SUCCESS STORY

There are numerous benefits to using products containing Soil Amendment. While most of our success stories focus on increasing yield, and reducing or eliminating fertilizer, the attached before and after soil analyses demonstrated significant improvements in the soil's water efficiency and the nutrients measured in the soil increased from 8% to 91%.

The soil samples are from a large Sports Complex, owned by the city of Costa Mesa, California, and were treated with Soil Amendment Solution. Since the sports fields use recycled water, it makes high pH and chlorides constant concerns. Despite these added issues, in less than three months, the pH in the treated fields went down slightly and the chloride and salinity levels dropped 26% and 34%, while the soil moisture (field capacity) increased from 63% to 69%.

		12/8/11		2/28/2012		**Percentage**
Description		average		average		**Change**
pH		7.68		7.59		**-1.17%**
Salinity		1.52		1.12		**-26.32%**
Chloride		210		137		**-34.76%**
Soil Moisture		63%		69%		**+9.52%**
SAR		7.0		5.8		**-17.14%**

Soil ***salinity*** is the salt content in the soil. Salt-affected soils are caused by excess accumulation of salts from high salinity irrigation water, the use of potassium as a fertilizer, which can form a naturally occurring salt, in saltwater coastal areas where atmospheric deposition naturally occurs, or salts can be transported to the soil surface by capillary transport from a salt laden water table and then accumulate due to evaporation. As soil salinity increases, salt effects can result in degradation of soils and vegetation.

Accumulation of soluble salts (brine, salt, and chloride may be used interchangeably for our purposes) is not normally a hazard to human health; however, it can cause adverse and long lasting environmental impacts to soil and ground water resources because chloride is highly soluble, does not adsorb onto soil particles, does not degrade, and generally inhibits biological processes.

Releases of salt onto the ground can damage soils by destroying the soil structure and permeability. The presence of high concentrations of soluble salts can inhibit seed germination and a plant's ability to uptake water. Salt-contaminated soil in the near surface can lose its ability to support agricultural crops, native grasses, or other vegetation if salt levels are high enough, potentially contributing to surface erosion.

Chloride is the most recent addition to the list of essential elements and is essential for many plant functions; however, too much chloride in plants results in symptoms that are similar to typical cases of salt damage. As shown in the attached reports, the chloride target is <150 and Soil Amendment, Soil Amendment inside, brought the chloride from an average of 210, outside the target range, down to an average of 137, within the target range.

Soil Moisture (or Field Capacity) is typically defined as the quantity of water, or moisture, contained in the soil 2-3 days after rain or irrigation. Soil Amendment, Soil Amendment inside increased the ability of these fields to hold water.

Sodium Adsorption Ratio (SAR) is a measure of the suitability of water for use in agricultural irrigation, as determined by the concentrations of solids dissolved in the water. Although SAR is only one factor in determining the suitability of water for irrigation, in general, the higher the sodium adsorption ratio, the less suitable the water is for irrigation. Irrigation using water with a high sodium adsorption ratio may require soil amendments to prevent long-term damage to the soil.

If irrigation water with a high SAR is applied to a soil for years, the sodium in the water can displace the calcium and magnesium in the soil. This will cause a decrease in the ability of the soil to form stable aggregates and a loss of soil structure and tilth. This will also lead to a decrease in infiltration and permeability of the soil to water leading to problems with crop production.

These laboratory reports clearly show the soil's water efficiency being improved. There is more water in the soil, as evidenced by the higher soil moisture percentage, the water in the soil is more available to the plant life since the lower amount of salts in the soil allow more soil moisture to be used by the grass being grown, and the SAR indicates the water in the soil is a higher quality water than before treatment started. These results were achieved without any significant rainfall.

The nutrient levels increased across the board with every element measured showing increases, some very significant. This is especially significant when considering the short period of time between the soil tests, and accepting that Soil Amendment, Soil Amendment inside is primarily a microbial product which takes more time than fertilizer to show initial results.

The city of Costa Mesa did continue its fertilization program (slow release 32-0-0) during the field trial, however, this would only have affected the increase in soil available nutrients for nitrates, and even then, not to the degree shown. Further, other field trials using products containing Soil Amendment show even better results if fertilizer is dramatically reduced.

The microbial formulation of Soil Amendment, Soil Amendment inside, would have to be given the credit for the 48% to 91% increases in manganese, zinc, copper, boron and magnesium, all essential nutrients for optimal growth.

	12/8/2011		2/28/2012		**Percentage**
Description	average		average		**Increase**
Nitrate	13		19		**46.15%**
Phosphorus	42.2		65.4		**54.98%**
Potassium	475		532		**12.00%**
Iron	29.1		38.66		**32.85%**
Manganese	0.93		1.78		**91.40%**
Zinc	11.39		17.64		**54.87%**
Copper	3.57		5.29		**48.18%**
Boron	0.39		0.58		**48.72%**
Magnesium	351		384		**9.40%**
Sodium	552		627		**13.59%**
Sulfur	57		62		**8.77%**