

Sustainable Gardening

A thoughtful balance between resources used and results gained

Enjoyed by millions, gardening is among the most popular leisure activities in America and throughout the world. Gardening can contribute to your enjoyment and appreciation of nature and how you garden can have a significant impact – both positive and negative – on your local and regional environment. As a result, gardeners are becoming more aware of environmental protection and improvement practices.

Sustainable gardening is a straightforward concept that requires only slightly more planning than conventional gardening. A sustainable garden is one that thrives with minimal inputs of labor, water, fertilizer, and pesticides. Sustainable gardening also may mean altering your perception of the “perfect garden.” Lawns that are lush, green, and weed-free; plants with no insect damage; and unblemished fruit may be desirable, but they carry a price. Sustainable gardens achieve a balance between inputs and outputs.

You can do a number of things to reduce the inputs necessary to make your garden thrive. The first and most important concerns the soil. Starting with soil that has the correct pH, good drainage, adequate fertilizer, and few weeds is a critical first step in sustainable gardening. Research has shown that nearly 80% of plant problems are related to poor soil. Completing the initial soil test can give guidance on how to improve your soil.

Selecting plant material adapted to your area is the next step. Choosing plants that are well suited to your yard’s climate, light exposure, annual precipitation, and other environmental conditions helps ensure that your plants will grow well. Additionally, selecting species that are disease- and insect-resistant can drastically reduce your need for insecticides and fungicides.

You can also incorporate resource conservation practices into your gardening repertoire. Composting pruned limbs, leaves, and other garden by-products is a good way to create a constant supply of nutrient-rich organic material. Incorporating this composted material into the soil not only improves soil fertility and drainage, but also reduces the burden that garden waste adds to landfills. Likewise, a mulching lawn mower keeps finely chopped clippings on the lawn, where they can decompose and return nutrients to the soil, at the same time eliminating the need to bag clippings and send them to a landfill.

Covering bare soil with mulch leads to many garden benefits. The mulch layer reduces soil water evaporation and runoff, thus allowing water to be used more efficiently. Reduced weed growth is another benefit. Suppressing weeds eliminates the need to apply herbicides and reduces the competition for water between weeds and desired plants. A mulch layer can also minimize fluctuations in soil temperature and reduce root damage from temperature extremes. Additionally, as organic mulches (such as bark chips and leaves) decompose, they add organic matter to the soil and improve soil fertility.

As the world population grows, the planet’s natural resources face increasing stress. Contrary to popular perception, gardening methods do have implications beyond the backyard. If all gardeners, new and experienced, continue to adopt and refine the principles of sustainable gardening, they will further enhance the environment for people, plants, and wildlife.

Biological Principles

Sustainable management of man-made landscapes emulates the natural processes that sustain the biosphere and its ecosystems. First and foremost is the harnessing the energy of the Sun and the cycling of materials thereby minimizing waste and energy use.

Native Plants

The use of native plants in a garden or landscape can both preserve and protect natural ecosystems, and reduce the amount of care and energy required to maintain a healthy garden or landscape. Native plants are adapted to the local climate and geology, and often require less maintenance than exotic species. Native plants also support populations of native birds, insects, and other animals that they coevolved with, thus promoting a healthy community of organisms.

Plants in a garden or maintained landscape often form a source population from which plants can colonize new areas. Avoiding the use of invasive species helps to prevent such plants from establishing new populations. Similarly, the use of native species can provide a valuable source to help these plants colonize new areas.

Site Principles

The following are some site principles for sustainable gardening:

- Do no harm
- Use the Precautionary Principle

The **Precautionary Principle** states if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is *not* harmful falls on those taking an act.

This principle allows policy makers to make discretionary decisions in situations where there is the possibility of harm from taking a particular course or making a certain decision when extensive scientific knowledge on the matter is lacking. The principle implies that there is a social responsibility to protect the public from exposure to harm, when scientific investigation has found a plausible risk. These protections can be relaxed only if further scientific findings emerge that provide sound evidence that no harm will result.

- Design with nature and culture
- Use a decision-making hierarchy of preservation, conservation, and regeneration
- Support a living process
- Use a system thinking approach
- Use a collaborative and ethical approach
- Maintain integrity in leadership and research
- Foster environmental stewardship

Measuring Site Sustainability

One major feature distinguishing the approach of sustainable gardens, landscapes and sites from other similar enterprises is the quantification of site sustainability by establishing performance benchmarks. Because sustainability is such a broad and inclusive concept the environmental impacts of sites can be categorized in numerous ways depending on the purpose for which the figures are required. The process can include minimizing negative environmental impacts and maximizing positive impacts. As currently applied the environment is usually given priority over social and economic factors which may be added in or regarded as an inevitable and integral part of the management process. A home gardener is likely to use simpler metrics than a professional landscaper or ecologist.

The *Sustainable Sites Initiative* is producing recommendations for the American Landscape Industry. The standards and guidelines finally adopted will lead to a uniform national standard, which does not currently exist. Sustainable Sites is currently in the pilot program stage, and will formally introduce its first rating system by 2013. The U.S. Green Building Council supports the project and plans to adopt the Sustainable Sites metrics into future versions of its Leadership in Energy and Environmental Design Green Building Rating System. Sites are rated according to their impact on ecosystem services.

The following ecosystem services have been identified by the study group:

- Local climate regulation
- Air and water cleansing
- Water supply and regulation
- Erosion and sediment control
- Hazard mitigation
- Pollination
- Habitat functions
- Waste decomposition and treatment
- Global climate regulation
- Human health and well-being benefits
- Food and renewable non-food products
- Cultural benefits

What is a Sustainable Garden?

A sustainable garden works in harmony with nature. There are many techniques that can improve the health of your garden and minimize any negative impact on the environment. Most are easy and fun and will save you time in the long run. Sustainable gardening includes:

Organic Gardening

Organic gardening is growing food without the use of petrochemical pesticides, herbicides and inorganic fertilizers that pollute our soil and water. It relies on the use of beneficial insects, diversity of plants, and the use of compost to supply the soil with nutrients.

Native Plants and Trees

Planting native plants and trees is one of the best ways to work with, rather than against, nature. By matching plant species to your particular area you will have plants and trees that take less care and energy and will be healthier than exotic species. Another benefit is that native birds, insects, and other wildlife have evolved with native plant species and are able to use the fruits, nectars and habitat these plants and trees provide. There are many native plant nurseries in Michigan, visit Michigan Native Plant Producers Association website at www.mnppa.org for a listing.

Double Digging

Double digging helps the soil hold more water, improves aeration and places organic material at a depth that enables plant roots to adequately extend. John Jeavons, the leading pioneer in biointensive farming, attributes the technique of double digging and adding compost to build humus and soil fertility, the basis of his success which he describes as "growing the soil." The website at Grow Biointensive has a section on sustainable mini-farming (http://www.growbiointensive.org/Self_Teaching.html).

Vermicomposting

Worm composting is a fun and easy way to have a supply of pure organic plant food available at all times. All you need to start is a shallow bin that allows air to circulate, bedding and worms. The castings that worms produce are a great fertilizer for plants and vermicomposting is an excellent way to keep food waste out of the garbage.

Backyard Composting

Backyard composting is a method of returning organic waste back into a nutrient rich soil amendment. Good compost contains huge food resources that plants need to grow. Ultimately, compost improves plant health by supplying nutrients to the soil. There are three methods of composting: hot, cold or trenching, and good compost can be achieved by using any of the three.

Drip Irrigation

Drip irrigation is a controlled, slow application of water that flows under low pressure through plastic pipe or hose laid along each row of plants. The water drips out of tiny holes that are made in the hose wall or from fittings called emitters that are plugged into the wall at proper spacing. Soil moisture remains constant, and air is always available. By delivering water directly to plants, little is lost to evaporation or runoff so this technique is very water efficient. A variety of emitters allow the proper amount of water to be delivered to each individual plant. It is one of the best techniques for watering gardens, fruit trees, vines and container plants.

Water

The next important step in your sustainable garden is conservative watering. The easiest way to conserve water is to group plants according to water needs—thirsty plants with thirsty plants, and low-water plants with other similar plants. Once this is done, you'll need to choose a watering system.

Rain Barrels

The most sustainable method of watering plants comes from the sky in the form of rain. You'll greatly reduce rainwater run-off by purchasing a rain barrel system to put under your roof's downspouts. The barrel will capture all of the rain that would normally run down the roof to the lawn, and then onto streets and into sewer grates. Once the water is captured, you can water your garden by hand when needed, or set up a drip system to irrigate.

Mulch

Mulch protects the soil by helping it retain moisture, suppresses weeds and insulates plants from extreme temperatures. Any material such as wood chips, straw, nut shells, paper, sawdust, leaves, seaweed, grass clippings or compost can be used as a mulch. Mulching is a way to recycle materials that might otherwise be discarded and simultaneously improve your soil.

Integrated Pest Management (IPM)

In our efforts to grow a maximum amount of food, we have come to view all insects as enemies. We have created chemical fertilizers to encourage growth and poisons to kill pests. Most are indiscriminate and kill beneficial organisms too, upsetting the natural balance, and, when it rains, the chemical runoff poisons our ground water, rivers and bay. A better way is to use IPM methods to control pests and keep a healthy, natural balance in your garden. IPM techniques can be as simple as planting companion plants to attract beneficial insects, introducing beneficial insects to your garden or making your own pesticides from ingredients you may already have on hand such as borax, ammonia and beer. IPM controls are preferable to chemical pesticides. However, when it is absolutely necessary to use a pesticide, choose the least toxic product.

Learn to tolerate a certain amount of pests. In an organic garden there are a few pests, but there is also an army of beneficial insects, spiders, reptiles and birds waiting to have a pest for lunch.

Plants that attract beneficial insects

Aster (Aster)
Baby blue eyes (Nemophila)
Calendula (Calendula)
California Lilac (Ceanothus)
California Poppy (Eschscholzia californica)
Chervil (Anthriscus cerefolium)
Chrysanthemum (Chrysanthemum)
Coriander (Coriander sativum)
Cosmos (Cosmos)
Coyote bush (Baccharis pilularis)
Dill (Anethum graveolens)
Elderberry (Sambucus mexicana)
Fennel (Foeniculum vulgare)
Fleabane (Erigeron)
Holly-leaved cherry (Prunus ilicifolia)
Monkey flower (Mimulus)
Native buckwheat (Eriogonum)
Queen Anne's lace (Daucus carota)
Rosemary (Rosmarinus officinalis)
Rudbeckia (Rudbeckia)
Sunflower (Helianthus)
Sweet alyssum (Lobularia maritime)
Tidy-tips (Lobularia maritime)
Toyon (Heteromeles)
Yarrow (Achillea spp.)

Friends You Should Invite Into Your Garden!

Ladybugs — This aphid loving beetle is worth its weight in gold.

Lizards — Alligator lizards will search dark basements, garages and bushes for their favorite meal – black widow spiders.

Spiders — The average spider eats about 100 insects a year. He's one of the good guys.

Toads — One toad can eat between 10,000 and 20,000 slugs, flies, grubs, cutworms or grasshoppers per year.

Bats — Besides being a valuable pollinator, bats consume large quantities of insects. A single little brown bat can catch 600 mosquitoes in one hour.

Bees — In California alone, forty–two different nut, fruit, vegetable, forage and seed crops rely directly on bee pollination.

Green Lacewings — Green Lacewings will eat mites, mealy bugs and other small insects but their favorite meal is aphids.

Ground Beetles — Ground beetles' favorite insect meals are cutworms, grubs and root maggots. Some even love slugs and snails. To invite them into your garden, place a log or board at one end of your garden.

Hover Flies — These flies look like little flying helicopters. They are some of the garden's greatest allies. They feed on flower nectar, which makes them excellent pollinators. Their favorite meals are aphids and mealy bugs.

Hummingbirds — These small birds consume more than half their total weight in food everyday and a big part of their diet is insects.

Recycle and Re–use

Items that are normally thrown away can be used in the garden. Paint–stirring sticks and old forks can be used to display vegetable seed packets. A broken pot can be a toad house. An old chair or table can hold container plants. Make your garden fun and whimsical and a joy to visit.

Rigid, black plastic pots that bring plants into your garden can be returned to nurseries for growers to re–use.

Sustainable farmers and gardeners contribute to the earth rather than take away from it. In sustainable systems, plants are grown without depleting natural resources or contributing to pollution. And, in order for anything to be sustainable, it should continue for a long time. This means that it should sustain itself as much as possible, without constant inputs from you.

So how can you practice sustainable gardening? Here are a few ideas:

- Limit the size of your lawn. Lawns use more water and fossil fuels to maintain them than any other planting. Have a mixed-grass lawn rather than a monoculture. Choose the right type of lawn grasses for your area. Use an electric or human-powered mower. Or remove your lawn altogether and create natural or planted areas with perennials, shrubs and trees instead.
- Contribute to your yard or patch of space in whatever ways you can. Make compost out of vegetable peelings and yard clippings. Shred newspaper to make mulch, and cover weeds with cardboard instead of applying herbicides.
- Take stock of the plants in your yard. Do they contribute to feeding birds and other wildlife? Are any of them native? Are you constantly replacing plants (and if so, why)? Buy plants that are hardy to your area.
- Use natural fertilizers like compost, rock phosphate, kelp or seaweed, fish meal and alfalfa meal. These feed the soil and the microorganisms it contains. They also encourage a natural rate of plant growth, which helps eliminate some pest problems.
- Increase water retention (and decrease watering) by using mulch and incorporating compost into your soil. (This will also decrease runoff and protect soil.)
- Think about maintenance. Have you created an unsustainable area by making lollipops out of shrubs and trees, which have to be constantly maintained, usually with gas-powered pruners? Are you constantly mowing because you've overapplied fertilizer and water?
- Contribute to your community. If you can't use all the leaves from your trees, recycle them by taking them to a municipal compost site. And buy locally – especially from organic and sustainable growers.

Sustainable gardening is easy to do; it just requires some thought. Small changes lead to bigger ones, though, so get started today!