

# EARTH'S OWN

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## A COMPARISON OF THE WATER FOOTPRINT OF DIFFERENT TYPES OF MILK

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# BACKGROUND

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Towards a goal of promoting the plant-based diet as a healthful and environmentally sustainable alternative to the conventional North American diet, Earth's Own engaged Conscious Brands to examine the water footprint of its Earth's Own™ So Fresh Oat Milk and Earth's Own Unsweetened Almond Milk. These two non-dairy plant-based alternatives would be compared to a "traditional" dairy milk. The investigation required direct contact with Earth's Own staff, as well as extensive secondary source research in academic journals, NGOs, and government reports.

We used secondary source research to compile a water footprint profile of each of the three types of milk, and used the protein amount that is contained in a litre of milk to normalize the data.



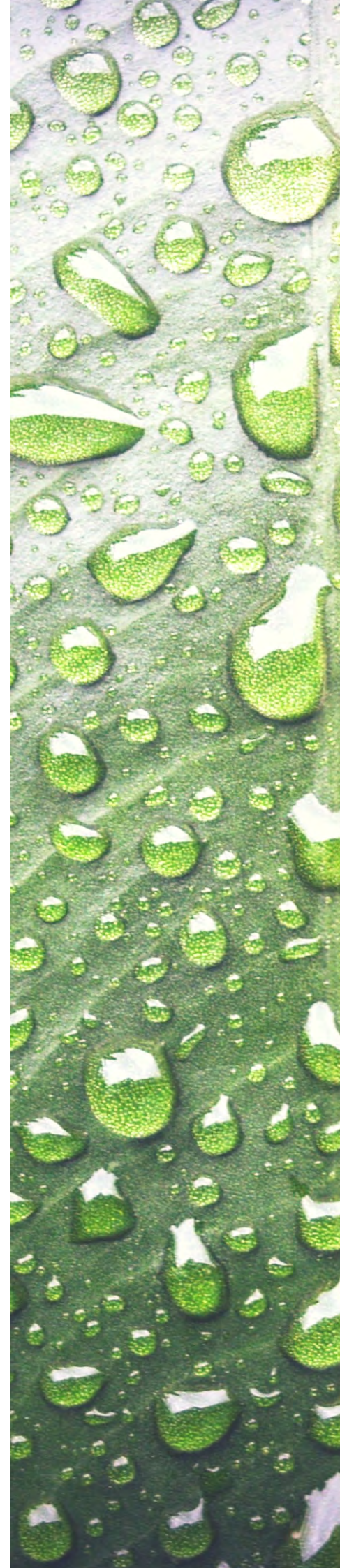
# WHAT IS THE WATER FOOTPRINT OF A PRODUCT

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The water footprint of a product is the amount of water that is consumed and discharged in all processing stages of its production. A product water footprint tells us how much pressure that product has put on freshwater resources. It is measured in cubic metres of water per tonne of production, or litres per kilogram, gallons per pound or per bottle of milk.

By measuring the volume and source of water consumed in the growing of a product and the volume of water needed to assimilate pollutants so that water quality standards are met, we can get a picture of how a specific product contributes to the growing concerns of water scarcity and degraded water quality. It also allows us to compare different products for their relative contribution to these critical water issues.

In the case of rain-fed agriculture, the blue water footprint is zero and green water use is calculated by summing up evapotranspiration per day over the growing season of the plant. In the case of irrigated crops, green and blue water consumption is calculated based on the soil to water ratio. The grey water footprint modeled by Mekonnen and Hoekstra refers only to the water required to assimilate nitrogen fertilizer runoff. All three categories of water consumption are included in this water footprint analysis (Mekonnen, 2011).





# PROJECT SCOPE

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This project was not a full water footprint assessment, according to the Water Footprint Network and DIS ISO 14046, and didn't go beyond the scope of farm gate (the growing of the finished product.) Also, not included are the greenhouse gas (GHG) emissions associated with the three different products. Earth's Own chose to focus instead on the larger, sometimes overlooked impacts of water usage in relation to the growing of the raw ingredients for the products studied.



## FUNCTIONAL UNIT

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The functional unit use for the water comparison assessment study is the mass of protein in a litre of milk (8g). Each type of milk contains a different amount of protein. Therefore, with the protein functional unit, the water footprint for a litre of milk is divided by the protein content in the milk.

# SPECIFICS

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**OUT OF SCOPE** - Water stress indicators, water scarcity assessment, and endpoint modelling.

**IN SCOPE** - Reduced water availability from consumption and degradation + direct pollution impacts, water degradation footprint (grey water), water availability footprint (green and blue water).

Total farm use water consumption over the complete growing cycle, including:

- Green water - The consumption of naturally available water from soil moisture/precipitation
- Blue water - The consumption of water use originating from ground/surface water
- Grey water - The volume of ground/surface water polluted (required for assimilation of fertilizers or pesticides)

Also included was the consumptive water use, the water used but not returned to the watershed. In this case, an amount of 1.5 litres were added to both the oat and almond milk for processing the raw ingredients. Dairy milk has the volume already included.

NOTE - The 1.5 litre consumptive use was adjusted and increased to the functional unit of protein present in dairy milk.

# RESULTS



As expected, the plant-based oat milk product had a significantly lower water footprint profile than the almond and dairy milk options. The almond and dairy milk were similar in water footprint, with dairy being only slightly higher.

## INVENTORY DATA SOURCES

The sources of data for the water footprint of each product were selected to be as recent and geographically relevant as possible. A range of published literature and national data sources were use in this water footprint. Table 1 shows the source of data for each aspect of the life cycle assessment model described above.



Table 1: Data Sources

	Earth's Own™ So Fresh Oat Milk	Earth's Own™ So Fresh Unsweetened Almond Milk	Dairy Milk
Water Footprint Consumption	(Mekonnen, 2010b)	(Mekonnen, 2010b)	(Mekonnen, 2010b)
Functional Unit (Protein) Normalization data	Earth's Own data	Earth's Own data	

Table 2: Water consumption by type, per milk type based on regions

		Green WF (m3 ton-1)		Blue WF (m3 ton-1)		Grey WF (m3 ton-1)		Total WF (m3 ton-1)	
Milk	HS Code	Global*	Region (Canada)**	Global	Region (Canada)	Global	Region (Canada)	Global	Region (Canada - Almonds US)
1 - Oats	110412	1479	1434	181	14	128	186	1788	1634
2 - Almonds	80212	9264	2321	3816	4026	3015	6637	16095	12984
3 - Dry Pea	71310	1453	1199	33		493	699	1979	1898
4 - Dairy	40120	863	647	86	60	72	80	1021	787

# PROTEIN LEVELS

1 cup of almond milk contains 1g protein.

1 cup of oat milk contains 4g protein.

1 cup dairy milk contains 8g protein.

(Milk data from USDA National Nutritional Database for Standard Reference, release 28 (2015))

Oats and almond water consumption are originally reported in cubic meters per ton of crop and are adjusted based on the amount of crop that ends up in the finished milk to show the water footprint per litre of milk on a protein basis. Dairy milk water consumption is already allocated to the finished milk product and is reported in terms of cubic meters per ton of milk.

## Oats don't deplete underground water aquifers.

An oat crop can flourish with much less water than most other crops. In drier production areas, many crops must be irrigated to survive and flourish. Long-term irrigation has depleted precious underground aquifers in some areas.<sup>1</sup>

Table 3: Water Footprint Results

Milk Type	Water (m3/ton crop)	Water (m3/kg crop)	Litres of water used to produce 1/L milk on a protein basis
Oats	1634	1.80	348.82
Almonds	12984	14.14	2879.38
Dairy	821		3148.00

1 - <https://www.namamillers.org/issues/sustainability/oat-sustainability/>

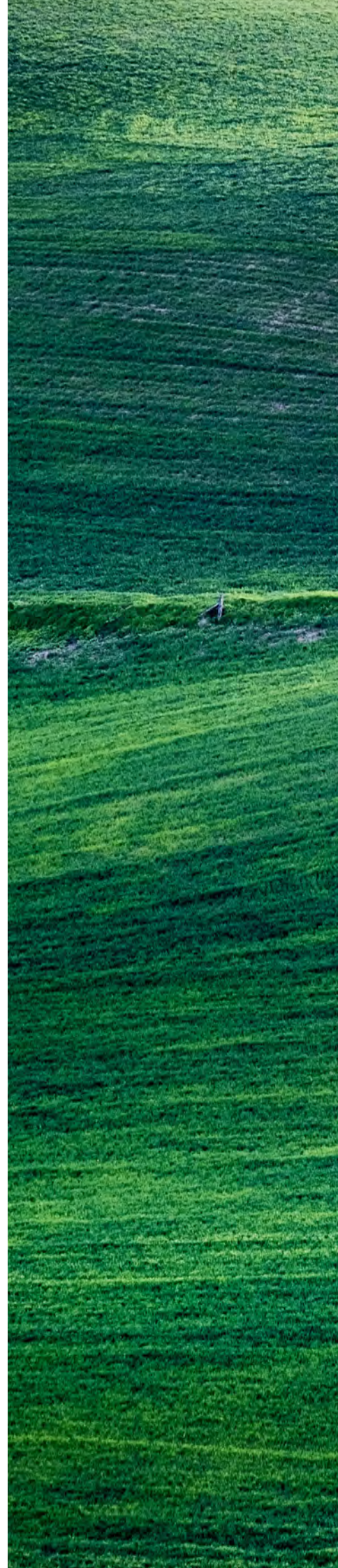
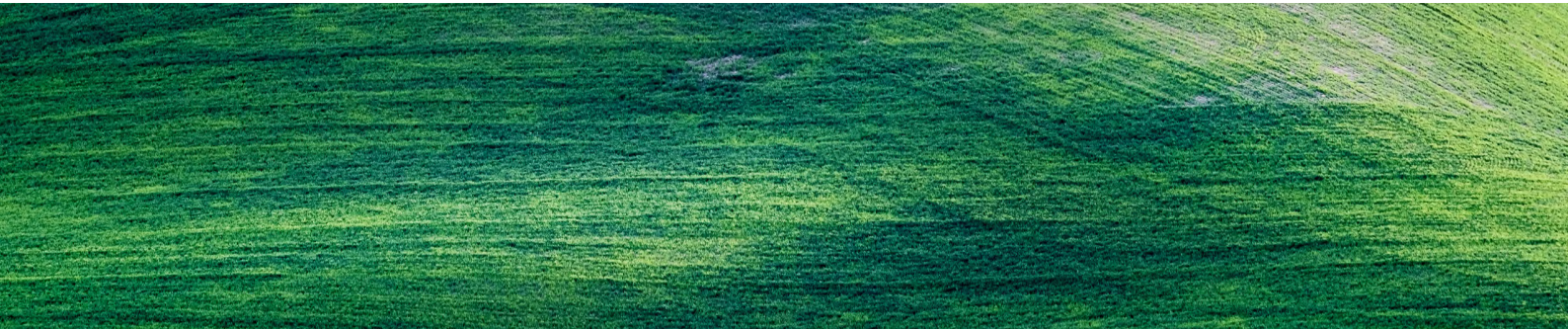
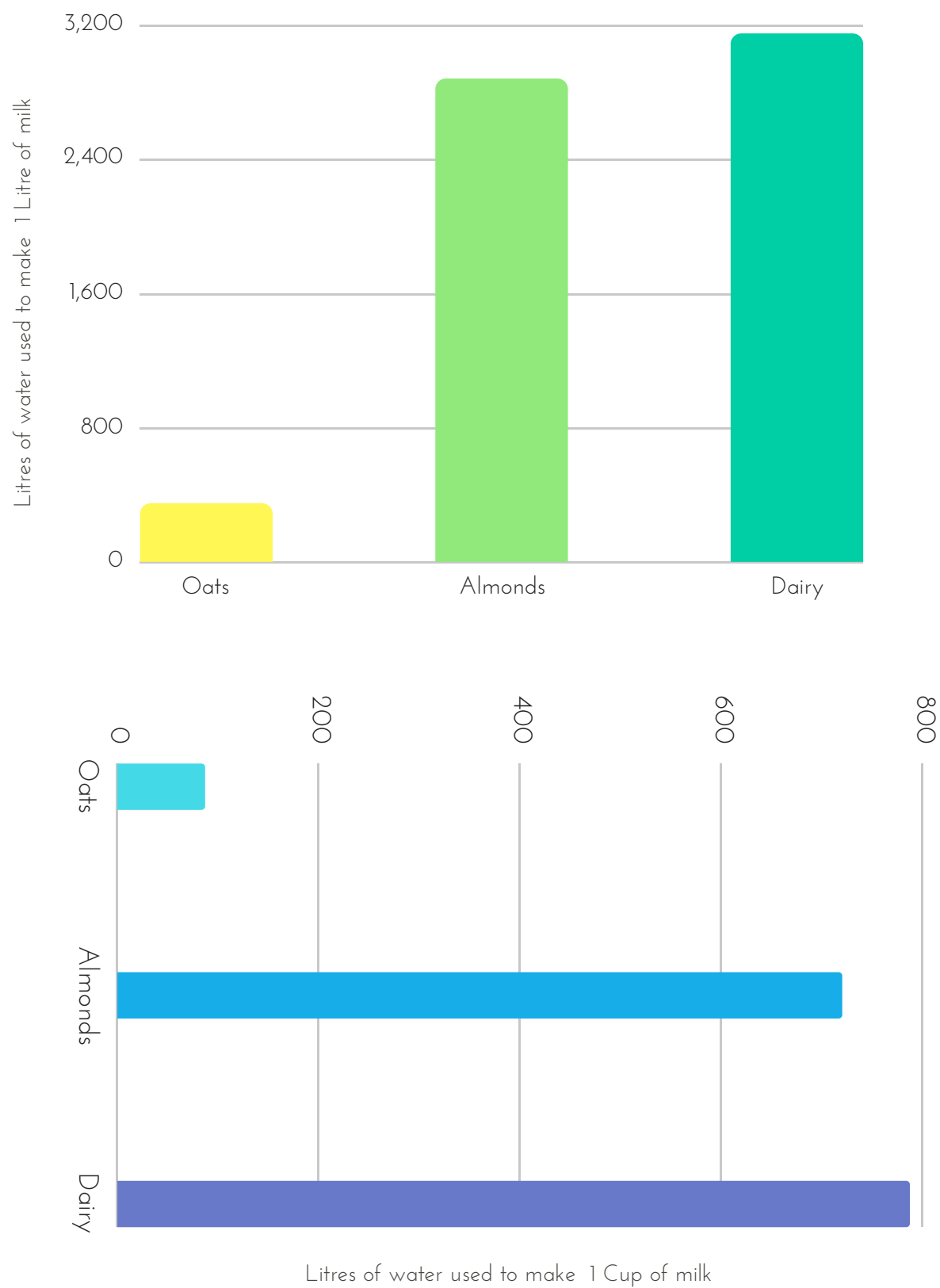


Table 4: Water usage comparison for the growing of various milk types



# MARKETING

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We believe that the data we've collected is sufficient to make the following claims:

- Dairy milk creates about 7 times the water footprint as a serving of Earth's Own™ So Fresh Oat Milk
- Almond milk creates about 7 times the water footprint as a serving of Earth's Own™ So Fresh Oat Milk
- The water saved from drinking one glass of Earth's Own™ So Fresh Oat Milk over dairy milk is enough to fill 7 bathtubs.

The figures we have used in this analysis represent the best available data we could collect from client and secondary sources given the project budget and timeline. A dedicated research analysis with an unlimited budget would undoubtedly arrive at different conclusions than we have, but their conclusions would not likely contradict the two claims above by very much.

In Canada the average personal daily water consumption per person is 251 litres. <sup>2</sup>

We would also suggest that Earth's Own™ markets these findings as a percentage of the average North American's water footprint. I.e. One serving of Earth's Own™ So Fresh Oat Milk; a day is x% of your daily water footprint allowance.

If water is where Earth's Own is wanting to put their flag in the sand, there are many options to talk about. Upon searching for domains 'h2oconscious' is available with most extensions, including .com.

Earth's Own™ So Fresh Oat Milk - A h2o conscious business.



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- Project Platforms - <http://www.project-platforms.com/files/productgallery-new.php> (N.D)



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