segregates manure of immature animals from manure of mature animals.		Manure is from a farm that combines manure from young animals with manure from mature animal or little or nothing is known about manure handling practices of the source.
Timing manure application to planned fruit or vegetable acreage 	Manure is applied and incorporated into the soil at least 120 days prior to harvest of a produce crop OR manure is applied to the field the year fruit trees are planted OR composted manure is applied. Time between manure application and harvest is ALWAYS maximized.		Manure is applied and incorporated into the soil, at least 60 days prior to harvest of a produce crop.	Manure is applied and incorporated into the soil less than 60 days prior to harvest of a produce crop or manure is top dressed or side dressed to produce crop within 60 days of harvest. This top dress may be in the form of animal bedding that was applied as a mulch between rows.

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Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
Crop choice and pathogen contamination risks on recently manured ground	Only tree fruits, fruit bushes, field or forage crops, or vegetable crops to be heat processed are planted on recently manured land.	Vegetable crops are staked and rows covered with mulch to reduce risk of contamination from manure in soil.	Low growing fruit or vegetable crops are grown without mulch on recently manured ground.	Lettuce and root crops are planted in recently manured ground.
Manure teas	No manure teas are used.			Raw manure is used in production of foliar fertilizers or "teas" that are applied to soil or plants less than 120 days before harvesting the crop.
Sidedressing crops with manure	No manure is used to sidedress the produce crop in the field			Manure is used to sidedress produce crops during the growing season.
Barriers to reduce manure runoff or movement to surface water sources, to minimize risks of pathogen contamination of water used by downstream neighbors	Crop residues or cover crops are always used to minimize manure nutrient leaching or run-off from fields. Cover crops or "filter strips" are <u>always</u> used at field boundaries and along water courses to minimize manure runoff.	Crop residues or cover crops are usually used to minimize manure nutrient leaching or run-off from fields. Cover crops or "filter strips" are <u>sometimes</u> used at field boundaries or along water courses to minimize manure runoff.	Crop residues or cover crops are not routinely used to minimize manure nutrient leaching or run-off from fields. Cover crops or "filter strips" are <u>seldom</u> used at field boundaries or along water courses to minimize manure runoff.	Cover crops are never used to reduce manure nutrient leaching or run-off from fields. Filter strips are <u>never</u> used along water courses to minimize manure runoff.

Manure Sources and Application Practices

Good Agricultural Practices

Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
Manure run-off to produce fields	Produce is never grown in fields that might receive manure run-off from other fields or barnyards.	Produce is seldom grown in fields that might receive manure run-off from other fields or barnyards.	Produce is occasionally grown in fields that might receive manure run-off from other fields or barnyards.	Produce is regularly grown in fields that receive manure run-off from other fields or barnyards.
Field status at time of manure application	Manure is never spread on fields that are water saturated, prone to flooding or runoff, AND is not spread on frozen or snow covered ground.	Manure is seldom spread on fields that are water saturated, prone to flooding or runoff, AND is not spread on frozen or snow covered ground.	Manure is sometimes spread on fields that are water saturated, prone to flooding or runoff, AND is sometimes spread on frozen or snow covered ground.	Manure is spread on fields regardless of their condition. During wet periods no attempt is made to select fields that are less saturated, prone to flooding or runoff, and frozen or snow covered for manure applications
Record keeping of manure use 	Detailed records are kept of fields receiving manure, including rates and dates of application.	Records are kept of fields receiving manure, but not rates and dates of application.	No records are kept of manure application, but manure is applied only to fields to be planted to non-human food crops.	No records are kept of manure applications.

Manure Sources and Application Practices Action Plan

Date: _____ Reviewer: _____ Field or Commodity: _____

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Knowledge of manure handling from provider								
Manure segregation practices of young and adult animal manure								
Timing manure application to planned fruit or vegetable acreage								
Crop choice and pathogen contamination risks on recently manured ground								
Manure teas								

Manure Sources and Application Practices Action Plan

Date: _____ Reviewer: _____ Field or Commodity: _____

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Sidedressing crops with manure								
Barriers to reduce manure runoff or movement to surface water sources, to minimize risks of pathogen contamination of water used by downstream neighbors								
Manure run-off to produce fields								
Field status at time of manure application								
Record keeping of manure use								

On-Farm Manure Storage and Handling

Good Agricultural Practices

Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
On-farm manure storage, prior to land application	Manure is stored in an area that is physically isolated from produce fields and produce handling facilities, with barriers to reduce risk of leaching, runoff, or windspread.	Manure is stored in an area that is physically isolated from produce fields and produce handling facilities but is not covered or quarantined by a barrier to reduce risk of leaching, runoff, or windspread.	Manure is stored adjacent to a produce field or handling area, but this pile will be completely removed prior to planting or handling a produce crop.	Manure is stored next to a produce packing or handling facility OR adjacent to a produce field AND this pile is present throughout production.
Slurry storage periods prior to application to produce fields 	Slurry to be applied to produce fields is placed in a separate storage that once filled, is held for 60 days in summer and 90 days in winter prior to land application.		Slurry to be applied to produce fields is from a storage with an estimated retention time of 40 to 60 days.	Slurry to be applied to produce fields is from a storage that has continuous additions and removals, so storage time is difficult to estimate OR slurry is applied to produce fields directly from livestock confinement area.
Manure storage conditions	Manure storage has roof AND there is no liquid runoff from the storage area. Manure is never piled in the field or on bare soil.	The manure storage has no roof. A retaining wall diverts liquid runoff to a separate liquid waste system. Manure is never stacked in field or on bare soil.	Any liquid runoff from manure storage is diverted to a grassed filter strip OR manure is piled on medium to fine textured soils, AND manure storage is completely cleaned out in the spring.	Liquid runoff is not contained OR manure is piled on coarse texture soils.

On-Farm Manure Storage and Handling

Good Agricultural Practices

Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
Preventing clean water from entering manure storage	Storage unit has surface water diversions to prevent runoff from entering storage AND a perimeter drainage system to prevent ground water entry.	Storage unit has surface water diversions to prevent runoff from entering storage but there is no perimeter drainage system to prevent ground water entry.	There are plans for a storage unit for surface water diversions to prevent runoff from entering storage and a perimeter drainage system to prevent ground water entry but neither are constructed.	Little or no control exists over amount of roof water, surface runoff water or ground water entering storage.
Slurry storage design to reduce risks of manure leaching or spills onto fields or to water courses	Slurry storage facilities are designed and installed according to engineering standards. Plans and test pit data are on file AND there are no signs of leaks, cracks or other structural problems. An emergency plan is available for pit failure or spills.	Slurry storage facilities are designed and installed according to standards in use AND there are no signs of leaks, cracks or other structural problems. There is no emergency plan available for pit failures or spills.	Slurry storage facilities are not designed according to standards, but there are no signs of leaks or cracks. If earthen, they are installed on tight soils with bedrock and normal water table more than 3 feet below the bottom of the storage unit.	Slurry storage facilities are not designed according to standards AND they are installed on permeable soils. If earthen, they are closer than 3 feet to normal water table or bedrock without an appropriate liner. Farm owner has limited knowledge of soil conditions and depth to bedrock OR there is evidence of leaks, cracks, or other structural problems.



On-Farm Manure Storage and Handling

Good Agricultural Practices

Practices Requiring Attention



Management Area	Best Practice	Minor Adjustments Needed	Concerns Exist; Examine Practice	Needs Improvement: Prioritize Changes Here
<p>Use of self-assessments (e.g. Farm-A-Syst¹) or consultants to reduce negative environmental impacts of manure management practices</p> 	<p>An assessment of farm environmental impacts has been conducted and necessary changes have been made to reduce risk of manure movement from fields or barnyards into water courses or other fields. These records are on file.</p>	<p>An assessment of environmental impacts has helped identify problem areas on the farm, and efforts are currently being made to reduce manure movement from fields or barnyards into water courses or other fields. These records are on file.</p>	<p>An assessment of farm environmental impacts has identified problem areas related to manure management, but no efforts are being made to address these problems.</p>	<p>There has been no assessment of environmental impacts of current manure management practices.</p>

1. Please see Farm-A-Syst web site for additional information: <http://www.wisc.edu/farmasyst/>.

On-Farm Manure Storage and Handling Action Plan

Date: _____ Reviewer: _____ Field or Commodity: _____

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
On-farm manure storage, prior to land application								
Slurry storage periods prior to application to produce fields								
Manure storage conditions								
Preventing clean water from entering manure storage								
Slurry storage design to reduce risks of manure leaching or spills onto fields or to water courses								

On-Farm Manure Storage and Handling Action Plan

Date: _____ Reviewer: _____ Field or Commodity: _____

Management Area					Your Plans to Reduce Risks			
					Action for Improvement	Person Responsible	Estimated Cost	Target Date
Use of self-assessments (e.g. Farm-A-Syst ¹) or consultants to reduce negative environmental impacts of manure management practices								

1. Please see Farm-A-Syst web site for additional information: <http://www.wisc.edu/farmasyst/>.