

IRRIGATION WATER NITROGEN CALCULATOR

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Nitrogen (nitrate and ammonium N) in irrigation water is as readily available to crops as N in chemical fertilizers. So, when growers account for N in irrigation water, they can reduce rates of fertilizer N application. The Irrigation Water Nitrogen Calculator converts nitrate and ammonium found in irrigation water, as measured by a laboratory or other method, into pounds of N applied per acre. The calculator is available online at <https://agmpep.com/calc-irrn/> and features the following options:

- A single source mode for consideration of a single water source.
- A multiple source mode for consideration of multiple water sources (e.g., surface water and groundwater).
- An offline version, which allows the tool to be downloaded and used offline. This version can also be joined with other calculations performed in a grower or CCA database or workbook.

WATER QUALITY SAMPLING

To determine the amount of N supplied by irrigation water, samples must first be collected and analyzed. Most of the N in irrigation water will be in the nitrate form. Sampling recommendations include the following:

- **Frequency:** sample irrigation water two times a year initially to understand potential variation. If results show the N concentration to be relatively consistent for two consecutive years, then consider reducing sampling to once every two years.
- **Sampling:** samples can be collected and delivered to a lab for testing (preferred). Inexpensive nitrate test strips or other testing methods can also be used.
- **Labs:** many agricultural labs can test water quality for N. County health departments can be contacted for a list of certified labs.

Your coalition may also provide irrigation water N testing services. Consult with your coalition for more information.

Sample Irrigation Water Nitrogen Calculator Results for a Single Water Source

The screenshot shows the calculator interface with the following inputs and results:

- 1 > Specify Single or Multiple Water Source:** Single (Irrigation) selected.
- 2 > Enter Irrigation Water Concentrations (mg/L, same as ppm):** Nitrate: 10 (NO₃-N selected), Mineral N in Water (mg/L): 10.
- 3 > Enter Applied Water:** Inches Water: 42, Available (inches): 39.
- 4 > Enter Estimated % Efficiency:** % of Applied Water: 92%.
- Calculated N Supplied in Irrigation Water:** N in Applied Water (pounds of N per acre): 88.

Red arrows labeled "Grower Inputs" point to the Nitrate, Inches Water, and % of Applied Water fields. A red circle highlights the final result of 88.

USE OF RESULTS

The Irrigation Water Nitrogen Calculator result (in pounds of N per acre) should be SUBTRACTED from the total crop N requirement. Other N credits, such as for N available in the soil and from organic amendments, should be similarly evaluated and SUBTRACTED from N requirement. The residual N requirement, after accounting for these sources, is the appropriate fertilizer N application rate.

Leaching of irrigation water beyond the root zone is necessary to maintain appropriate levels of soil salinity. Similar to any

applied N, some irrigation N will also likely be leached with the irrigation water because nitrate moves with water in soil. The amount of N lost can be minimized by maintaining irrigation water in the root zone through irrigation scheduling, making fertilizer N applications to match crop demands, and fertigating N during the latter hours of irrigation sets when possible. If leaching for salinity control requires off-season irrigations, then low-N water is preferable.

ADDITIONAL IRRIGATION AND NITROGEN MANAGEMENT TOOLS

The SSJV MPEP Committee launched <https://agmpep.com> in early 2017 to provide easy-to-use tools and information to growers and advisers. The website provides resources about management practices that are protective of groundwater quality, irrigation and nutrient management tools, learning opportunities, and more. Resources include:

- The **Events Calendar** compiles outreach event information from a wide range for resources, including University of California Cooperative Extension, CA Department of Food and Agriculture, CAPCA, and the Center for Irrigation Technology. Users can sort by crop, topic, or locale to identify the most relevant events. The events calendar is available at <https://agmpep.com/events/>.
- The **Resources** tab includes a directory of publicly available agricultural management practice tools and resources. The directory features urgent practices, such as well abandonment and well head protection, in addition to general irrigation and nutrient management information. Nitrogen management planning resources are available at <https://agmpep.com/nmp-support/>.
- The **Y-to-R Calculator** can be used to estimate N removed (R) and the ratio of N applied (A) to N removed (A/R). Results can be calculated from inputs for a single crop or for multiple crops. The conversion factors were developed

by Dr. Daniel Geisseler based on currently best available information, and will be refined as additional research results become available. Calculations may be completed online or offline. The calculator is available at <https://agmpep.com/calc-y2r/>.

- The **Evapotranspiration Variability Viewer** is another new tool. Variability of crop and soil conditions within a given field must be understood and managed to achieve productivity and environmental performance goals. A good measure of crop condition and variability within a field, as affected by factors such as irrigation uniformity, is the actual evapotranspiration (ET_a). The Evapotranspiration Variability Viewer maps field-level actual Evapotranspiration Distribution Uniformity (ET_a DU) for an irrigation season (May to October) and for July (peak ET_a). Using an online data portal provided through Irrigated Lands Regulatory Program coalition websites, growers can zoom into their fields and view maps and quantitative charts of field variability. Contact your coalition for more information.

Additional tools and resources related to irrigation and nutrient management are under development and will be added to the MPEP website over time. For more information, please visit <https://agmpep.com>.



SSJV MPEP COMMITTEE COALITIONS

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| Buena Vista Coalition | 661-324-1101 | http://bv20.com/ |
| Cawelo Water District Coalition | 661-393-6072 | http://www.cawelowd.org/ |
| Kaweah Basin Water Quality Association | 559-302-1620 | http://www.kaweahbasin.org/ |
| Kern River Watershed Coalition Authority | 661-616-6500 | http://www.krwca.org/ |
| Kings River Water Quality Coalition | 559-365-7958 | http://kingsriverwqc.org/ |
| Tule Basin Water Quality Coalition | 559-733-2948 | http://tbwqc.com/ |
| Westside Water Quality Coalition | 661-762-7316 | http://www.wwqc.org/ |

Please visit <https://agmpep.com> for more information.



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