Imperial County Agricultural Briefs

University of California
Agriculture and Natural Resources

Features from your Advisors

November 2017

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EFFECTIVE SOLUTIONS FOR IMPROVING ON-FARM IRRIGATION EFFICIENCY

Ali Montazar, Irrigation & Water Mgmt Advisor, UCCE Imperial & Riverside County

Efficient use of irrigation water is one of the highest conservation priorities in California and in the Low Desert Region. While efficient use of water may improve yield production and quality, conserve water and fertilizer, and improve water quality, it is highly dependent on climate (reference ET/or CIMIS ET and rainfall), soil properties, crop type, water quality, water supply reliability, and irrigation management practices. Amongst these factors, irrigation management is likely the most important driver for improving irrigation efficiency. This involves an array of methods to increase beneficial water use such as water used by crops as consumptive water use, excessive water uses to leach salts from the crop effective root zone, and water applied for canopy cooling and frost protection. The other component is to reduce non-beneficial water use which mainly includes deep percolation, tail water runoff, evaporation from soil, spray evaporation, and weed evapotranspiration.

To improve irrigation efficiency, perhaps **the most effective approach is switching surface irrigation to *well-designed and properly-managed pressurized irrigation systems*** (Fig. 1). Automation of surface irrigation and tailwater recovery system may be considered other effective techniques.

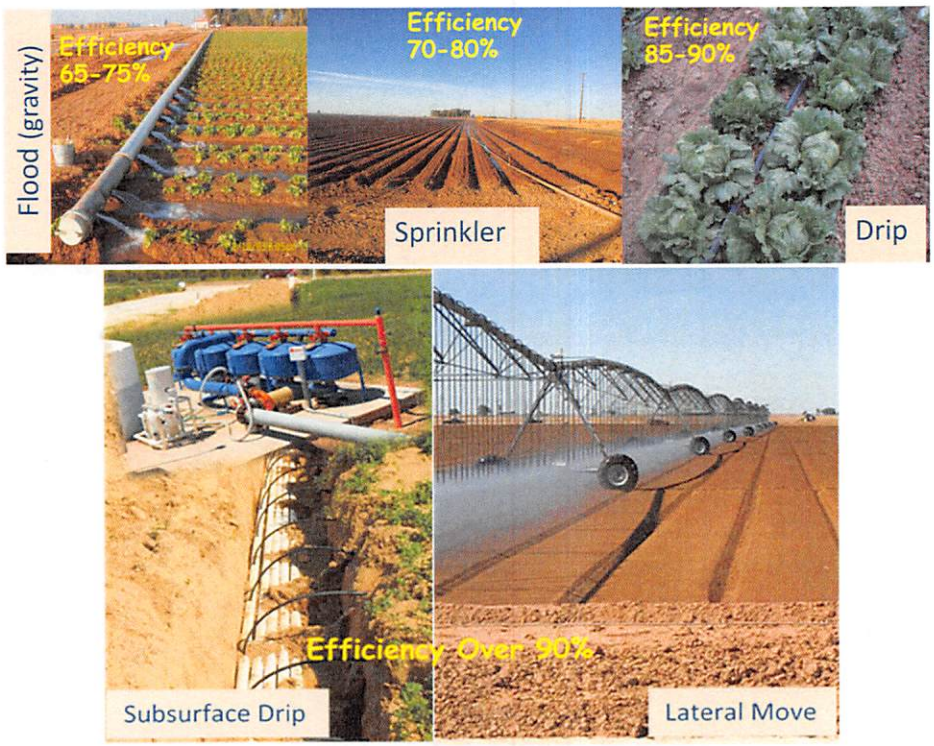


Fig. 1. Typical efficiency of different irrigation practices

Better water distribution uniformity in the entire field and *over the growing season* are <u>key points</u> in improving irrigation efficiency and crop yield production. Pressurized irrigation

systems have a higher potential than flood irrigation systems in terms of water distribution uniformity over time and space. As a result, maintaining soil moisture at a desired level is more achievable through utilizing these irrigation practices (Fig. 2).

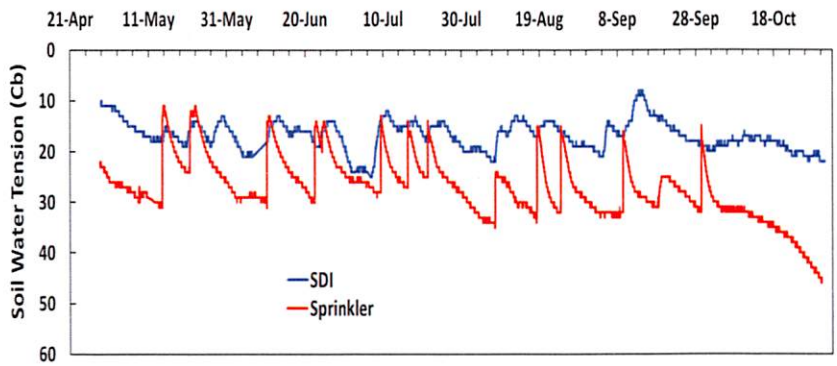


Fig 2. Maintaining soil moisture in a desired range through sprinkler and subsurface drip irrigation practices (SDI)

To improve on-farm irrigation efficiency, it is important to know *crop water requirements (ET), soil water holding capacity* and *intake rate*, *actual flow of water* being delivered to the field, and *soil moisture status*. All these parameters are relevant to irrigation water management which is as important as the irrigation method. To accomplish high water-efficiency in agricultural systems, we need both irrigation technology and irrigation management tools. Having only pressurized irrigation systems wouldn't necessarily result in optimal benefits of these systems.

Over irrigating and under irrigating fields are possible even with a pressurized irrigation system due to improper irrigation water management. Fig. 3 compares cumulative crop ET and irrigation applied water for part of a growing season in a commercial alfalfa field under subsurface drip irrigation in the low desert region. In the mid-season, the field was under water stress and in the late season, over irrigated. Overall, the field was irrigated 10% more than the crop water needs, while the grower was able to save about 12% water compared to flood irrigation through SDI system. The grower could conserve 10% more water through this irrigation practice, if irrigation events had been scheduled in a better manner.

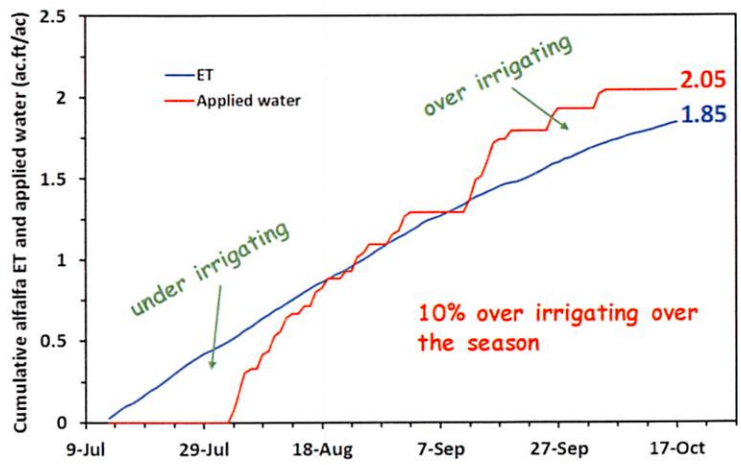


Fig. 3. Irrigation water management in an alfalfa commercial field under SDI system

To operate irrigation systems more effectively, one needs to first estimate crop water requirements more accurately; then apply water through an irrigation system to satisfy crop water needs. Regardless of the irrigation

method, **ET-based irrigation scheduling** (*following Crop ET + Soil Moisture Monitoring*) is an effective approach to manage irrigation water. Using this approach, the amount of irrigation should be considered as the difference of crop ET and rainfall for the corresponding period, and *soil moisture sensors should be used as a useful tool* to answer the following critical questions:

- What is the water status of the soil early in the season?
- When is the right time for the first and subsequent irrigation events?
- Is the soil profile full after each irrigation event?
- What is the length of irrigation time?
- Should the irrigation practice be changed?

In recent years, there has been a proliferation of commercially available soil moisture monitoring systems for agriculture (Fig. 4). Many sensors interface with dataloggers and wireless communication systems to provide near real-time status of soil moisture from several depths and locations within a field. Data is automatically uploaded by radio or cell phone communications to cloud-based computer servers and are accessible through apps on

Fig 4. An overview of different soil moisture sensors

smartphones and tablets. These communication advancements greatly improve the convenience of accessing data and can be configured to provide timely alerts when crops require irrigation. While considering the sensor/s that might work best for our own fields, depending on irrigation system, soil parameters, and crop type; it is also critical to learn where and how to install and maintain the sensors, and how to read, interpret, and use the data of soil moisture sensors for irrigation management.

Knowing the flow rate and the time required to apply the desired inches of water are as important as knowing crop water needs and soil moisture status. It is good to know that **Flow Meters** are not just for monitoring wells but they can be used for on-farm irrigation system management.

Regular maintenance and system management play a key role in obtaining the potential efficiency of irrigation practices. A list of required maintenance and best management practices for sprinkler, drip, and furrow irrigation systems are as follows:

- **Sprinkler Irrigation:** operate in low-wind conditions; fix leaks on main and lateral lines; replace worn gaskets; use optimal lateral spacing; maintain sprinkler heads; use appropriate nozzle size lateral and head spacing; use a uniform nozzle size; offset hand-move lines; maintain appropriate pressure in lateral lines; and reduce the time of irrigation sets to minimize run-off.
- **Drip Irrigation:** fix leaks on main and laterals; use filters appropriate for water quality; flush filters and drip lines regularly; regulate pressure; chlorinate lines.
- **Furrow Systems:** improve uniformity of slope (laser grade/level, plane); smooth furrows prior to irrigating; reuse tail water; short irrigation sets to reduce tail water runoff; split field to shorten furrow lengths; use amendments to improve infiltration (organic material, gypsum, Polyacrylamide- PAM); use a surge valve; and irrigate alternate furrows.

SOME PROBLEMATIC WEEDS OF THE COACHELLA VALLEY

Jose Luis Aguiar, Farm Advisor, UCCE Riverside County
Pratap Devkota, Weed Science Advisor, UCCE Imperial and Riverside Counties

It is important to identify weeds in order to understand their life cycle and management. Weeds can be summer or winter annuals, biannual, and perennials. The information on weeds emergence and life cycle is very important in implementing weed control measures in effective ways.

Some of the weeds have adopted to vegetable crop system and are extremely resilient from a management standpoint. Often it is difficult to control these weeds with some commonly implemented control practices. Most of the time, growers and PCA's have difficulty in identifying these problematic weeds, so farm advisors try to help these clientele by collaborating with Andrew Sanders at UCR Herbarium. In this article, we have tried to provide basic information's on some of the weeds that are becoming more common in Coachella Valley in recent years.

1. Salt grass (*Distichlis spicat):*

It is a perennial monocot which is native to California. It is distributed in a wide range of habitat ranging from the Coastal Salt Marshes to the Creosote Brush Scrub communities. Salt grass can be often confused with bermudagrass. Some differences between salt grass and bermudagrass is that salt grass produces glands that exude salt crystals and bermudagrass does not have these structures. In addition, bermudagrass spreads with stolons (runners) where as salt grass does not produce these reproductive structures. There are differences in flower characteristics between these species which also helps to distinguish them from each other.

2.Common purslane (*Portulaca oleracea* L):

Some of the common names for this weed species include portulaca and verdolaga. It is an annual dicot weed and

Source:
http://ipm.ucanr.edu/PMG/WEEDS/purslane.html

non-native to California. Common purslane is becoming a problematic weed in many agricultural production systems. It is a major weed in the organic production system because it is difficult to control with tillage and pieces of the plant can re-root in moist soil. Purslane produces yellow flowers in axils of the leaf/stem; the flowers are yellow in color. The plant produces tiny black colored seed with harder seed coat.

There is some biological control with the Purslane sawfly. By coincidence some were recently sent to the UCCE, Riverside office for identification.

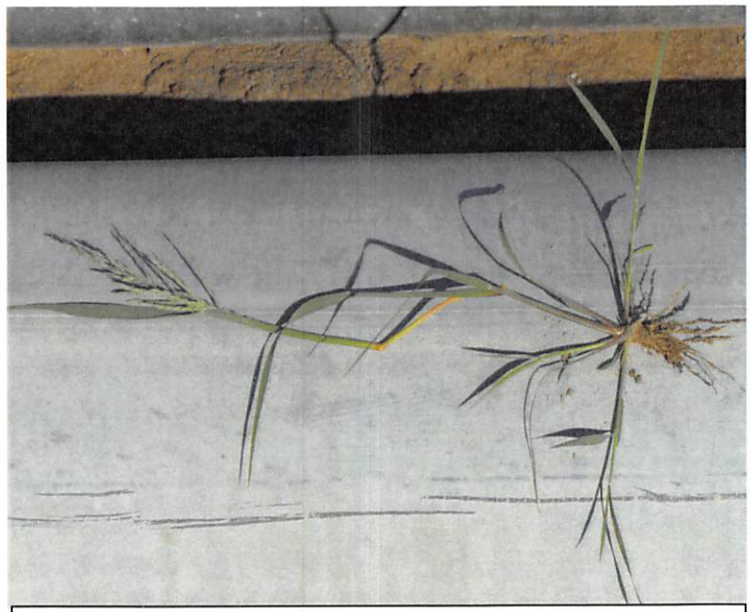
3. Puncturevine (*Tribulus terrestris*):

It is a summer annual, with prostrate growth habit and forms large mats on the ground surface. Puncturevine has a shallow taproot system. It is widely distributed throughout California. It is also listed as a "C-rated" noxious weed in California. It has adjusted to a wider range in terms of growing season and flowers from March to October. The flowers are bright yellow in color and produce seeds that remain viable for many years. Seeds produced are a woody bur and each bur has two sharp spines.

Source: http://ipm.ucanr.edu/PMG/WEEDS/puncturevine.html

4. Mexican sprangletop (*Leptochloa fusca* ssp.):

It is a monocot weed that is native to California. It can be found in crop and non-crop areas. It is also primarily found in wetland areas. Is has upright growth habit and grows in clump. In the low desert region, this grass weed has been a major weed because it has developed resistance to grass herbicides such as Clethodim and Select Max.



Source: http://calscape.org/Leptochloa-fusca-ssp.-uninervia-()

GREETINGS FROM NEW LIVESTOCK ADVISOR

Hello Everyone,

I am Brooke Latack, the newly hired Livestock Advisor with UC Cooperative Extension serving Imperial, Riverside, and San Bernardino counties. I am stationed at the Imperial County UCCE offices in Holtville, CA. I look forward to working with producers, managers, nutritionists, university academic and extension personnel, animal health experts, community members, and other stakeholders involved in livestock production within the low desert area of California. Meeting with the local stakeholders and creating strong relationships will help me to provide meaningful programs, ultimately allowing desert livestock production to grow stronger and more resilient.

I received my B.S. and M.S. degrees from Michigan State University. During my graduate work, I focused on how management decisions at each stage of livestock production affect the sustainability of animal protein production. Through this work I integrated livestock nutrition strategies, environmental nutrient losses during manure storage and field application (including air emissions and run-off), and the interaction between these factors to better understand the sustainability of long-term management decisions. This allowed me to develop a deep appreciation for identifying interactions and the critical control points within a system that will be economically and environmentally beneficial to producers and the community. During my graduate work, I collaborated extensively with academic faculty, extension personnel, and producers to create a model that met the needs of a wide array of users. I wanted to take the skills I had developed and apply them to current issues producers are experiencing. This led to me Southern California, where I can use my skillset as an asset to the community in an area where agriculture and livestock production are immensely important.

As the Livestock Advisor for the area, I will work to create an applied research, extension, and education program that addresses the needs and concerns of stakeholders. To better understand the needs and concerns of the counties I am serving, I hope to meet as many people involved in the livestock community as possible. I look forward to visiting farms, discussing production issues (large and small), and being able to apply my skills to help producers thrive. My programs will focus on nutritional and management strategies that will strengthen the bottom line as well as mitigate any health or environmental issues for animals, producers, and communities. I also hope to help

in the challenges associated with legislative changes. My goal is to create a program that makes information easily accessible to the entire community and allows producers to efficiently address any concerns.

While I am very new to this area, I have begun to meet the very welcoming people in the community. I look forward to meeting more people and developing a better understanding for issues surrounding livestock production in Imperial, Riverside, and San Bernardino counties. Please feel free to contact me (contact information listed below). I will be happy to meet you out at your farm, talk over the phone, or meet at the UCCE offices to discuss concerns, questions, and ways I can help you.

Thank you,

Brooke Latack

Livestock Advisor

UCCE Imperial County
1050 E Holton Rd, Holtville, CA

Office: (442)265-7712

Mobile: (269) 313-2579

Email: bclatack@ucanr.edu

http://ceimperial.ucanr.edu

IMPERIAL VALLEY CIMIS REPORT AND UC WATER MANAGEMENT RESOURCES

Ali Montazar, Irrigation & Water Mgmt Advisor, UCCE Imperial & Riverside County

The reference evapotranspiration (ET_o) is derived from a well-watered grass field and may be obtained from the nearest CIMIS (California Irrigation Management Information System) station. CIMIS is a program unit in the Water Use and Efficiency Branch, California Department of Water Resources that manages a network of over 145 automated weather stations in California. The network was designed to assist irrigators in managing their water resources more efficiently. CIMIS ET data are a good guideline for planning irrigations as bottom line, while crop ET may be estimated by multiplying ET_o by a crop coefficient (K_c) which is specific for each crop.

There are three CIMIS stations in Imperial County include Calipatria (CIMIS #41), Seeley (CIMIS #68), and Meloland (CIMIS #87). Data from the CIMIS network are available at: http://www.cim is.water.ca.gov. Estimates of the average daily ET_o for the period of November 1 to January 31 for the Imperial Valley stations are presented in Table 1. These values were calculated using the long-term data of each station.

Table 1. Estimates of average daily potential evapotranspiration (ET_o) in inches per day

Station	November		December		January	
	1-15	16-30	1-15	16-31	1-15	16-31
Calipatria	0.13	0.11	0.09	0.09	0.09	0.10
El Centro (Seeley)	0.14	0.12	0.10	0.09	0.10	0.11
Holtville (Meloland)	0.13	0.11	0.09	0.08	0.09	0.10

For more information about ET and crop coefficients, feel free to contact the UC Imperial County Cooperative Extension office (442-265-7700). You can also find the latest research-based advice and California water & drought management information/resources through link below:
http://ciwr.ucanr.edu/.

Register with Andrea
aiestrada@ucanr.edu

Location:

Farm Credit Services Southwest Ag Center Room

485 Business Park Way, Imperial, CA 92251

Time:

***Registration at 6:30 am** 7:00am -12:15pm*

Approved Continuing Education Units:

CA DPR - 3.5hrs. (#M-1259-17), CCA - 5.0hrs. (CA 55343)
and AZ Dept. of AG - 3.5hrs. (#17991)

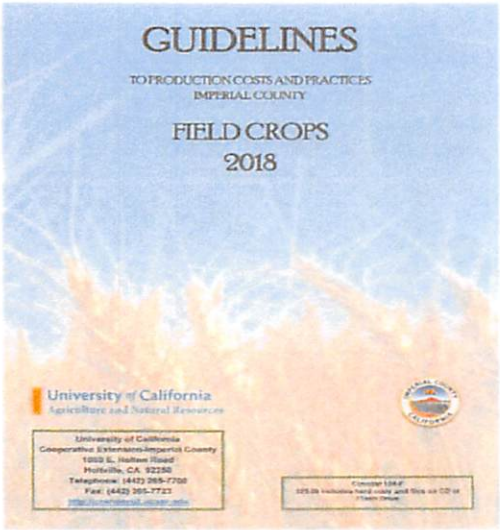
Lunch:

Courtesy of Western Farm Press & Commercial Suppliers

Presented by:

University of California Cooperative Extension Imperial County
1050 E. Holton Rd, Holtville, CA 92250 (442) 265-7700 office
http://ceimperial.ucanr.edu

This is to announce that the
2018 Guidelines are ready to be purchased.

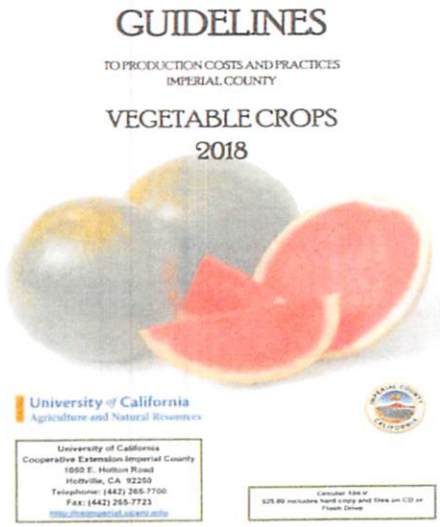


2018 Field Crops Guidelines

$25.00/book

2018 Vegetable Crops Guidelines

$25.00/book



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Each book includes either a CD or USB.