

Western U.S. soils can be improved under intensive irrigated vegetable production.

Measured Soil Quality Characteristics

	Soil organic matter	Active Carbon (ppm)	Soil protein (mg/g)	Soil respiration (mg/g)	Available water capacity	Infiltration, first inch (minutes)	Infiltration, second inch	Bulk density (g/cm ³)
Fields with Soil Improvement Practices:	2.2	461	5.3	0.5	0.182	12.5	16.5	1.34
Fields without:	1.8	374	4.0	0.4	0.165	14.9	22.0	1.34

Positive effect (P < 0.05)

No effect

The common story



Humid, temperate, tallgrass prairie.



Parent material
+Climate +Vegetation +Time
Soil; Soil organic matter content (SOM)

Soil
+Agriculture (erosion, tillage, etc.)
Degraded Soil, Decreased SOM

Soil
+Intensive vegetable production
Degraded Soil, Even lower SOM

A Different story



Columbia Basin of Washington State, irrigated agriculture; comparison of 9 paired fields (18 fields total), with and without practices; practices used 3-20 years depending on farm.



Organic amendments



Strip-till and No-till



Green manures

Parent material
+Climate (Semi-arid desert)
+Vegetation (Sparse shrub-steppe)
+Time

Soils with native SOM < 1%

Low SOM soils
+Water
+Intensive vegetable production
+Farmers using soil improvement practices (above)

High yields of important food crops
Increased SOM and other soil quality indicators

Minutes to infiltrate 1 in. of water*

	1st Inch	2nd Inch	3rd Inch
Long-term green manures	0.3	3.1	6.4
No green manures	17.4	19.6	>20

*Subsamples in adjacent fields