



Appalachia-Science
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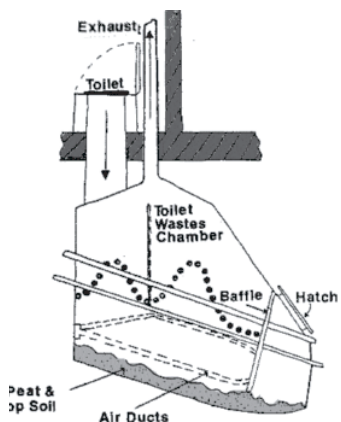
ASPI TECHNICAL SERIES TP 59

Twelve Ways to Conserve Water in Appalachia

The periodic droughts which have afflicted Appalachia and other parts of America in 1999, and have lingered in sub-sections well into the new millennium, cannot be eliminated by human intervention. But through responsible action one can soften the impact of regional water shortages on the local and wider levels. At the same time one can conserve precious energy and resources needed to pump, purify, and redistribute this ever more scarce liquid to our homes and businesses. Domestic water shortage is expected to increase both in this country and beyond during this millennium — and is surfacing as a major environmental problem.

The following are twelve proven ways which we use at ASPI to curb water consumption and enhance water quality. These work quite well without participants going unbathed or undergoing any diminishment of quality of life. We recommend these for wider application both within the region and beyond. The ways are arranged according to what I regard as relative importance in water conservation.

One — Install dry composting toilets. Since this is the way of saving half of the domestic water in Appalachia, appropriate technology conservationists will bestow on it the number one spot. Technical Paper 2, *Compost Toilets*, along with the more recent TP 58, tell the story of these devices and how they save money, are easily maintained, do not require potable or higher quality water for flushing, and are free of odor or unpleasantness of any fashion when properly constructed. Details are given in the papers. The major domestic waste source (sewage) is eliminated, and potable water, which is often turned into sewage and then returned to potable water, does not have to continue to be an embarrassment to environmentally conscious people.



Two — Save rainwater. *Cisterns* are discussed in TP 3. In an age when one needs extra water, the rainwater is ideal — to save for the non-rainy day. They are low cost, can be easily maintained when properly built, and are a source of high quality water which surpasses chlorinated water for plant growth. We have found at ASPI in times of drought that the cisterns being filled from buildings with roof collection space will be replenished far faster than those ground-water filled cisterns. In fact, while irrigating moderately throughout the 1999 drought, infrequent showers augment the cistern supply. Rainwater can also be caught for use in the heat retaining tanks in greenhouses. The overflow water from the cistern at the Mount Vernon demonstration center is channeled to the retaining tank where it is used for heat storage in winter and to assist in irrigating greenhouse plants. If one chooses to use cistern water for human consumption, you are advised to install a water purifying system as mentioned in TP 19 *Water Purification Techniques*.

Three — Apply targeted irrigation techniques. Agriculture is America's number one use of water and those states with higher irrigation such as Idaho rank first in per capita consumption. All know that sizeable amounts can be required in dry times to keep the domestic garden alive. A triage system of watering must be initiated in dry times: saving the most sensitive (young plants, greens and those ready to bear); giving moderate additional water to hearty longer-lived plants; and allowing a portion (such as okra, onions and Jerusalem artichokes) to go unwatered and hope they weather the period. The subject of *Drip Irrigation Systems*, was treated in TP 25, which are limited due to the need for fairly clean water supplies; furthermore, the plastic delivery systems could become clogged.

However there are other more intensive ways to distribute water to domestic garden plants or small-scale cultivated areas. One is to water by hand or water hose in the evenings at twilight or very early in the morning so the plants can have maximum use of the water before evaporation. One needs to water right at the root system rather than on the foliage. Some people put pipes down beside tomato plants and pour water into these. Others bury gallon milk jugs with pinholes in the corner and these are placed equidistant from two or four peppers, tomatoes or squash. These jugs are periodically filled and allowed to drip with no loss of moisture at the surface.

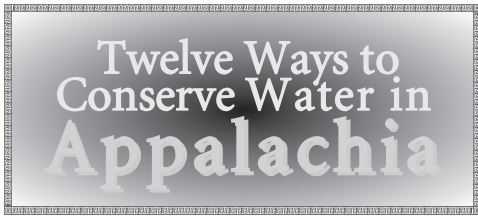
Four — Install low-flow devices. This suggestion extends from showers to existing flush toilets and to water faucets in kitchens and bathrooms. The practice is becoming far more commonplace and is discussed extensively elsewhere. The water-saving accessories are commercially available in most plumbing supply houses and some are mandated by federal and state regulations for new construction. Granted, there has been some discontent by the users of low-flush commode systems as to their effectiveness. Appropriate technologists are not champions of flushing but rather dry compost toilets and recognize that the low-flusher has a number of standard plumbing problems.

Conservationists regard kitchen and bathroom sinks as excellent candidates for water conserving attachments. These deliver far less water in a foam manner over a wider surface area of the object to be washed. It means more time is given to cleansing with less wasted water in the washing process.



Five — Reuse greywater. The term greywater is opposed to sewage or "black water and refers to water from kitchen and bathroom sinks. ASPI technical papers TP 30 and TP 58 discuss advantages of and how to build *Artificial or Constructed Wetlands*. These can be installed at low cost, are durable, are easily maintained, and can be turned into showcase flowerbeds.

Washing machines — Homemakers often allow wash water to go out into the sewer or wetlands. One could fill buckets with at least part of the washing and dump this water onto hearty plants such as Jerusalem artichokes or use it for washing cars or other uses around the house.



Six — Recirculate water fountains. External water sources are rich additions to the ecological landscape. All of us need to hear and see the movement of water and experience it in relation to our land — a harmony of water and land. Thus the presence of fountains, waterfalls, and fish tanks raise the spirit of dwellers. However, water bubbling, gushing, falling and cascading devices

can result in sizeable amounts of evaporative water loss, depending on the size of the container, the amount of water circulated, the weather and flow of air, and the amount of direct sunlight falling on the mechanism. It pays to plan well before installing such a water using device.

One approach to saving water at these places is to cover the location with vines or trellises so that the place is partly or totally shaded during the hotter times of the day. Another is to allow water circulation to occur only at certain times such as during daylight hours or business hours. A solar water pump could be quite serviceable for recirculating water during daylight hours. It would not require an expensive storage system since the circulating water would only occur during daylight hours. Water in fish tanks may have to be circulated at all hours.

Seven — Modify individual hand washing/teeth cleaning practices. The personal practices of individuals vary immensely in the amount of water used for brushing teeth or washing hands. Some run the water full blast throughout the process. Others turn the water on for wetting the brush and then off until rinsing it. People should learn that it is a scientific fact that large amounts of water at one time gets utensils and containers less clean than three smaller amounts in sequence. Teach youth early how to do daily ablutions using smaller amounts of water. The public facilities which only deliver a set amount of water for a short time are far better utilized for hand washing than the free flowing ones which can be turned on or off at will.

Eight — Limit clothes washing to heavier loads. Many use the clothes washer and dryer at quite frequent intervals and that is in part due to the limited number of certain items (socks, towels, etc.). A good investment is to have larger numbers of these frequently use clothing and other items, and to do the laundry less frequently using larger loads. To increase from weekly to biweekly or even monthly washing can lead to saving often half of the wash water at only the inconvenience of having dirty clothes stored longer. Besides savings of about twenty gallons or more of water per person per month, this can require far less time and save energy and money when using a commercial laundromat.

Nine — Practice lawn water conservation. This is another practice that has immense potential for saving water. A person who washes off sidewalk debris with a strong spray stream from a garden hose is applying a rather questionable practice that could easily be done by a broom or vacuum system. Lawn watering practices should also follow xeroscape methods of emphasizing native plants, a practice which ultimately leads to sizeable water savings over a period of years. Native plants are also answers to the brown patchy lawns at places during dry times when lawn watering is forbidden by local or regional mandates. Wildscapes (wild flowers in previous lawn grass areas) may result in additional water savings, (see TP 48, *Domestic Wildscapes*).

Ten — Take military showers. “Wet down, soap down and rinse off is an old adage” which is soon forgotten in times of apparent plentiful water supply. In fact, it is the matter of deciding between a cleansing shower and one that acts as a massage, which can be a heavy drain on water supplies in times of scarcity. It is the difference between a five-minute and a twenty-minute shower, of a three gallon and a twenty-gallon shower. Even if one refuses to perform the disciplinary shower method, it is



still possible to reduce shower time by doing such practices as lathering hair before entering the shower and allowing the shampoo to set in the hair for a few moments while taking the last steps before entering the shower. Another is to turn on and off water in bathing at times of reduced use, or set the ideal temperature on the water handles prior to the shower and reduce warm up time.

Eleven — Fix even slightly leaky faucets. Fixing leaking plumbing hardly needs to be emphasized to conservation conscious people, because most of us would not hesitate to have a leaky faucet repaired or do it our-

selves. However, all of us can overlook the slightly leaky faucet. It may only drip one or two drops per second but could lead to accumulated wastes of twenty or more gallons of water a day, and deplete a thousand-gallon storage tank in two months. This leaky system defect becomes a major sleeper in our homes and places of business.

Twelve — Use dehumidifier water. For people in totally dry areas this may seem a small conservation measure, but it mounts up in humid areas and in summer, even when there is dry weather outdoors. Homemakers find that dehumidifiers and air conditions can collect several gallons a day during summer months, which is a higher quality of deionized water that can be used for plants, though one may not recommend it as potable water, except for pets.

In conclusion, one must note that higher quality water is becoming more scarce both in Appalachia and in other parts of the world. All need to practice water conservation and to see that this becomes a permanent part of one's proper living of their life. It should not be drought measures which are forgotten when the rains come. Water conservation is here to stay.