Colorado Ag Water Alliance

"Commited to the preservation of agriculture through the wise use of Colorado's water resources"

Ag Water Tour: North Metro
June 27, 2017

Learn more about CAWA at coagwater.org

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These organizations make this tour possible

Metro Basin Roundtable

CITY OF LONGMONT COLORADO

DENVER WATER

WEST ADAMS CONSERVATION DISTRICT

AURORA WATER

D-BARN Reception Hall

Boulder Valley Conservation District

CAWA relies on sponsorships and grants to function. We work hard to make our programs accessible for those who want to learn more about water in agriculture. Sponsorship allows us to continue programs this this.

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What is the impact of Colorado Agriculture? How important is irrigation to sustaining agriculture along the Front Range?

Tour Itinerary: June 27 2017

7:30 Registration at D-Barn, Longmont, CO

8:00 Welcome and Introductions from Greg Peterson, CAWA
"The Importance of Irrigated Agriculture" Chris Wiseman, Deputy Colorado Commissioner of Agriculture
"The Value Chain of Colorado Agriculture" Gregory Graff, Colorado State University

9:00 Tour of Hergenreder Farm, Jerry Hergenreder, Hergenreder Farms
"The Role of Ditch Companies" Dan Lisco, local producer and ditch company board member
"Pasture Management" Sylvia Hickenlooper, Natural Resources Conservation Service

11:00 Drive to Fort Lupton with presentation by Alex Funk of National Young Farmers Coalition

11:30 Tour and lunch at River Garden Vineyards in Fort Lupton with Bob Stahl

12:45 Bus route to Sakata Farms with Presentation on River Administration by Brent Schantz, Division of Water Resources
Tour of Sakata Farms and Diversion Structures by Robert Sakata, Sakata Farms and George McDonald, Ditch Rider of the Fulton Ditch

4:00 Arrive at D-Barn, Longmont, CO.

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Ag Water FAQ

Augmentation Plan - A court-approved plan that allows a junior water user to divert water out of priority so long as adequate replacement is made to affected stream system preventing injury to the water rights of senior users.

Consumptive Use - 1. Any use of water that permanently removes water from the natural stream system. 2. Water that has been evaporated, transpired, incorporated into products, plant tissue, or animal tissue and is not available for immediate reuse.

ET (Evapotranspiration) – The process by which water is evaporated from soil surface and water is transpired by plants growing on that surface.

Deep Percolation - Water that drains vertically through the bottom of the crop root zone such that it is lost with respect to potential crop use.

Return flow - The amount of water that reaches a surface or ground water source after it has been released from the point of use and thus becomes available for further reuse.

Root zone - The root zone is the portion of the soil profile that is generally considered to store water available for crop use. The depth of root zone varies for soil types, crops, and water availability

Leaching - The process where material in the soil (such as nutrients, pesticides, etc.) are washed into lower layers of soil by the downward movement of water.

Crop Residue - The materials left in an agricultural field or orchard after the crop has been harvested.

Tillage – Preparing the soil through digging, stirring, and overturning.

Strip-till - Narrow strips are tilled where seeds will be planted, leaving the soil in between the rows untilled

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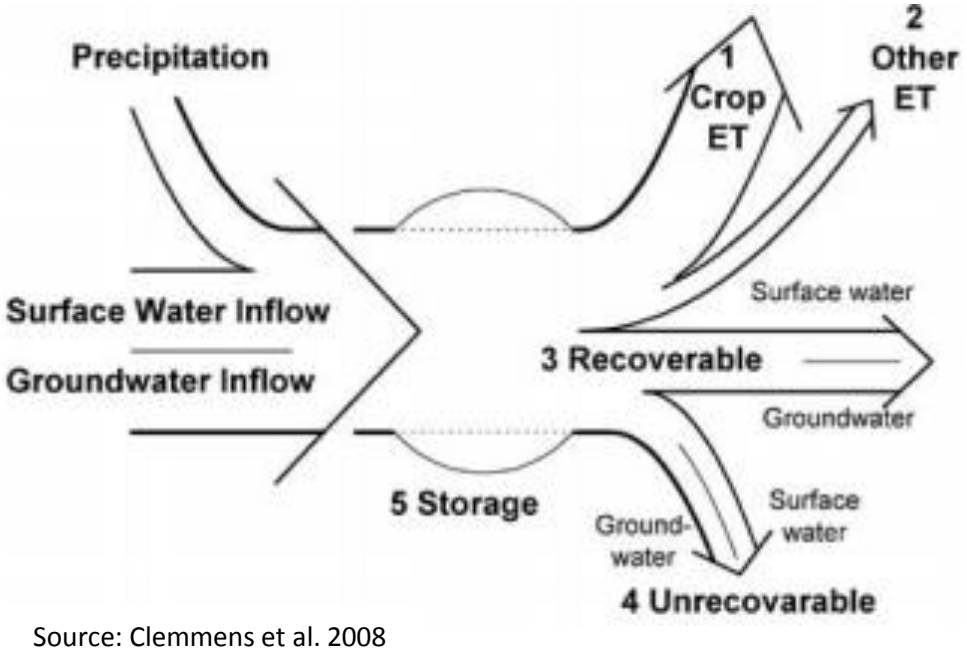
Irrigation Efficiency and the Farm Water Balance

The term irrigation efficiency is most commonly defined as a percentage,

$$Irrigation\ \ Efficiency\ \frac{Crop\ Consumtive\ Use}{Toral\ Stream\ Diversions}$$

This definition leads to misunderstandings because in most engineering fields efficiencies of less than 100% imply a loss or waste, such as wasted heat in energy applications. In water, however, the loss or waste is actually still liquid water that will ultimately be recycled as a return flow at some point in space and time. Crop consumptive use includes all consumptive use that is necessary for farming, including evaporation from canals and other consumptive uses that are recognized as necessary under water law.

Return flows are critically important in many river basins in the West. Farms using flood irrigation are often only 50% efficient, meaning that 50% of their diversions return to the river for recycling. Because of recycling, 'stacked' farms that rely on irrigation return flows can obtain high collective efficiencies, a feature sometimes known as the 'basin approach'. Sprinklers and drip can reach 80 to 90% efficiency with commensurate reductions in return flows. A mass balance, which is merely the application of the law of conservation of mass to a suitably large geography and time period to account for all the consumed and non-consumed flows of water (both liquid and vapor), can help to understand how water is being used.



Source: Clemmens et al. 2008

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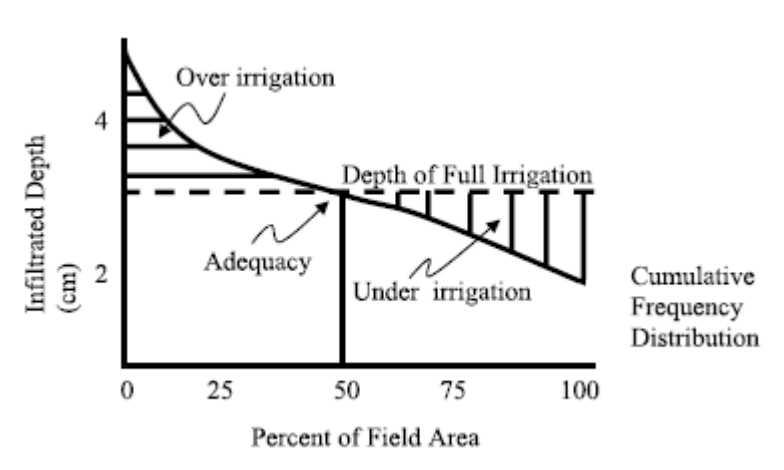
The "Fractions" of Water in an Irrigation System"

	Consumptive Use	Non-Consumptive Use
Beneficial Use	-Crop ET -Landscape ET -Evaporation for climate control	-Deep percolation for salt removal
Non-Beneficial Use	-Phreatophyte ET -Sprinkler evaporation -Reservoir and Canal Evaporation -Excess wet soil evaporation	-Reusable excess deep percolation -Reusable excess runoff -Reusable canal spills

The Irrigation Efficiency Paradox

In many cases of increased efficiency, diversions from the stream decline as efficiency increases and it thus appears that the crops are getting less water. Even though total diversions decrease, in many cases efficiency measures actually increase the amount of water delivered to and consumed by the crop. Sprinklers, drip, and laser leveled fields ensure that all crops in a field receive the optimum amount of water rather than having some plants receive too much and some too little. Thus ditches with poor delivery "uniformity" can increase consumptive use after efficiency improvements. Farmers may shift to crops with more consumptive use with a new system that can deliver more water to crops during high need times.



Source: Huffaker 2008

Efficient irrigation spreads water more uniformly, reducing both over-irrigation and under-irrigation.. The dashed horizontal line represents the ideal level of irrigation as infiltrated depth of water in the soil. Increasing efficiency will "flatten" the slope of cumulative frequency distribution and increase the amount of applied water consumed by crops.

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