University of California
Agriculture and Natural Resources
Cooperative Extension, Stanislaus County

VEGETABLE VIEWS

SUMMER 2018, ISSUE #3

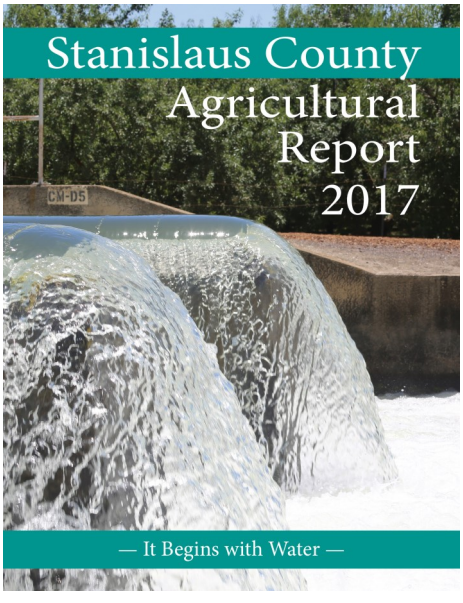
Recent Happenings

2018 California Specialty Crop Tour was held August 6-9.

The tour attracted 50 attendees coast-to-coast, of which nearly half were from USDA and its affiliations in D.C. The planning committee arranged bountiful crop field visits and company tours involving orchard and warm-season vegetable production in San Joaquin Valley and leafy greens in Salinas Valley. Participants shared their questions and concerns with the presenters regarding labor shortage, pest control, yield increase, water quality, and irrigation strategy. I gave a presentation regarding the water usage in the Central Valley crop production. The presentation slides can be found at http://ucanr.edu/zheng .

The 2017 Stanislaus County Agricultural Report is now ready to view.

According to the 2017 Stanislaus County Agricultural Report, vegetable production in Stanislaus County continues to be diverse. In 2017, vegetable crop production experienced significant increases in total harvested acreage (20%) and sales value (15%) compared to 2016, reaching totals of 28,630 acres and $180 million, respectively. Tomatoes (fresh market and processing), melons, and sweet potatoes continue to be major commodities in Stanislaus County, constituting nearly 60% total acreage and sales value. Follow the link (http://bit.ly/SCAR17Mod) to download the 2017 and previous years' Crop Reports for more details.



In This Issue

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Two Examples Showing Possible Solutions to Labor Shortage

Labor shortage is not a secret in California, and it was one of the most frequently mentioned concerns during the California Specialty Crop Tour. To show us some examples of dealing with labor shortages, the Specialty Crop Tour took us to visit an automated leafy vegetable transplanting (Plant Tape) system in Salinas and a cantaloupe field grown with long-shelf-life varieties located in Los Banos. Both production practices appear to help with labor shortages.

Traditional leafy vegetable transplanting requires 6-10 people sitting on the back of the transplanter to pull young seedlings from trays and then introduce them into the ground. Meanwhile, another 4-6 people follow the transplanter to check root ball-soil contact and coverage. The whole process needs 10-15 people, which is very labor-intensive. In addition, seedlings must grow to specific stages when roots tightly wrap around the potting media to ensure an intact root ball for transplanting. This reduces the transplanting time flexibility. The automated transplanting system is called Plant Tape. The Plant Tape was originally developed in Spain and was acquired by Tanimura & Antle (A California-based vegetable grower and seller headquartered in Salinas) in 2014 for technical development and commercialization. The Plant Tape offers an integrated system from sowing, through post-germination care, to transplanting. The farm manager told us that one of the most prominent advantages is saving manual labor. Only 2-3 people (one driver, and one or two system feeders to feed seedling tapes to the planting system) are needed, which reduces over 80% labor requirement compared to the traditional system. Other benefits include more efficient transplanting (over six times faster

Figures E-G. The grower displayed cantaloupes at different mature stages (flowering to fully ripe) in the field at Los Banos (E and F). Long shelf life cantaloupe is much easier to tell the optimal harvest stage. In this case, straw-color nets climb up to the stem, and there is light cracking at the stem base as shown in the red box (G). Fruit harvested at this stage have orange flesh, good sugar content,

Figures A-D. Lettuce seeds were sown into the biodegradable plant tapes until germination and growth of two true leaves before transplanting (A). Plant tapes are placed into a tray which holds up to 900 plants (300 plants in a regular plug tray). Plants with tape on are easily pulled out of the tray regardless of growth stage when transplanting (B). The system can hold multiple trays in a time. One driver steers the tractor and one or two feeders provide plants to the system to complete transplanting (see the trays and hanging plant tapes in red boxes; C and D). Photos

Continued…Labor Solutions

than traditional transplanting), 97% less peat use, and more flexible planting time because seedlings are auto-planted, and root balls are protected with tapes at transplanting. This system is currently being used in commercial production of lettuce, broccoli, cauliflower, celery, tomatoes, and onions. More details can be found at http://www.planttape.com/.

Another labor-intensive activity in vegetable production is harvest. Harvesting melon is a labor-intensive activity due to the fruit size, multiple harvests, and lack of an alternative mechanical system. Additionally, judging the time of harvest is critical and more difficult than with many other vegetables. Signs indicating near maturity or full maturity are not as evident as other vegetables. Worse, if harvested earlier, melons cannot automatically mature as tomatoes do during shipping. If melons are harvested overripe, fruit quality declines rapidly in 2-3 days due to the short shelf life. Seed companies started to breed for long-shelf-life melon varieties in the past several years to elongate the optimal harvest stage and improve shipping. Previous evidence indicates that growing long-shelf-life melons allowed growers more flexibility to harvest at the optimal mature stage and reduced harvests from 10-15 times to 2-3 times in some cases. The farm at Los Banos grows long-shelf-life cantaloupes with the expectation that more fruit will be within the optimal stage when harvested, thereby reducing the number of harvests and lowering labor costs. Varieties bred for long shelf life have firm skins and flesh without sacrificing the flavor. The grower told us that the Brix value of long-shelf-life cantaloupes can reach as high as 17 (16 is usually considered excellent).

Bare-ground Fallow or Green Blankets: Consider a Fall Cover Crop after Summer Vegetables

As most summer vegetables are harvested, growers may start planting cool-season vegetables (i.e., leafy greens) or simply fallow the fields until next year. An alternative to bare-ground fallow is to grow cover crops. Growing annual cover crops in fall between two summer vegetable seasons offers many benefits, including fall-spring weed suppression, nitrogen fixation, excess nutrient scavenging, nutrient leaching prevention, and soil moisture retention. There are abundant fall cover crops to select for your field, but some factors must be considered prior to making the decision.

Are you ready for seeding cover crops? This appears to be an odd question. It is true in many cases that planting a cover crop is relatively simpler than growing vegetables; however, care must be given regarding soil preparation for drilling seeds or broadcasting, irrigation supply, and cover crop termination. All cover crops require water to grow, especially when planting in early fall. The earlier a cover crop is planted in the fall or the longer it is allowed to grow in the spring, the more water it will require. For example, winter cover crops, such as tillage radishes, typically require less irrigation than early fall varieties because most of the critical growth stages are within the rainfall season.

What is the purpose of growing cover crops? There are many purposes in growing cover crops. Particular to vegetable growers, growing fall cover crops can suppress the fall-spring weed seed bank by generating tremendous biomass, replenishing soil nutrients and organic matter for a good start for the next season or scavenging excess plant-available nutrients that are left over from the previous season to prevent nutrient leaching and soil erosion. For example, a fall-seeded winter rye cover crop will produce a large amount of biomass the following spring to effectively suppress weed emergence and potentially increase soil organic matter. Besides weed suppression and increasing organic matter supply, winter rye is a credited nitrogen scavenger. Previous studies have shown that winter rye can hold up to 60% residual nitrogen that could potentially leach from the soil to groundwater systems. Hairy vetch is a fall-winter cover crop that can be grown after vegetable harvests. In contrast to winter rye, hairy vetch is a heavy contributor of nitrogen fixation which can replenish soil with key nutrients for early vegetable planting in the next year. Sometimes, combinations of two or three cover crops offer multiple benefits. For instance, the companion of grains (i.e., winter rye) and legume cover crops (i.e., field pea, hairy vetch, and clovers) are popular combinations to modulate soil

nitrogen level and synergistically suppress weed species.

Can the cover crop overwinter and when to terminate? According to the USDA Crop Hardiness Zone Map, our county is in Zone 9b, which means most of our fall and winter cover crops will be alive in winter. Hence, relying on a killing frost for termination is not a realistic expectation for our cover crops. Mechanical termination of cover crops at the appropriate time can reap the benefits and prevent disadvantages. One rule of thumb is "do not let cover crops become the weeds of your cash crops." For example, most Brassica cover crops (mustard, forage turnips, tillage radishes) can be grown in early fall to suppress weeds and improve water infiltration. Most of these cover crops can be frost-killed before shedding seeds in Zone 7 and more northern regions. However, deep tillage is necessary to mechanically kill these cover crops before seeds are deposited to the weed bank here in the Central Valley.

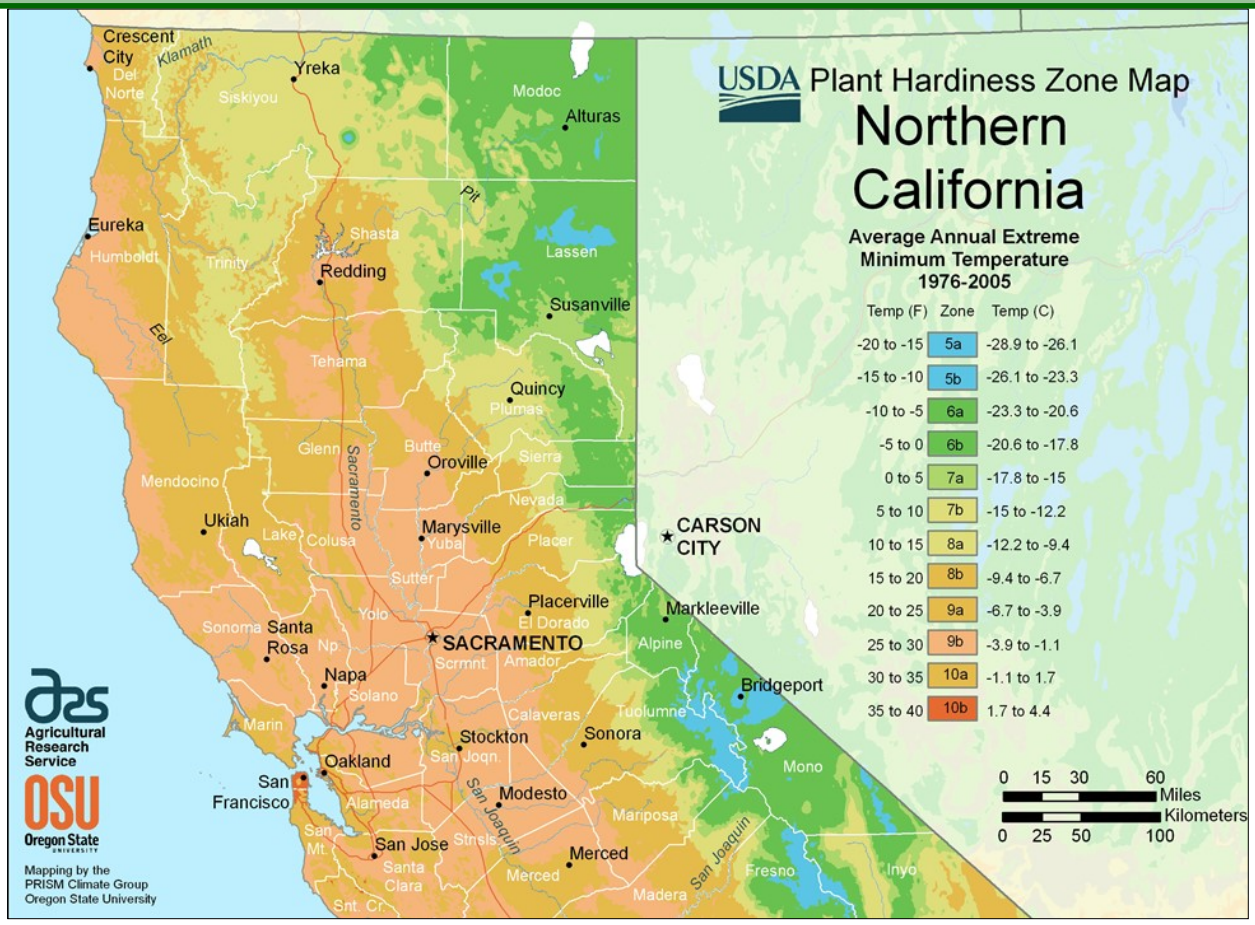
There are many resources depicting cover crop usage. Please visit USDA-SARE (Sustainable Agriculture Research and Education) for more information (Managing Cover Crops Profitably, 3rd edition: https://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition and Cover Crop Topic Room: https://www.sare.org/Learning-Center/Topic-Rooms/Cover-Crops). Also, if you plan growing cover crops or have questions about cover crops on your farm, please let me know (209-525-6822; zzwwang@ucanr.edu).

Average Rainfall by Month: Modesto, CA (1888-2017, source: MID)

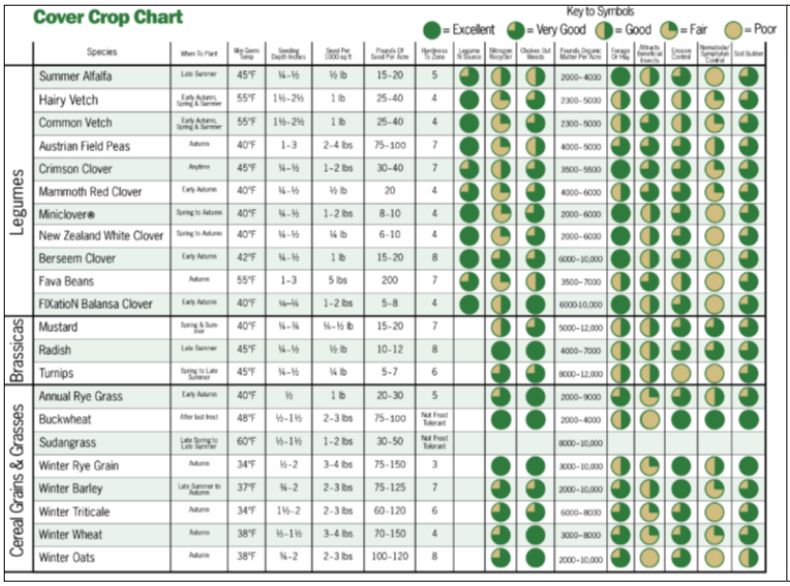
January	**2.38"**
February	**2.05"**
March	**1.91"**
April	**0.97"**
May	**0.48"**
June	**0.10"**
July	**0.02"**
August	**0.03"**
September	**0.20"**
October	**0.63"**
November	**1.33"**
December	**2.10"**

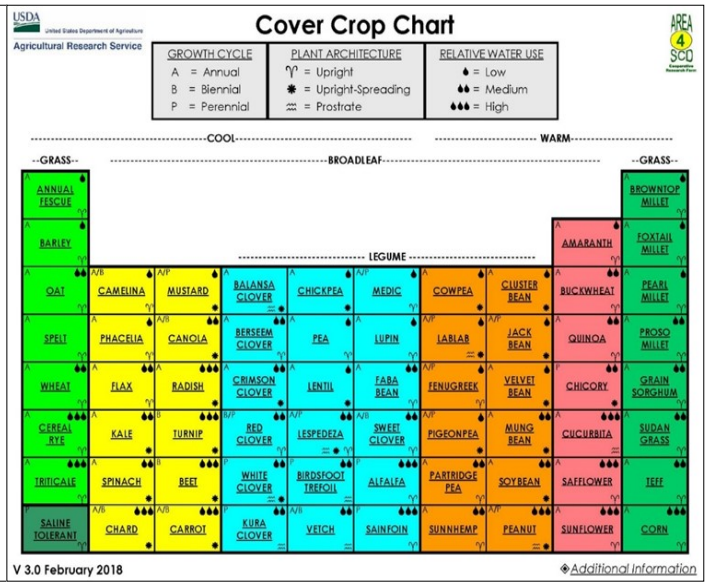
Cover crops planted in late fall or winter are closer to the start of rainfall season, thereby requiring less irrigation during the entire growing stages.

Continued...Fall Cover Crops



Northern California Plant Hardiness Zone Map 1976-2005 (Note: Stanislaus County within Zone 9b). In this hardiness zone, most cover crops can overwinter. Source: USDA-ARS and Oregon State University.





A cover crop chart can be a reliable tool to make decisions (Left: http://www.bit.ly/cropcoverchart and Right: http://bit.ly/cropcoverchart2).

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