



Agricultural Water Needs and Sources Water Supply

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This fact sheet will provide information on the volume of water needed for various agricultural purposes, where adequate water supplies can be found, how to locate groundwater, and the regulation of consumptive water uses in Pennsylvania.

gpm per acre. The question remains, "Where can reliable water supplies be found and what are the typical advantages and disadvantages of each?"

Where to find water

Where to find adequate quantities of good-quality water has been an important consideration for many generations. Livestock and crop producers, irrigators, homesteaders and municipalities require large quantities of good quality water. The agricultural industry consumes more water than any other industry. Typical agricultural water needs are shown in Table 1. The need to provide water for personal use and livestock is the most critical. In recent years there has been increasing interest in irrigation. Irrigation requires very large quantities of water. A water supply of 5 gallons per minute (gpm) (without a storage) is usually adequate to supply a farmstead including the home and livestock. Sprinkler irrigating cropland requires water supply rates as high as 10 gpm per acre, while drip irrigation requires 3 to 7

Municipal

When you are located near a municipal water authority, it is sometimes possible to buy water from this supplier. Municipal water is high quality and is usually delivered at a minimum pressure of 40 pounds per square inch. Municipal water suppliers may limit use rates or volumes of water that may be taken or they may limit times during which water may be used. These limits are established to protect the other users on the system.

Surface Water

Surface water runoff from local watersheds can often be collected and stored in a pond and then used to supply agricultural water needs. Individual home or farmstead water supplies seldom utilize surface water because the water quality is not satisfactory and requires some level of treatment before it is suitable for consumption. Surface runoff can often be col-

Table 1. Agricultural Water Needs.

Type of Water Use	Daily Water Needed (gallons/day)	Annual Water Needed (Acre-feet/year)
Personal Use (per person)	50	0.060
Dairy Cow	35	0.040
Steer	20	0.022
Horse	12	0.013
Chickens (per 100 head)	9	0.010
Swine	1.5	0.002
Spraying		0.015 per acre
Irrigation (humid climate)		0.5 per acre
Irrigation (arid climate)		2.0 per acre

lected and stored for irrigation during periods of lower than normal precipitation. In Pennsylvania for each 2 acres of watershed tributary to an impoundment, approximately 1 acre-foot (ac-ft) of water can be collected annually. Some of this water will be lost as seepage through the pond bottom and evaporation from the pond surface. Seepage and evaporation losses may be as high as 40 to 60 percent of the pond volume. Therefore, it requires about 4 acres of upland watershed to supply one acre-foot of usable water per year. Storage ponds should have extra capacity to impound sediment that will settle from the captured water. Nutrients in surface runoff may cause algae and other plants to grow in ponds, especially during warm weather.

If the area to be irrigated is near a stream fed by a large watershed, it may be possible to simply withdraw water from the stream without building a storage pond.

Groundwater

Groundwater is often of good enough quality that it can be used to supply domestic water and farmsteads without extensive treatment. Groundwater can also be considered as a source of irrigation water. Groundwater is removed from the ground by drilling a well into a water bearing strata (or aquifer) and installing a pump to lift the water from the well.

Locating and drilling a well that will provide adequate, high quality water is an expensive task that requires the assistance of a qualified hydrogeologist. Even then there is no assurance of generating a successful well. Since groundwater is stored in the soil and rock layers below the land surface where it cannot be seen, there is no guarantee that groundwater is present in quantities necessary to meet your intended needs. Wells located at random or near the intended use site have only a limited chance of being successful. Scientific methods have been developed for locating wells so they will penetrate into zones of fractured rock beneath the land surface. Wells located in such fractured rock zones will produce larger quantities of water than wells drilled into zones where the rock is not fractured. Finding the fractured rock zones, or better yet, finding the intersection of two fractured rock zones can be a time consuming and expensive procedure. Only hydrogeologists with special training are qualified to locate wells by this fracture trace technique. For additional information on drilling and testing wells, see Fact Sheet F-197. If you plan to consider developing a groundwater supply, it is

best if you first consult a hydrogeologist who can locate the well and who can discuss the possibilities of finding adequate quantities of water. Local well drillers can be an important source of information on well yields in your area.

Permission to Use the Water

When you use the waters of the Commonwealth, you may be depriving others of their right to use the same water. Water withdrawn from surface and/or groundwater sources may be regulated by the respective Susquehanna or Delaware River Basin Commissions. Currently there are no water quantity restrictions in the Allegheny, Monongahela or Ohio River Basins.

In the Susquehanna River Basin you are required to register daily water withdrawals in excess of 100,000 gallons per day (averaged over 30 days). If you are watering animals or irrigating crops a very large portion of this water is considered to be consumptively used because it is returned as a vapor that is not available for others to use. Consumptive uses of water within the Susquehanna River Basin are carefully regulated. All consumptive users who withdraw more than 20,000 gallons per day from surface and/or groundwater must register with the Susquehanna River Basin Commission.

In the Delaware River Basin you are also required to register daily water withdrawals in excess of 100,000 gallons per day (averaged over 30 days). If you live in the southeastern portion of Pennsylvania, within the Delaware River Basin, you are required to register all daily withdrawals in excess of 10,000 gallons per day. Currently the Delaware River Basin Commission does not regulate agricultural consumptive use of water.

If you plan to withdraw large volumes of water from either surface or groundwater, you should contact the appropriate group (listed below). Their goal is to help you develop plans that will preserve our water resources and best accommodate the needs of all users, especially in times of drought. Before you spend any money on plans or irrigation equipment, be sure to contact the commission in your watershed and PADER.

Susquehanna River Basin Commission
1721 North Front Street
Harrisburg, PA 17102
(717) 238-0425
www.srbc.net

Delaware River Basin Commission
P. O. Box 7360
West Trenton, NJ 08628
(609) 883-9500
www.state.nj.us/drbc/drbc.htm

Ohio River Basin Commission
C/o University of Kentucky
Bradley Hall 403
Lexington, KY 40506-5141
606-323-2882
www.dep.state.pa.us/river/orbc.htm

PA Department of Environmental Resources
State Water Plan Division
P. O. Box 8761
Harrisburg, PA 17105-8761
(717) 541-7805
www.dep.state.pa.us

The PA Fish Commission may also be interested in your use of surface water. If your withdrawal of water reduces the stream flows to the point where the health of sport fish may be endangered, you can be held responsible. If you have any questions, call your local representative.

For further information or for a copy of our Fact Sheet Listing contact:
Agricultural and Biological Engineering Department
246 Agricultural Engineering Building
University Park, PA 16802
Telephone: 814-865-7685
FAX Number: 814-863-1031

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