

Denali Farm, LLC
Rainwater Irrigation and Storage Calculations

Overview:

Water for cannabis irrigation will be supplied entirely by a rainwater catchment system. The system will utilize a combination of catchment from rooftops, greenhouses, and HDPE rainwater catchment tanks. Rainwater will be captured from the residence (1,500 sf), drying barn (1,120 sf), greenhouses (10,745 sf), and 40 rainwater tanks (2,270 sf). The greenhouses will be outfitted with a gutter system to collect and convey rainwater from the covers. Water from these locations will be used supplement the HDPE rainwater tanks (200,000 gallons) and fill the standard HDPE tanks. The combination of rainwater sources will provide nearly 344,00 gallons of water, plenty to meet the 255,000 gallon projected water need.

Note: although the 50yr average for annual rainfall is 66.79", the rainfall volumes below are calculated using the mean precipitation value for outlier drought years (35.29"). See the scatter plot graph for details.

Calculations:

Rainwater capture volumes by source:

Residence: $1,500 \text{ ft}^2 = 32,998$ gallons
Drying Barn: $1,120 \text{ ft}^2 = 24,639$
HDPE tanks: $56.75 \text{ ft}^2 \times 40 \text{ tanks} = 2,270 \text{ ft}^2 = 49,938$ gallons
Greenhouses: $10,745 \text{ ft}^2 = 236,379$ gallons

Total rainwater volume: **343,954** gallons

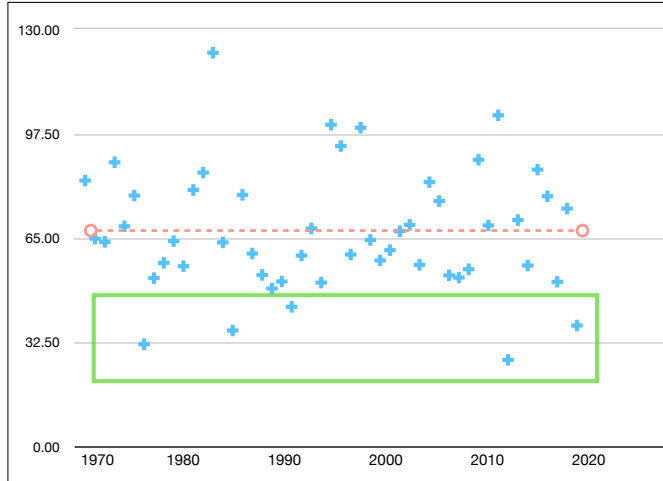
Annual irrigation water need: **255,000** gallons

Storage: **264,700** gallons in tanks

Sources: <https://www.omnicalculator.com/other/rainfall-volume>
https://www.fao.org/fishery/docs/CDrom/FAO_Training/FAO_Training/General/x6705e/x6705e02.htm
<https://concalculator.com/pond-volume-calculator/>

PRISM_ppt_stable_4km_1970_2020_40.4592_-123.6690

PRISM Time Series Data	
Location: Lat: 40.4592 Lon: -123.6690 Elev: 2684ft	
Climate variable: ppt	
Spatial resolution: 4km	
Period: 1970 - 2020	
Dataset: AN81m	
PRISM day definition: 24 hours ending at 1200 UTC on the day shown	
Time series generated: 2022-Aug-01	
Details: http://www.prism.oregonstate.edu/documents/PRISM_datasets.pdf	
Date	ppt (inches)
1970	82.95
1971	64.85
1972	63.82
1973	88.64
1974	68.69
1975	78.27
1976	31.91
1977	52.53
1978	57.28
1979	64.06
1980	56.26
1981	80.00
1982	85.43
1983	122.80
1984	63.66
1985	36.18
1986	78.48
1987	60.19
1988	53.52
1989	49.28
1990	51.47
1991	43.57
1992	59.57
1993	67.99
1994	51.13
1995	100.35
1996	93.71
1997	59.88
1998	99.42
1999	64.42
2000	58.05
2001	61.24
2002	67.14
2003	69.11
2004	56.66
2005	82.45
2006	76.54
2007	53.38
2008	52.69
2009	55.29
2010	89.43
2011	68.96
2012	103.29
2013	27.04
2014	70.62
2015	56.46
2016	86.35
2017	78.04
2018	51.37
2019	74.21
2020	37.74
Annual Average	66.79



Annual precipitation w/ severe drought outliers highlighted

Average annual rainfall 50yr: 66.79"

Low: 27.04" High: 122.80"

Mean precipitation for drought outlier years: 35.29"