

An assessment of the drainage quality and quantity associated with recycled wastewater irrigation in an urban park

Hamideh Nouri

*PhD scholar and tutor
University of South Australia*

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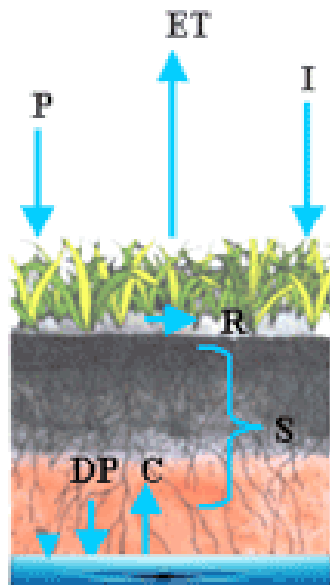
Background

- Of some concern is the **nutrient leaching** from drainage into ground water that possibly percolates excess nutrient to the ground water table. This is even more critical when reclaimed wastewater throughout irrigation.



Soil Water Balance (SWB)

A soil moisture budget tracks the inputs and outputs of water in soil.



I = Irrigation

R = Runoff

S = Storage

C = Capillary Rise

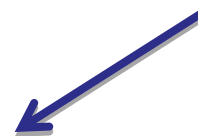
P = Precipitation

ET = Evapotranspiration

DP = Deep Percolation

$$S = I + P + C - ET - DP - R$$

**Drainage
(deep percolation)**



Knowledge gap

- Research work on Soil Water Balance of agricultural crops is well established.
- Little research has been conducted on this aspect for urban green space mixed plantings.



Drainage, a component of SWB

Estimating drainage requires in-situ soil water collection from undisturbed soil which is quite challenging particularly in **heterogeneous urban landscape environments.**



Why pan lysimeter?

Pan lysimeter is a sampler in a pan shape, without large side walls, that freely collects the drained water, measuring drainage volume and solute leaching simultaneously.

ADVANTAGES:

- low complexity design
- inexpensive to construct and install
- reduced disturbance of the soil in installation
- simple and cheap operation
- minimizes the surrounding matric potential fluctuations and potential bypass flow

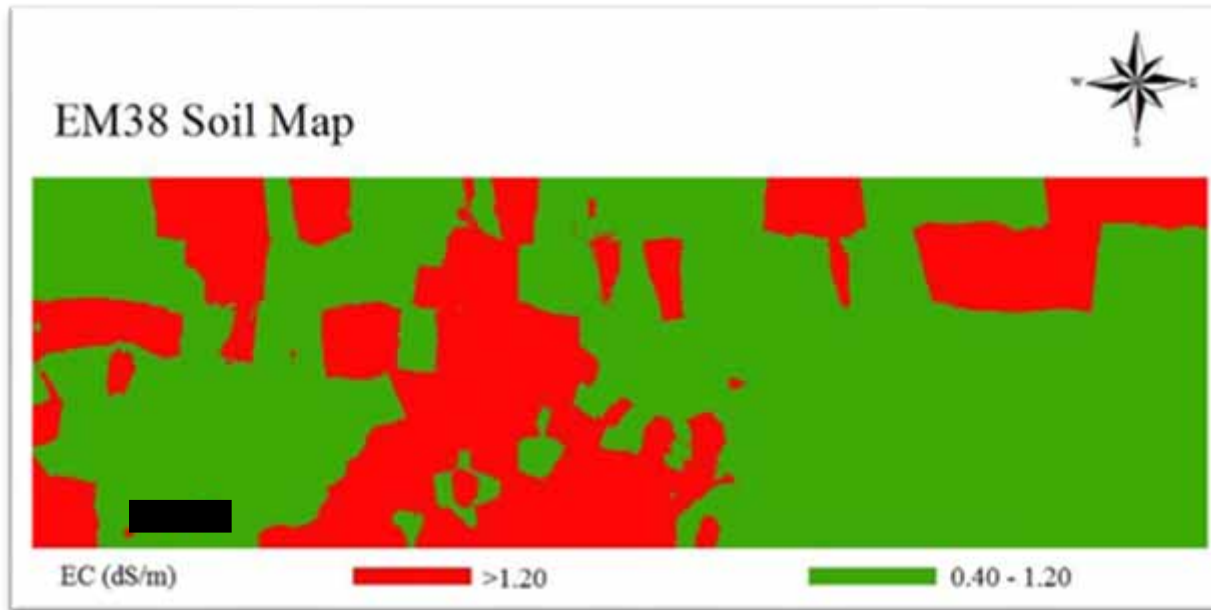


Lysimeter installation



Objective

Study the temporal variation of drainage rate and nutrient leaching in an urban park



Map of the urban park and lysimeter position

Study area

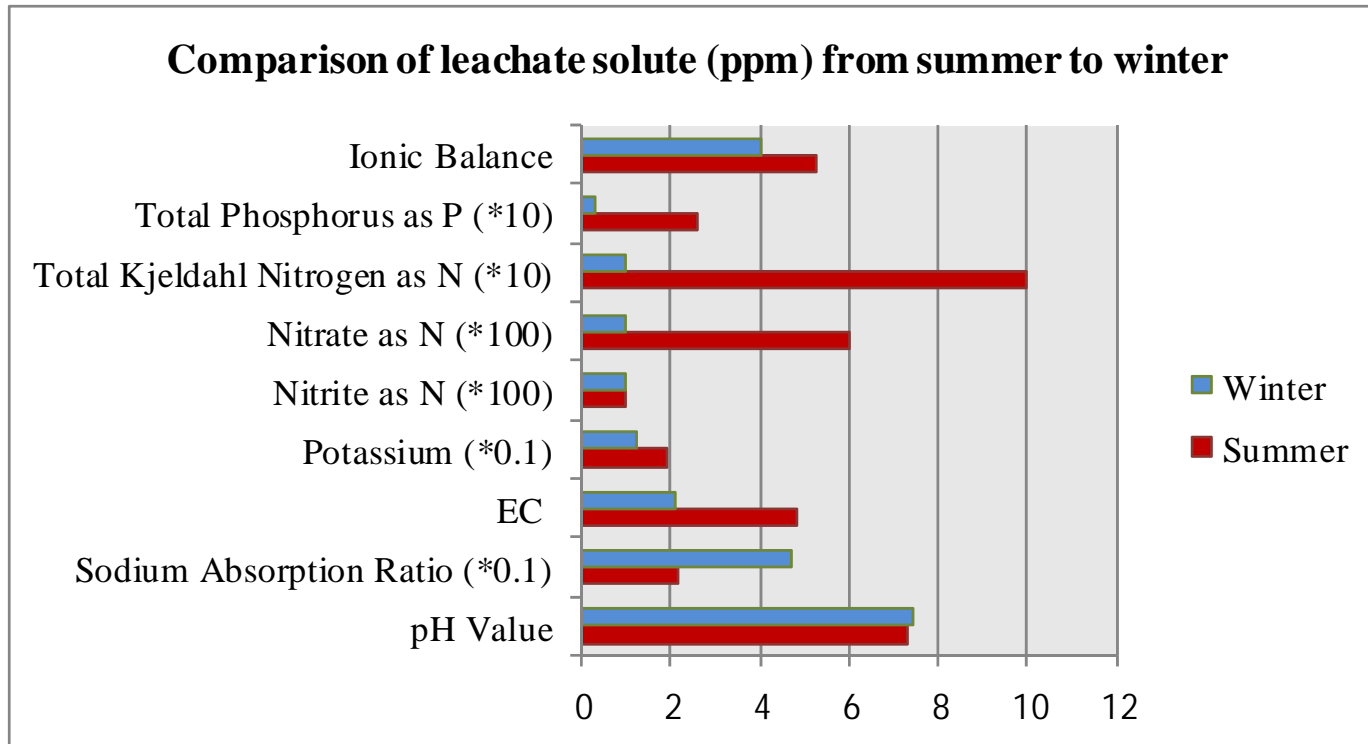


Quantity of drainage

- The volume of the drained water was recorded monthly and analysed.

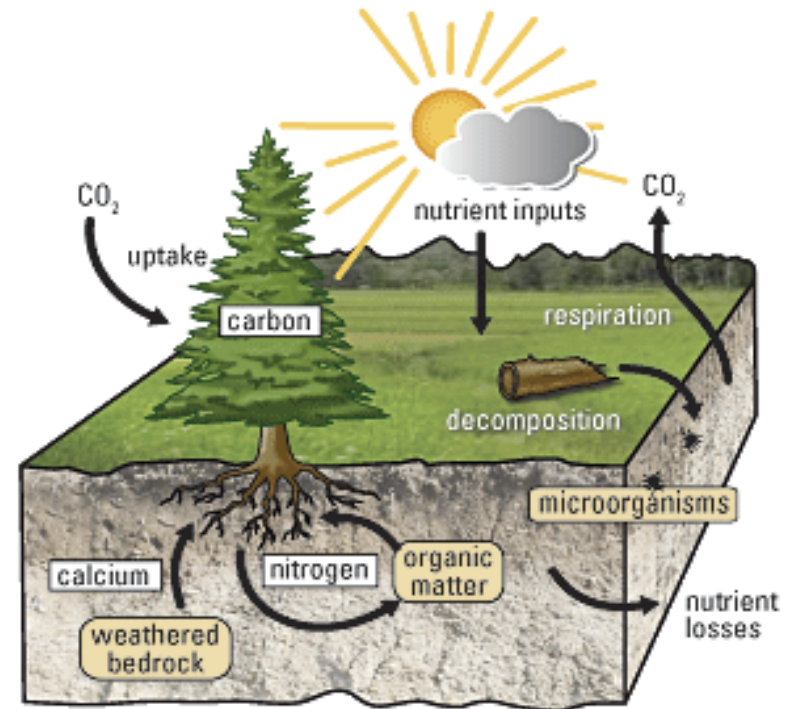
	Summer	Winter
Irrigation	198.67	0
Rainfall	37.44	157.36
Input water (irrigation + rainfall)	236.11	157.36
Volume of drainage	0.8	123.6

Quality of drainage



Outcomes & benefits

The risk of nutrient loading resulting from irrigation with recycled waste water was investigated. The outcomes showed **a minimal impact from use of recycled waste water in terms of nutrient loading to the ground water for the study period.**





Thank you for your kind attention