How to Create a Sustainable Landscape

By Everett Chu
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A socially equitable, ecologically sound, and economically feasible balance

When we hear the word "sustainable," it reminds us of "resources" and "future." For the landscape, the resources of interest would include air, water, soil, plant, wildlife, as well as the efforts and expenses that go into it. If these resources are overused or misused, there will be fewer left for us and future generations to draw on.

Sustainability also means a balance—socially equitable, ecologically sound, and economically feasible. Socially, the landscape must be aesthetically pleasing, serving intended purposes, and culturally acceptable. A healthy landscape would likely be ecologically sound, as supported by biodiversity and treasured by the occupants and the wildlife. And a sustainable landscape would be cost-effective, during construction and after. A drought-tolerant landscape is considered sustainable, from an economic standpoint. In this narrower definition, when the output (benefit) is high and the input (resources) is lower, the outcome may be more sustainable.

Five factors collectively contribute to and help determine a landscape's level of sustainability: 1) soils, 2) vegetation, 3) materials selection, 4) hydrology, and 5) human health and well-being. There are no 100% self-sustaining constructed landscapes. To reap the most benefit from a sustainable approach, it makes sense to keep all factors even-keeled instead of allowing a few to get out of sync.

Healthy, naturally nutrient-rich soil is the foundation for a thriving landscape—so called "happy soil, happy plants." Maintaining a layer of organic debris on top of the soils is an easy way to make the soils happy. Still, the types and makeup of the vegetation and hardscape materials must be appropriate. Understanding the microclimates of the site when selecting plants can lead to success—so called "right plant, right place."

Hydrology pertains to the quantity, quality, and availability of water on-site. Managing storm-water runoff is a crucial task in any landscape. Before contaminated (including nutrient-laden) water is discharged to the storm drain, it should be properly intercepted and treated. The availability and application of irrigation water is another challenge affecting sustainability.

The ultimate gauge for a sustainable landscape is how effectively it supports the human health and well-being. So, how do we create a sustainable landscape? It takes three interconnecting stages: 1) design, 2) construction, and 3) maintenance. Missing any of the three is a setup for disappointments.

This garden is an excellent example of a drought-tolerant landscaping plan. *Photo by Everett Chu / WSU Skagit County Master Gardeners.*

In the design stage, the focus would be on assessing the functional needs and balancing with sustainability goals. A soil-management plan would be a starting point: obtaining soil-test results and managing construction disturbances. To do so, map and assess the site's hydrology for existing plantings, soil types, topography, and drainage. Find ways to maximize onsite water-conservation options. Design with low water use plants that require no or minimal irrigation. If irrigation is necessary, including planting-establishment periods (1 to 3 years), design a high-efficiency watering system with zones to match plant water needs and controllers that are weather-based and seasonally-adjustable.

To reduce storm water runoff, minimize impervious surface areas. Incorporate design features that direct water into compost-amended vegetated areas, swales, rain gardens and bioretention cells, pervious paving, cisterns, rain barrels, and vegetated roofs. Prioritize designs that improve or create healthy habitats for native wildlife (supplying food, water, and shelter). Use local native-plant communities as models to support biodiversity.

Design low-energy-input landscapes, with minimized use of power tools for maintenance as well as reduced energy consumptions for heating, cooling, and lighting of buildings. Select local sources for sustainably-produced materials. Choose renewable, biodegradable, and recycled materials. Incorporate and protect existing thriving plants wherever possible. Design plantings to encourage maximum soil coverage. Specify disease and pest-resistant plants, and avoid using invasive varieties.

This landscape is ecologically sound and aesthetically pleasing as demonstrated by the variety of plants and shrubs. *Photo by Everett Chu / WSU Skagit County Master Gardeners.*

Use construction methods that cause the least cut-and-fill and vegetation clearing. Protect soil from compaction. Restore disturbed soil with compost amendment. Protect tree-root zones using a fence or cover the access paths with 4 to 6 inches of coarse wood chips, crushed rock, or metal plates. Use "closed system" management, to salvage, reuse, compost, and recycle all materials from site, demolition, and construction; and dispose of waste material in the most environmentally-sound manner available. Reduce import and export of earth materials; improve existing soil as an alternative.

To sustain healthy plants during construction, inspect all plants for health, vitality, pests and diseases. Monitor, water and protect plant materials until installation. Remove and replace non-site-adapted or pest-susceptible plants. Install plants properly, including deep watering soon after installation. Apply only organic mulch.

A sustainable landscape must come with a maintenance plan. If there is a lawn, the plan must define types and time to fertilize (organic and slow-release), the mower type (preferably mulching) and mowing heights (according to grass varieties), and irrigation method and frequency.

If watering of plants during dry summer months is needed, the typical technique is "water deeply but infrequently" to train the plants to grow deep roots for drought-tolerance. Pest control would take the approach of integrated pest management (IPM), relying more on prevention and monitoring, less on broad-spectrum applications of pesticides. Least-harmful methods and materials should be considered first. Fertilizer applications should be based on actual needs, from soil tests, tissue analysis, and clear indications. If possible, minimize or eliminate the use of chemical pesticides and synthetic fertilizers altogether.

In summary, a sustainable landscape does not happen by accident. It takes forethought, careful execution and plenty of follow up. But its reward, from conserved or regenerated resources and from increased benefits at present and into the future, is well worth it.

RESOURCES:

- ***Sustainable Landscape Management: Design, Construction, and Maintenance***. Thomas W. Cook and Ann Marie Vanderzanden. Wiley, 2011.
- ***Residential Landscape Architecture*: *Design Process for the Private Residence***. 6th edition. Norman K. Booth and James E. Hiss. Prentice Hall, 2012.
- ***Sustainable Landscapes & Gardens*: Good Science – Practical Application**. Linda Chalker-Scott, author and editor (with chapter authors from faculty at OSU, UW, and WSU). GFG Publishing, 2009. www.sustainablelandscapesandgardens.com
- ***Basic Design Concepts for Sustainable Landscapes***. Ann Marie Vanderzanden and Jan McNeilan. Oregon State University Extension Service, 2002.
- ***Sustainability as Defined by USEPA***. http://www.epa.gov/sustainability
- **ecoPRO Certification and Best Practices**. WSNLA and WALP. https://ecoprocertified.files.wordpress.com/2015/02/ecopro_bestpractices-8-20141.pdf
- ***Sustainable Sites Initiative***. http://www.sustainablesites.org/

WSU Master Gardener Know & Grow Workshop

What:	**"Creating a Sustainable Landscape"** Everett Chu, a certified plant horticulturist, a member of the steering committee of eco-PRO, and a professional member of the APLD, will speak about drought and plant selection for sustainable landscapes.
When:	Tuesday, March 15
Time:	1:00 P.M - 2:30 P.M
Where:	WSU Mount Vernon Northwestern Research and Extension Center, 16650 State Route 536 (Memorial Highway)
Cost:	Free
Questions	Call the WSU Skagit County Extension at 360-428-4270, ext. 0.