



Yard and Garden Nutrient Management

A major source of water pollution is nutrients from yard and garden areas. The two most harmful nutrients are phosphorus, which is carried on soil eroded in water running into water bodies, and nitrogen, which leaches through the soil to the groundwater. Deep groundwater sources provide most of Hawaii's drinking water, while shallow groundwater eventually flows into stream and the ocean. This HAPPI-Home worksheet will help you recognize nutrient pollution risks from your current yard and garden management practices and identify areas for improvement. It is designed for people with lawns or small gardens and for urban residents who have plots in community gardens. If you are a commercial grower, please consult the HAPPI-Farm series for more information.

All plants need nutrients, including nitrogen, phosphorus and potassium, to grow. However, excessive nutrients can pollute streams and other bodies of water. In the home yard, two potential sources of nutrient pollution are applying more fertilizer than plants can use and improperly disposing of grass clippings, leaves, prunings, and fruits.

Fertilizer management

Before applying either organic or chemical fertilizer to plants, identify the type and amount of fertilizer that will be the most effective. Using too much fertilizer can cause water pollution and is costly. Testing your soil is the best way to learn how much fertilizer you need. The CTAHR Agricultural Diagnostic Service Center conducts basic soil tests for a fee and provides application recommendations. Information on how to take a soil sample can be found in the free CTAHR publication *Testing your soil—why and how to take a soil-test sample* available on the college Web page (<http://www2.ctahr.hawaii.edu/oc/freepubs/>) or by request from CTAHR Cooperative Extension Service (CES) offices.

On Oahu or Maui, the master gardener programs at the Pearl City Urban Garden Center and the Maui Garden Center can help. On Oahu, call them at 453-6055. The phone number of Maui is 244-3242.

Information is also available in various free CTAHR publications, including *Calculating the amount of fertilizer needed for your lawn* (TM-9), *Fertilizers for trees and shrubs* (L-2), and *Fertilizers for fruit trees in the home garden* (GHG-37). Other publications cover specific vegetables and ornamentals. Recent CTAHR publications can be found on the Web page <<http://www2.ctahr.hawaii.edu/oc/freepubs/>>; many others can be requested through your local CES office.

Organic fertilizers such as manure or compost generally release their nutrients more gradually than most inorganic fertilizers, but they can still cause water pollution if used improperly. Be sure to apply the right amount of organic fertilizer based on the nutrient requirements of your lawn, vegetables, flowers, or other landscape plants. Compost and manure are often applied to the soil surface, and special care should be taken to ensure that they cannot be carried off by rainwater during storms.

Slow-release fertilizers can also help reduce nutrient loss by slowly providing plant nutrients. Unlike soluble inorganic fertilizers, which dissolve quickly, slow-release fertilizers contain materials or have coatings that allow them to dissolve slowly. This can help reduce leaching and runoff losses of nutrients. Fertilizers should be lightly worked into the soil or covered by mulch to prevent their being washed away by rain.

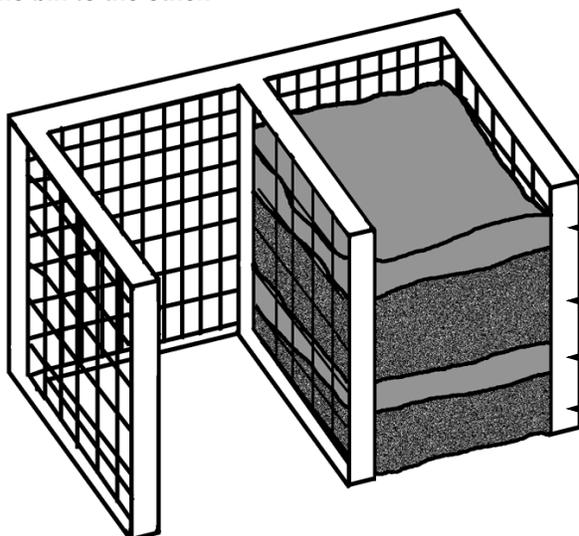
Disposal of organic wastes

Organic wastes including grass clippings, shrub and tree trimmings, leaves, and fruits are another potential source of nutrient pollution. As they decompose, nutrients are released. Do not dispose of these materials on paved

areas or in ditches where they will be carried to streams or storm drains by rainwater. Grass clippings are best left on your lawn to decompose and provide nutrients. On Oahu, curbside collection is provided in some neighborhoods, and drop-off sites are available. Organic waste is composted into mulch that you can get for free. Contact the City Recycling Office at 527-5335 or <<http://www.opala.org>> for more information.

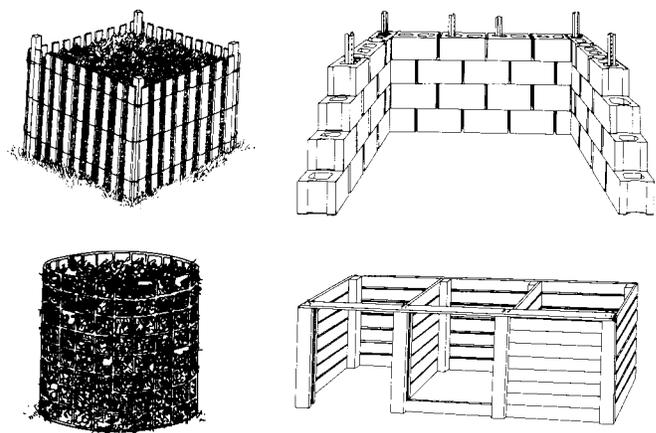
If you have the space, composting is a cost-effective, natural way to recycle leaves, grass clippings, and other yard residues. To compost, put yard wastes in a pile, or install homemade or store-bought bins to contain the material. In addition to yard waste, you can add vegetable trimmings and fruit peels from your kitchen. Your compost pile will remain relatively odor-free if it is turned and aerated regularly. Finished compost can be mixed into garden soil or spread on lawns as a slow-release fertilizer and soil enhancer. For additional information, please consult two other CTAHR publications: *Backyard composting: Recycling a natural product*, and *Composting at a glance*. Both are available on request from your local CES office. On Oahu, the City and County of Honolulu Recycling Office sponsors periodic workshops on backyard composting. Contact them at 527-5335 for more information.

Turning the compost pile speeds decomposition. With two adjacent bins, the compost can be turned by shifting it from one bin to the other.



Animal manures contain high levels of nitrogen, and different types of manure have different levels. If manure is left in piles exposed to the weather, nitrogen-rich runoff may result. If you mix manure from horses, sheep, cows, or other plant-eating animals into your compost, be sure to add plenty of high-carbon materials such as leaves, straw, or sawdust. This will keep the nitrogen from being lost to runoff or leaching. Do not put pet wastes in compost piles because of potential parasite and disease problems. To minimize water pollution risks, cover piles so water will not run off and carry away nutrients and locate piles at least 50 feet from streams or other water bodies.

Different types of compost bin



Build a layered pile at first. The ingredients will be mixed as the pile is turned.

- ← 1–2 inches of soil
- ← 6 inches of organic material (grass, leaves, weeds, etc.)
- ← 1–2 inches of soil
- ← 6 inches of organic material

Risk Assessment Table for Yard and Garden Nutrients and Wastes

	Low risk	Moderate risk	High risk	Your risk
Inorganic fertilizers	Inorganic fertilizers not applied; if used, applied as part of nutrient management plan based on plant requirements and soil test results; slow-release formulations used	Fertilizers applied when poor growth is apparent and nutrient deficiencies are suspected, but soil test results and plant requirements are not considered	Fertilizers regularly applied without considering plant requirements or soil nutrient levels, <i>or</i> fertilizers not applied according to label directions	<input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high
Organic fertilizers	Organic fertilizers not applied; if used, applied as part of nutrient management plan based on plant requirements and soil test results; incorporated into soil	Fertilizers applied when poor growth is apparent and nutrient deficiencies are suspected, but soil test results and plant requirements are not considered	Fertilizers regularly applied without considering plant requirements or soil nutrient levels, <i>or</i> fertilizers applied to soil surface where they can be easily washed off in stormwater	<input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high
Grass clippings, leaves, fruits, and trimmings	Grass clippings, leaves, fruits, and trimmings are left on the lawn or garden or under bushes and flowering plants, composted, or disposed of on property far from water bodies; on Oahu, yard wastes sent for municipal composting	Grass clippings, leaves, fruits, and trimmings are dumped near or in a water body flood zone or on paved surfaces where they can be washed into storm drains	Grass clippings, leaves, fruits, and trimmings are dumped directly into a water body	<input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high
Composting	No compost pile, <i>or</i> the compost pile is well maintained; it is aerated regularly and contains a balanced mixture of yard waste, vegetable food scraps, and a nitrogen source such as manure	The compost pile is poorly maintained; it is not aerated or lacks the proper mix of materials; dog, cat, and other pet wastes are added to the pile	The compost pile is poorly maintained: It contains excessive high-nitrogen material and is not turned regularly. The pile is uncovered or less than 50 feet from surface water	<input type="checkbox"/> low <input type="checkbox"/> moderate <input type="checkbox"/> high

Sometimes grass clippings, compost or excess fertilizer end up on sidewalks and driveways. These materials can easily wash into storm drains and on into streams. Sweeping them back onto your lawn where they belong will stop this from happening.

Assessing your risks

The next step is to determine the water pollution risks from nutrient management in your yard and garden. Compare the items in the risk assessment table above with your management practices and rate your risk as low, moderate, or high for each category.

Your action plan

Now that you have assessed your management practices, you can take action to change practices that may be causing water pollution. For areas that you identified as high or moderate risk, decide what action you need to take and fill out the Action Plan below.

Write down all your moderate-risk and high-risk activities below	What can you do to reduce the potential risk for water pollution?	Set a target date for action
<p>Samples of action items:</p> <p><i>Fertilizers are regularly applied to garden but soil has never been tested</i></p>	<p><i>Collect soil sample and send to CTAHR Agricultural Diagnostic Service Center for analysis and fertilizer recommendation</i></p>	<p><i>One week from today</i></p>



This HAPPI document was adapted by Michael Robotham, Carl Evensen, and Linda J. Cox from *Yard and garden care* by K Marc Teffeu and Ray Bosmans, Chapter 7, pp. 69–74, in *Home•A•Syst: An environmental risk assessment guide for the home* developed by the National Farm•A•Syst/Home•A•Syst Program in cooperation with NRAES, the Northeast Regional Agricultural Engineering Service. Permission to use these materials was granted by the National Farm•A•Syst/Home•A•Syst Office. HAPPI-Home materials are produced by the Hawaii's Pollution Prevention Information (HAPPI) project (Farm•A•Syst/Home•A•Syst for Hawaii) of the University of Hawaii College of Tropical Agriculture and Human Resources (UH-CTAHR) and the USDA Cooperative Extension Service (USDA-CES). Funding for the program is provided by a U.S. EPA 319(h) grant administered by the Hawaii State Department of Health.