

### Lesson 1: Water Needs

Water is critical to most agricultural operations. Calculating the volume of water needed and determining suitable sources of water is one of the responsibilities of a farm planner. These questions may be difficult to answer precisely. However, suitable estimates are necessary to ensure that an agricultural operation can function effectively.

#### Sources of Farmstead Water

Water for agricultural operations is generally available from a variety of sources. The most common artificial sources are public water services, wells, and cisterns. Public water supplies generally provide a safe, dependable water supply, but this water source is not available in all areas, making private water sources necessary. Wells can provide a large quantity of safe water with relatively little maintenance. Underground wells may be either shallow or deep. Shallow wells will give sufficient water, but the quality of water will be poorer, because the water is not filtered through as much soil for purification. Deep wells will have cleaner water and usually contain a larger volume of water, although they are more expensive to drill. Cisterns can store rainwater for domestic use but may not supply enough for livestock.

Ponds may be natural or man made. They often supply livestock with water and, with the proper construction and purification, can be used for humans as well. Protection from pollution can be a problem.

Natural sources of water, such as creeks, streams, and springs, are also useful to farm operations. However, they may not be able to provide enough water to meet the needs of the operation. Also, flooding, droughts, and the changing topography of water courses can make these sources of water unreliable for most irrigation and animal needs. Operations that utilize natural sources of water must be flexible enough to operate successfully in a variety of conditions.

The construction involved in developing some water sources, such as wells and ponds, is beyond the scope of the average producer and

requires the assistance of knowledgeable professionals. Further information about wells and ponds is available from local University Extension offices.

Selecting the correct water source for an operation involves a number of different factors. The water sources already available, the uses of the water, and the costs of developing new sources should all be considered. Underground wells are the preferred water source for human consumption, but water for animal needs, irrigation, cleaning, and other uses can be from ponds, rivers, reservoirs, and other sources because the quality is not as important. The major exceptions to this rule are dairy operations and large hog operations, where high quality water is preferred. These types of operations require optimal water quality to maximize production.

#### Water Uses on a Farmstead

The uses of water from these various sources will depend on the type of agricultural production taking place. A few uses of water that are essential to many enterprises are drinking water for livestock, water for irrigating crops, and water for sanitation. Another common use of water is for cooling systems in some types of facilities, such as greenhouses or hog facilities. Water can also be utilized as a delivery system, by adding fertilizer to water while irrigating or medication to the animals' drinking water. If a home is located on the farmstead, water will also be used by humans for various domestic purposes.

#### Determining Total Daily Water Need

The exact amount of water required for the different uses of agricultural operations would be very difficult to calculate, because conditions that affect water needs, such as temperature and humidity, change regularly. However, the total amount of water normally required to meet the daily needs of an operation can be closely estimated. The first step in making this estimate is finding information on water needs. Charts that show the water needs for different types of animals and crops or special circumstances have been developed to help estimate needs. Table 1.1 shows a sample water needs chart. Sources of information about water needs include local University

Table 1.1 - Water Needs Table

Plumbing	Water Needs
Adult human	50 to 100 gallons per day
Beef animal	8 to 12 gallons per day
Milk cow	35 to 45 gallons per day
Dry cow	20 to 30 gallons per day
Calf	6 to 10 gallons per day
Swine (finishing)	3 to 5 gallons per day
Sow and litter	8 gallons per day
Horse	12 gallons per day
100 chickens (laying)	9 gallons per day
Lawn and garden	600 gallons to apply 1 inch of water on 1,000 square feet of area
Flushing floors	Minimum of 10 gallons per 100 square feet of floor

Extension offices and trade associations, which may be the best resource for more specialized products.

Once information on water needs for a particular operation has been collected, the total daily water need of the operation can be determined. The first step is multiplying the recommended amount of water for a particular use by the amount of usage; for example, the amount of water needed for a beef animal is multiplied by the number of animals in the herd to find the total amount of water needed for a beef cattle herd. The different water uses are then added together to find the total daily need of the operation. Overestimating the amount of water needed and planning for that amount is better than not having enough water. Keeping accurate records of the amount of water used and what the uses were over a period of a few years will yield very accurate data for future water use projections.

Some producers may wish to take fire protection into consideration when estimating water needs, in addition to the normal needs of the operation. If water for fire protection is desirable, a minimum of 1,200 gallons (at 10 gallons of water per minute for two hours a day with a pressure of 30 pounds per square inch) is required. Twice this amount, or 2400 gallons (20 gallons per minute at 60 pounds of pressure per square inch for two hours per day), would be even more effective.

### Determining Peak Water Need

After estimating the total daily water needs, the peak water needs for a farmstead can be determined. The volume of water a water source can deliver is usually measured in gallons

per hour. The total daily needs should be compared with the hourly output, which should be greater than the daily needs of the operation in order to meet peak water needs. Having a water system that can meet the peak need will be sufficient to supply the operation under most circumstances.

### Summary

Water is indispensable to production for agricultural operations. The water may come from a variety of sources, including wells, ponds, and springs. It also has a variety of uses, such as drinking water for livestock, water for irrigating crops, and water for sanitation. While determining the exact amount needed to operate may not be possible, accurate estimates of the total daily water needs and peak water needs can be made and used in planning water systems.

### Credits

Annis, William H. *Basic Plumbing Skills*. Athens, Ga.: American Association for Vocational Instructional Materials (AAVIM), 1989.

University Extension agricultural publications, University of Missouri-Columbia.

G1800: Sources for Farm and Home Water Supply

G1801: How to Size a Farm and Home Water System

