

Resource Conservation District of Santa Cruz County

# How to estimate the leaching requirement of your crop based on your well salinity

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Irrigation water carries salts with it, so every time you irrigate you add salts to the soil. Depending on the salinity level of your well, you may need to apply an additional quantity of water to leach down the salts and maintain the salinity of your soil below a certain threshold. For each crop there is a different soil salinity threshold below which yield is not affected. Above this threshold, there is a reduction in yield that is more or less severe depending on the crop. The water requirement for leaching salts is in addition to the irrigation requirements of your crop determined by evapotranspiration and by the efficiency of your irrigation system. This guide provides directions for estimating the extra water that you will need to apply to your crop in addition to the evapotranspiration requirement to maintain the soil salinity at a level that does not affect your yield.

To use this guide, you will need to know the salinity of your well water. Salinity in water is expressed as EC (electrical conductivity) in units of dS/m (deciSiemens per meter). You can take a well water sample and bring it to a water quality lab (see **Figure 1** for an example of lab results). You can also request a free measurement of your well salinity by the RCD of Santa Cruz County: (831) 464-2950, [info@rcdsantacruz.org](mailto:info@rcdsantacruz.org).

Sample Identification:	Water
CONSTITUENTS	
pH	
Electrical Conductivity (dS/m)	0.61
Nitrate Nitrogen, NO <sub>3</sub> -N (ppm)	14
Chloride, Cl (ppm)	67
Sulfate, SO <sub>4</sub> -S (ppm)	27
Bicarbonate, HCO <sub>3</sub> (ppm)	104
Phosphorus, P (ppm)	0
Ammonium Nitrogen, NH <sub>4</sub> -N, (ppm)	0
Potassium, K (ppm)	0
Sodium, Na (ppm)	32
Calcium, Ca (ppm)	41
Magnesium, Mg (ppm)	28
Iron, Fe (ppm)	0.09
Manganese, Mn (ppm)	0.02
Zinc, Zn (ppm)	0.20
Boron, B (ppm)	0.13
Copper, Cu (ppm)	0.02

Figure 1, Example of water analysis lab results indicating the electrical conductivity of a well water sample

If you know how many inches of water your crop needs to satisfy evapotranspiration and distribution uniformity requirements, or if you know how much water, or hours of pumping you are currently applying, use **Table 1**.

If you don't know the evapotranspiration requirements of your crop, you can estimate the quantity of irrigation water needed for both evapotranspiration and leaching using **Table 2**. Use Table 2 with caution, these are just estimates.

	Well Water Salinity expressed in EC, dS/m																								
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5
Strawberry	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.8	1.9	2.1	2.3	2.6	3.0	3.6	4.7	6.8	13.0	
Lettuce	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.0	2.2	2.4	2.7
Caneberry	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.8	1.9	2.0
Broccoli	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3

Table 1. A coefficient by which to multiply your known water requirement in order to increase it by the quantity needed to leach salts

### How to use Table 1.

Pick the row corresponding to your crop and the column corresponding to your well salinity and look up in the table the corresponding coefficient. Multiply this number by the inches of water or the hours of pumping that your crop needs.

For example, if you grow strawberry and your well salinity is 0.6 dS/m, your coefficient is 1.2. If you know that your strawberry crop needs 30 inches of water per season, then you should apply  $30 \times 1.2 = 36$  inch. Another example. Say that your well never was salty and you usually run the pump 35 hours in one cycle of lettuce. All of a sudden your well goes salty and the result from the lab is EC = 1.1 dS/m. The coefficient from the table is 1.3; so for your next cycle of lettuce you should run your pump  $35 \times 1.3 = 45.5$  hours.

	Well Water Salinity expressed in EC, dS/m																									
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2	2.3	2.4	2.5
Strawberry	26	27	27	28	28	29	30	31	32	33	35	36	38	40	43	46	49	54	59	67	78	94	121	176	338	
Lettuce	8	8	8	8	9	9	9	9	9	10	10	10	10	11	11	11	12	12	13	14	14	15	16	18	19	21
Caneberry	20	20	21	21	21	22	22	22	23	23	24	24	25	25	26	27	27	28	29	30	31	33	34	36	38	40
Broccoli	20	20	20	20	21	21	21	21	21	21	22	22	22	22	23	23	23	23	23	24	24	24	25	25	25	26

Table 2. Estimated amount of seasonal irrigation water in inches for different crops at different well salinity levels

### How to use Table 2.

Pick the row corresponding to your crop and the column corresponding to your well salinity. The table gives you how many inches of water you need for one cycle of the crop.

For example, if you grow raspberries and your well water has an electrical conductivity of 1.1 dS/m, you should apply about 24 inches per season. Remember, these are just estimates, to obtain detailed irrigation recommendations contact the RCD!

For a visual of how the salinity of well water increases irrigation requirements, refer to Figure 2.

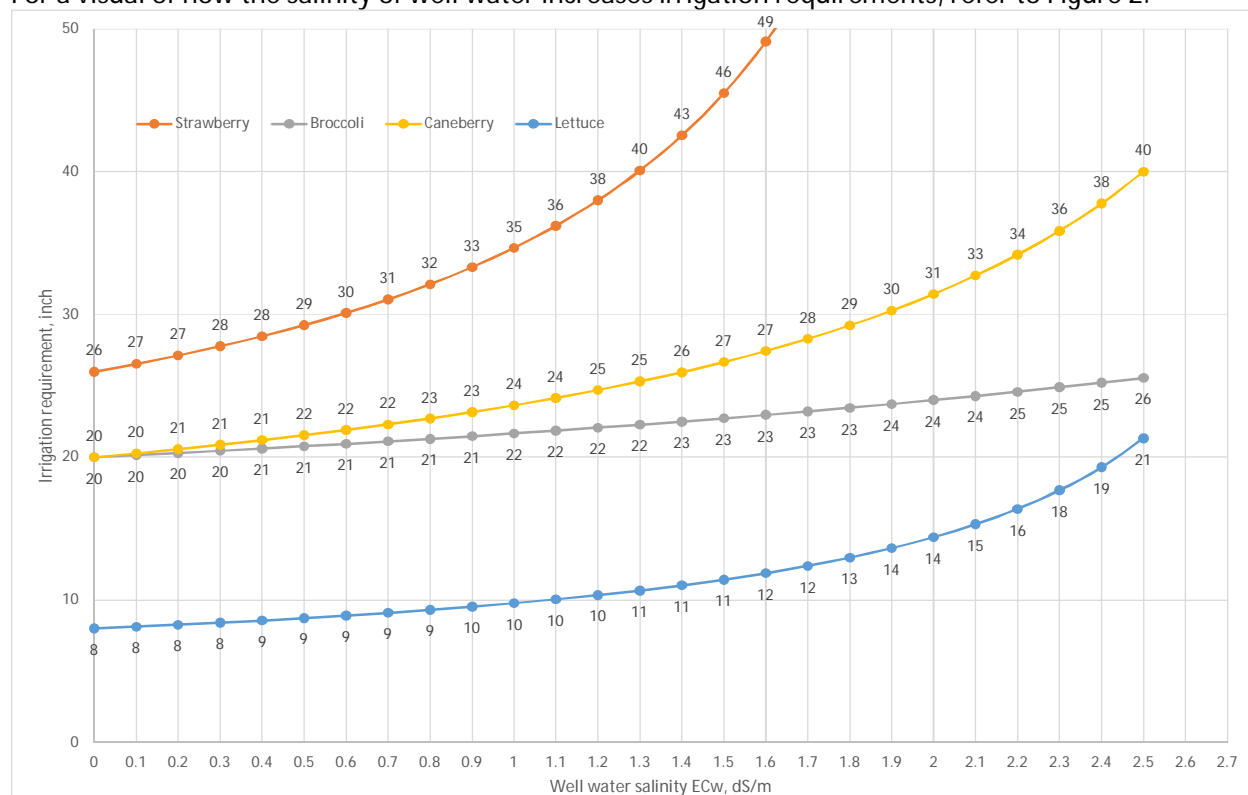


Figure 2. Irrigation water requirement for one cycle of various crops with different levels of well water salinity