



# Farmnote



## Nutrients applied to potato crops from irrigation water

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### Introduction

Water from bores or dams used to irrigate potato crops is not pure water. As well as common salt (sodium chloride), irrigation water often contains nutrients essential to plant growth such as calcium (Ca), magnesium (Mg), nitrogen (N), potassium (K) and sometimes phosphorus (P). If the concentration of these nutrients and the amount of water applied are high, significant quantities of a nutrient can be applied to a crop when irrigating. Nutrients added to the crop from irrigation water should be accounted for in your overall fertiliser program; for example surplus application of nitrogen can lead to excessive top growth and quality problems in potatoes. This Farmnote should be used in conjunction with other Farmnotes on the fertiliser management of potatoes on coastal sands (see further reading).

### How much nutrient can be applied from irrigation water?

The amount of a nutrient applied from irrigation water can be calculated. To do this, the water supply should be analysed by a laboratory to determine the concentration of nutrients in the water. The amount of irrigation water to be applied to the crop should also be determined.

A quick calculation of nutrients applied from irrigation water can be determined from Table 1. For example, the total nitrogen applied to a potato crop from irrigation water is 14 kg per hectare per week, if 10 mm of irrigation water with a nitrogen concentration of 20 mg/L is applied every day for a week (that is, 70 mm of irrigation water per week). This figure is shown in bold in Table 1.

**Table 1. Rate of nutrient applied (kg/ha) based on the amount of irrigation water applied (mm) and the nutrient concentration in the water (mg/L).**

Water applied (mm)	Concentration of nutrient in water (mg/L)						
	1	5	10	15	20	25	30
1	0.01	0.05	0.10	0.15	0.20	0.25	0.30
5	0.05	0.25	0.50	0.75	1.00	1.25	1.50
10	0.10	0.50	1.00	1.50	2.00	2.50	3.00
15	0.15	0.75	1.50	2.25	3.00	3.75	4.50
20	0.20	1.00	2.00	3.00	4.00	5.00	6.00
25	0.25	1.25	2.50	3.75	5.00	6.25	7.50
30	0.30	1.50	3.00	4.50	6.00	7.50	9.00
35	0.35	1.75	3.50	5.25	7.00	8.75	10.50
40	0.40	2.00	4.00	6.00	8.00	10.00	12.00
45	0.45	2.02	4.50	6.75	9.00	11.25	13.50
50	0.50	2.50	5.00	7.50	10.00	12.50	15.00
55	0.55	2.75	5.50	8.25	11.00	13.75	16.50
60	0.60	3.00	6.00	9.00	12.00	15.00	18.00
65	0.65	3.25	6.50	9.75	13.00	16.25	19.50
70	0.70	3.50	7.00	10.50	<b>14.00</b>	17.50	21.00

Note: Milligrams per litre (mg/L) equals parts per million (ppm).

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For a ten week crop, the total amount of nitrogen applied from the irrigation water will be 140 kg per hectare. The rate of fertiliser nitrogen applied to the crop should be reduced by the amount calculated for the life of the crop (in the example, 140 kg N/ha).

### **Determining the amount of water applied and water sampling**

To find out how much irrigation water is applied daily or weekly by your irrigation system either use reliable sprinkler data or measure output with rain gauges. When collecting a water sample for nutrient analysis, allow the irrigation system to operate for five minutes and then rinse a clean plastic bottle or jar and its lid with the irrigation water. After emptying the rinse water, collect a 100 ml to 200 ml water sample from the sprinklers and place the lid tightly on the container. Don't completely fill the container, as it may need to be frozen before analysis. The water sample should be forwarded promptly to a laboratory for analysis.

After analysis of the sample, you will receive a sheet of results. The results listed should include total nitrogen (total-N), nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) and ammonium-nitrogen ( $\text{NH}_4\text{-N}$ ), phosphorus (P), potassium (K), sulphur (S), calcium (Ca) and magnesium (Mg). To determine the concentration of nutrient in the sample, the total value should be used. However, if nitrogen analysis is only expressed as nitrate, divide the number by 4.5 to get the nitrate-nitrogen concentration. For example, 45 mg/L nitrate equals 10 mg/L nitrate-nitrogen.

### **Further reading**

Note: 219 *Fertiliser management using petiole analysis for fresh market potatoes grown on coastal sands*, I. R. McPharlin.

Note: 220 *Trace element requirements for fresh market potatoes grown on coastal sands*, I. R. McPharlin.

Note: 222 *Fertiliser program for fresh market potatoes grown on coastal sands*, I. R. McPharlin.