

4.5 Miscellaneous Systems

4.5.1 TAILWATER RECOVERY AND REUSE SYSTEM

A. *Applicability*

Tailwater recovery and reuse systems (tailwater systems) are applicable to any irrigated agricultural system (typically flood or furrow irrigation) in which significant quantity of irrigation water, as a result of the irrigation method, runs off the end of the irrigated field. Tailwater systems are typically implemented by agricultural producers that use flood or furrow irrigation.

B. *Description*

A Tailwater System consists of ditches or pipelines to collect tailwater and deliver water to a storage reservoir (typically below the grade of the irrigated land) and includes a pumping and pipeline system that conveys the water to irrigated fields for reuse. Most tailwater systems also collect rainfall that may run off of the irrigated field. Natural reservoirs, such as the playa lakes located in the High Plains region of Texas, may serve to both capture irrigation runoff and rainfall runoff and may be used as part of a tailwater system. Also, capture and reuse of tailwater can improve the water quality of downstream reaches of rivers, streams, or waterways. Conservation through reduction in field runoff may reduce agricultural drain flow and the amount of water in downstream reaches of rivers, streams, or waterways. In the irrigated agricultural areas of Texas supplied by groundwater, reduction or reuse of field runoff is a common practice and can provide secondary benefits such as an open water source for wildlife (tailwater ponds). Also, capture and reuse of tailwater can improve the water quality of downstream reaches of rivers, streams, or waterways. Conservation through reduction in field runoff may reduce agricultural drain flow and the amount of water in downstream reaches of rivers, streams, or waterways.

C. *Implementation*

The steps required to implement a tailwater system are:

- 1) Construction of the tailwater collection system.
- 2) Construction of the storage reservoir.
- 3) Construction of the tailwater irrigation water delivery system.
- 4) Application of the tailwater for irrigation of crops or other uses.

D. *Schedule*

The time required to construct and install a tailwater system varies from several days to over a month.

E. Scope

The most common limitation on the installation of a tailwater system is the availability of land for construction of the storage reservoir such that the tailwater can be conveyed to the reservoir by gravity. Secondary concerns include water quality and disease problems that result from the reuse of irrigation water. Some agricultural users of tailwater systems have the systems designed so that reused irrigation water is kept separate from virgin irrigation water, and the reused water is applied to crops that are more resistant to the problems that may exist with use of tailwater for irrigation.

F. Documentation

To document this BMP, the agricultural water user shall gather and maintain one or more of the following:

- 1) Photographs of the installed storage reservoir and pump back system;
- 2) Reports or receipts that document the purchase and installation of reservoir and pump back system;
- 3) Any USDA, NRCS or FSA or other governmental agency evaluation and assistance reports that may relate to the project; or
- 4) Water measurement records from both the period before and after conversion to the water efficient irrigation system.

G. Determination of Water Savings

Both direct and indirect measurements of the volume of water captured and reused by the Tailwater System can be used to determine the annual volume of water saved. The amount of runoff from a surface irrigated field varies significantly from site to site, but it is not uncommon for runoff to be 15 percent or greater of the gross volume of water applied to the field. Typical tailwater systems can reuse 0.5 to 1.5 acre-feet per acre of irrigated crop per year.

H. Cost-Effectiveness Considerations

The cost of constructing a tailwater system varies significantly from site to site and with land costs. The cost to construct a small storage reservoir (assuming the water user owns the land) ranges from \$800 to \$2,000 per acre-foot. Construction of the tailwater collection system varies from little cost (adapting an existing surface drainage system) to as much as \$15 per foot of installed pipe. The cost of the pump back system is also site specific and typically costs several thousands of dollars.

I. References for Additional Information

- 1) *Irrigation System, Tailwater Recovery*, Natural Resources Conservation Service, United States Department of Agriculture, National Conservation Practice Standards No. 447.