**Can Subsurface Drip Irrigation Improve Alfalfa Water Productivity?**

**Promises:**
- Higher Yields: Growers have nearly all reported significantly higher yields in SDI fields compared to check flood fields. They attribute this to better distribution and uniformity in time.
- Lower Weeds, Labor: Weeds can be reduced in SDI systems. Labor for irrigation is less with SDI, but monitoring for rodents requires more time.
- Higher Management: Better nutrient management is also required. However, the rewards of higher management may be worth it with significant yield increases.

**Pitfalls:**
- Cost of SDI: The cost of SDI has been a major stumbling block for growers. Improvements in point are definitely required to make the technology attractive. In other states (e.g., Oregon), the prices have frequently exceeded $200/acre, making these systems more interesting for producers, but fluctuations to low price is a definite disadvantage.

**Higher Yields**

Higher yields in SDI are thought to be a largely a function of better distribution and uniformity in time. Moisture and nutrients are more readily available to roots and evaporative losses and runoff are near zero. However, a corrugation effect is important in alfalfa, which effectively has a $26 -$7 distribution uniformity in time. This is important in alfalfa, which effectively has a $26 -$7 distribution uniformity in time. Distribution uniformity across this grower’s field was improved significantly by SDI, but monitoring for rodents requires more time.

**Reducing Water Use**

There have been a number of reports of lower water use when farmers have adopted SDI, from 5% to 50% reductions in water use, but this will depend upon how efficient the system is. ET may be greater on less than flood, depending upon factors. Evaporative losses and runoff are less with SDI vs. flood, but if growth is better and water supplied more successively, the crop may use more water in SDI. However, reductions in water used per unit crop yield is highly likely. SDI clearly has the potential to improve yields, conserve water, and improve water use efficiency (WUE) in alfalfa.

**Optimizing SDI Design**

Optimizing SDI design with varying lateral spacing and factors have been used with success.

**Extension and Research**

We have visited 18 farms throughout California and Arizona, documenting, promoting, and reporting on SDI and its potential. This work has been supported by UC Davis Crops and UC ANR Desert Research and Extension Centers. On-farm research has been developed to make information available to farmers. Space does not allow all of these materials to be discussed, but they can be found on the UC ANR Crops website.

**Integrated Irrigation Systems**

Our work seeks to integrate the many factors which might improve the efficiency of systems of SDI, including improving distribution uniformity in time, management of systems, and the use of deficit irrigation. Our work has wider implications for integrated flood irrigation with SDI and sprin- kler and monitored broadcast irrigation for irrigation systems in general.