Assessing Your Cropland to Protect Water Quality

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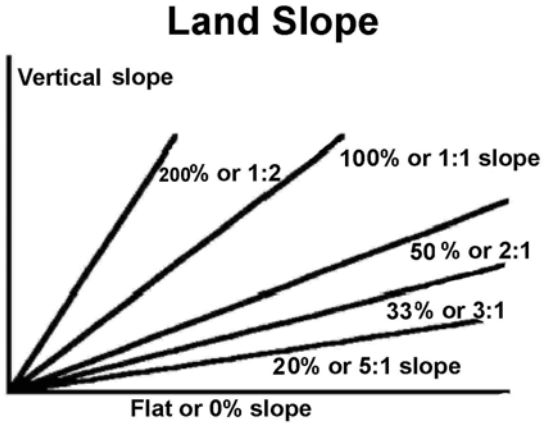
Good cropland management results in high quality produce and profits that support the farm family. Good cropland management also protects farm resources and the environment. This ensures that your land will be healthy and productive for future generations.

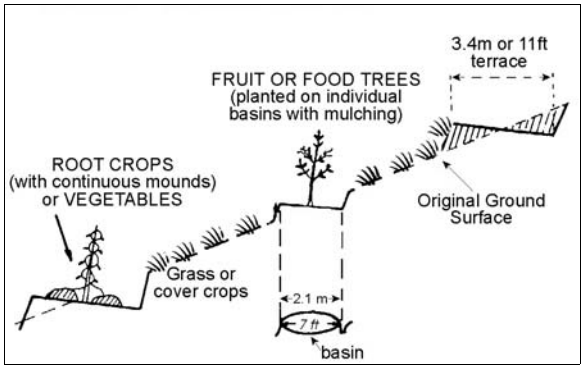
The Virgin Islands have heavy, intense rain storms that produce large amounts of stormwater runoff. Farmers need to install ***best management practices (BMPs)*** to control this water. BMPs can prevent erosion of fertile topsoil and flooding of fields, while conserving rain water for crops. BMPs are also used to improve soil quality (the soil's chemical and physical properties) and manage pesticide, manure and fertilizer applications. Use the BMPs listed below to protect your resources and the environment while improving production.



Filter Strips. Filter strips are narrow strips of grass, shrubs and/or trees that slow runoff water so pollutants like ***sediment*** (eroded soil), pesticides and fertilizers can collect in the vegetation and be used by the plants. Filter strips are most effective on flat land (5% slope or less). Cropland filter strips must be at least 15 feet wide for flat to 10% slopes, 20 feet wide for 10% to 20% slopes, and 25 feet wide for 20% to 30% slopes. If the filter strip is forested instead of grassed, it should be at least 50 feet wide.

Conservation Tillage is any tillage and planting system that reduces soil erosion caused by water and wind. To reduce erosion by water, at least 30% of the soil surface should be kept covered by residue after planting. There are a number of different conservation tillage practices. They include no-till, mulch-till, ridge-till and strip-till. ***No-till*** does not disturb the soil before planting. Planting is done in a narrow seedbed or slot made by a planter or drill. Weeds are kept down with herbicides. In ***mulch-till***, the total soil surface is tilled prior to planting with plows, cultivators, or roto-tillers. Weeds are controlled with cultivation and/or herbicides. ***Ridge-till*** does not disturb the soil before planting. Seedbeds are prepared on ridges and the ridges are rebuilt during cultivation. Weeds are controlled with cultivation and/or herbicides. ***Strip-till*** also does not disturb the soil before planting. Tillage in the row is done at planting using a roto-tiller, in-row chisel or other row cleaner. Weeds are controlled with cultivation and/or herbicides.

Hillside Terracing. Terraces provide a level surface to plant crops and to capture and slow stormwater runoff to reduce soil erosion. Slowing runoff water allows it to soak into the soil for plants to use. Runoff water can also be channeled through a ***swale***, ***grassed waterway*** or ***diversion*** (ditch) to be slowly routed off the field. Most sediment is held on the terrace, reducing loss of fertile topsoil and water pollution.

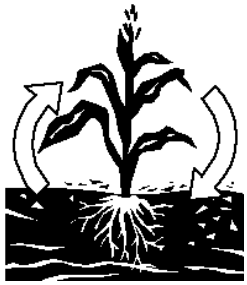


Mini-convertible terraces.

Contour Buffer Strips are a series of grass strips that are planted along the contour, across the land slope. These grass strips alternate with crop strips. The grass slows runoff water, helping the water soak into the soil and reducing erosion. Buffer strips also catch eroded sediment to prevent water pollution. Buffer strips should be at least 15 feet wide and usually make up 1/5 to 1/3 of the slope.

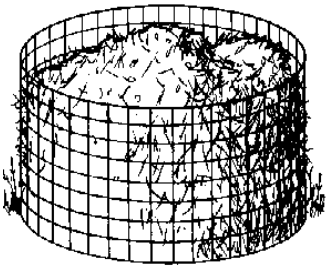
Crop Rotation. Growing (***cultivating***) the same crops continuously on the same fields can deplete soil nutrients and increase pest populations. This leads to increased fertilizer and pesticide use (natural and man-made) to maintain high crop yields and control pests. When large amounts of pesticides are used, the risk of soil and water contamination increases. A good nutrient and pest management plan includes ***crop rotation***. In this practice, crops are changed (rotated) each season in a planned order. Rotation is commonly used on sloping land because it can reduce soil loss by providing protective cover during the year. Rotations can include grasses or forages to provide erosion control. Rotation can also reduce fertilizer needs, break cycles of weeds, insects and diseases, and protect water quality.

Strip Cropping. Crops are arranged so that a strip of grass or forage is alternated with a strip of row crop (like corn). These crops are planted across the slope of the land, as in contour buffer strips. Less than half the field should be planted in row crops. The grass or forage strips reduce erosion, slow runoff water and trap sediment. This practice combines the benefits of contouring and crop rotation. Strip cropping is not as effective if the crop strips are too wide, especially on steep slopes. Maximum crop strip widths range from 130 feet for 1% to 2% slopes down to 50 feet for 21% to 25% slopes.



Mulching. W hen drops of water hit the ground, they can move soil particles up to five feet away from their original spot. Placing a protective barrier or ***mulch*** on the soil surface can reduce erosion caused by raindrops or irrigation water applied by garden hoses, watering cans or overhead sprinklers. Grass or woven mulch mats increase the amount of water that enters the soil (***infiltration***) by reducing crusting of the soil surface. Mulch reduces soil water loss due to evaporation, increasing the amount of water available in the soil for crop production. ***Organic material*** (straw, dried grass or wood chips) used as mulch reduces soil temperature and is especially useful on clay soils.

Organic Matter. The amount of organic matter in the soil is important to crop production. Organic matter increases water holding capacity, improves soil physical condition, provides nutrients and increases nutrient holding capacity. Mixing organic matter into the soil loosens up clay soils, which reduces water runoff. Soils high in organic matter trap excess pesticides and ***synthetic*** (man-made) fertilizers for soil organisms to break them down, reducing surface and ground water pollution potential. Most soils in the Virgin Islands contain only 2% to 6% organic matter, so it is important to add organic matter through mulch or compost.



Compost. Composting creates an organic, slow-release fertilizer that improves soil fertility and physical condition. You can make compost by collecting crop residues, animal manure, unmarketable and unsold harvested produce, and organic waste found around the farm and home. Yard waste (fallen leaves, cut grass or pruned twigs and branches) or some food wastes (egg shells, coffee grounds, fruit and vegetable peelings) are also good ingredients. Layer all these materials in a pile, add water, and turn once or twice a week. After a storm or hurricane, even more yard waste is available to be composted.

Organic Fertilizers. Organic fertilizers are nutrients that come from plants or animals (manure, compost, organic mulches or green manure crops). Organic fertilizers can improve soil physical condition (structure or tilth) and water holding capacity. However, these materials have a much lower nutrient content than synthetic fertilizers, so large amounts must be applied in order to obtain benefits. Repeated applications are usually needed because organic matter breaks down rapidly in the tropics. Handle animal manure carefully to prevent bacteria contamination problems.

Chemical/Synthetic (inorganic, man-made) fertilizers. These fertilizers have a much higher nutrient content than organic fertilizers, but they do not improve soil physical condition. Fertilizer application amounts and rates should be based on the needs of your crop and soil. Have your soil or plant tissue tested to determine how much fertilizer to add in order to prevent over-fertilization. Excess fertilizer is not used by the crop, and so can be washed out of soils by rainfall. This excess fertilizer can pollute ground water, guts, ponds and coastal waters and cause algal blooms and fish kills. Nitrate can also harm human health when found in high levels in drinking water. Follow recommended application rates to reduce pollution potential.

Irrigation. The most efficient method of watering plants is through a ***micro-*** or ***drip-irrigation system***. These systems apply water in small quantities, through hoses or pipes with emitting devices, directly to the plants' root zone. The benefits of using a micro-irrigation system include water conservation, energy conservation, soil conservation, increased crop yield and quality, and reduced pesticide use for disease and weed control. In order to avoid over-watering, apply irrigation water based on a schedule determined with the use of proper soil moisture monitoring devices (such as tensiometers).

Fertigation/Chemigation. An additional advantage of micro- or drip-irrigation is that you can apply fertilizers and pesticides through the system. This practice reduces application costs and risks of ground and surface water contamination.

Integrated Pest Management (IPM). IPM uses active cropland scouting for signs of pest infestation to prevent pest problems from causing a major loss of income. IPM may include a combination of cultivation, manual pest removal, biological practices (using beneficial insects) or synthetic or natural pesticides.

Fill out the following table (**risk assessment**) to determine water pollution risks on your property. If you rank a category ***"high risk,"*** you may not have a problem yet, but your land might be more at risk. If you have checked high risk areas you should create a plan to reduce your potential risks. The plan should include practices to reduce erosion (conserve soil), reduce water runoff (conserve water), improve the quality of your soils, crops and the environment, balance crop needs with resources through the use of a **nutrient management plan**, and control weeds and other pests through an **integrated pest management plan**. It should list:

- Things that you ranked as high risk ("1"),
- Your options (short-term actions that can reduce risks or long-term actions: construction or high cost), and
- The step(s) you will take to fix the problem(s). This will help you to develop practices for your cropland that will improve production and reduce pollution risks.

Name: _____ **Date:** _____ **Location:** _____

Signature: _____

CROPLAND RISK ASSESSMENT

	Low Risk - 3	Medium Risk - 2	High Risk - 1	Your Rating
Site Conditions				
Slope	All cropland < 5% slope	All cropland 5 - 10% slope	Cropland slopes >10%	
Organic Matter Levels	Soil tests show high organic matter levels (> 4%) for all soil types.	Soil tests show average organic matter levels (2 - 4%) for all soil types.	Soil tests show low organic matter levels (< 2%), soils are light in color, or **no soil test** available.	
Soil Structure	Soils are crumbly or loamy, and do not crust after a rain.	Soils are crumbly or crusting.	Soils are clayey, crust after a rain and crack when dry.	
Soil Test	Soils are tested every three years or sooner.	Soils are tested every three to five years.	Soils have not been tested within the last five years or have **never** been tested.	

	Low Risk - 3	Medium Risk - 2	High Risk - 1	Your Rating
Cropland Management				
Nutrient Management Plan	A nutrient management plan is in place on all plots.	A nutrient management plan is in place for some plots.	A nutrient management plan is **not** being used.	
Crop Rotation	A crop rotation of three or more crops is in use.	A crop rotation that uses two or more crops is used.	The same crop is planted on the same plot for more than one year in a row.	
Tillage System	Two or less passes are used on all fields. A minimum of at least 40% of the previous crop residue remains on all plots after planting.	Two or less passes are used on all fields. A minimum of 25% of the previous crop residue remains on all plots after planting.	Plots are tilled with tillage equipment that leaves less than 25% of the previous year's residue on the soil surface.	
Terracing	All plots with slopes >10% are terraced.	Some plots with slopes > 10% are terraced.	Plots with slopes >10% are **not** terraced.	
Pest Control	All plots use Integrated Pest Management (IPM).	Some pest control is based on IPM practices.	IPM is **not** used. Pest control is based on a single method.	
Pesticide Application	All pesticides are applied by a licensed applicator using recommended IPM practices.	Some pesticides are applied using recommended IPM practices. All pesticides are applied by a licensed applicator.	Pesticides are applied by a **non-licensed** applicator.	
Irrigation Application Method	All irrigation water is applied using a micro-irrigation system.	Most irrigation water is applied using a micro-irrigation system.	A micro-irrigation system is **not** used.	
Surface Water Runoff	All plots use stormwater control practices (BMPs) such as filter strips, conservation tillage, crop rotation, terraces, or natural buffers.	Some BMPs are in place and there is no evidence of surface water runoff contaminating water bodies (guts, ponds, or coastal waters).	There are **no BMPs** in place. Surface water runoff is contaminating water bodies (guts, ponds, or coastal waters).	
Water Supply	Have access to plenty of water.	Have access to some water.	Have **no** access to water.	

This **"Risk Assessment"** is a voluntary, private evaluation of your land. It is part of the VI*A*Syst **"Protecting Your Water Through a Home & Farm Assessment"** program. All your answers are confidential.

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