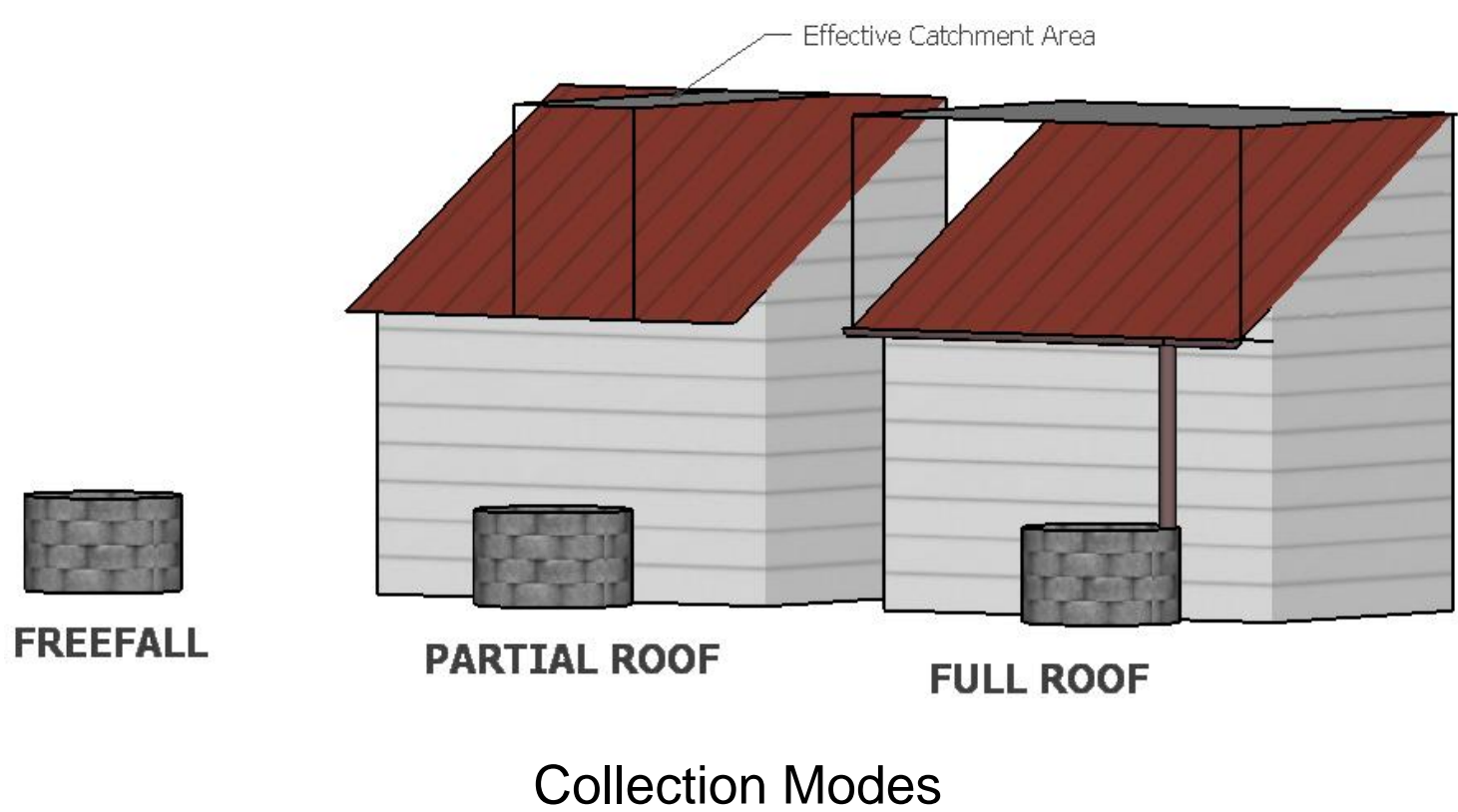


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INTRODUCTION

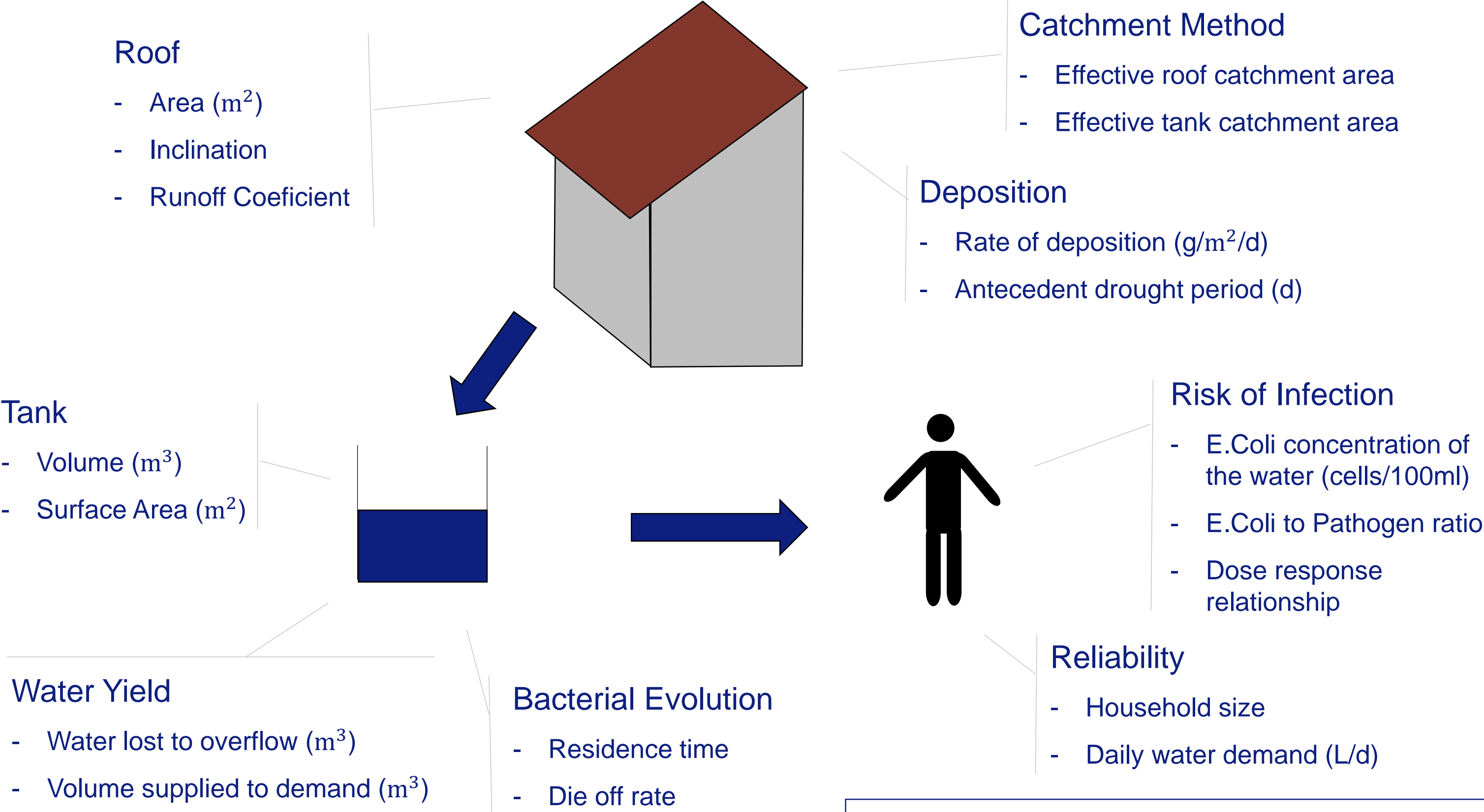
Despite the growing interest for rainwater as a water supply for drinking and domestic uses, little is known about the health impact associated with using a rainwater harvesting system. This study determined the quantity and quality of the collected rainwater for varying tank and roof sizes, considering three catchment modes: freefall, partial roof and full roof.



MODELLING RAINWATER HARVESTING

1. Collection

Determine the volume of water and amount of E.Coli cells entering the tank



2. Storage

Evaluate the quantity of water stored in the tank and the evolution of its quality

3. Demand

Estimate the performance of the tank according to its reliability and the risk of infection it presents when consumed

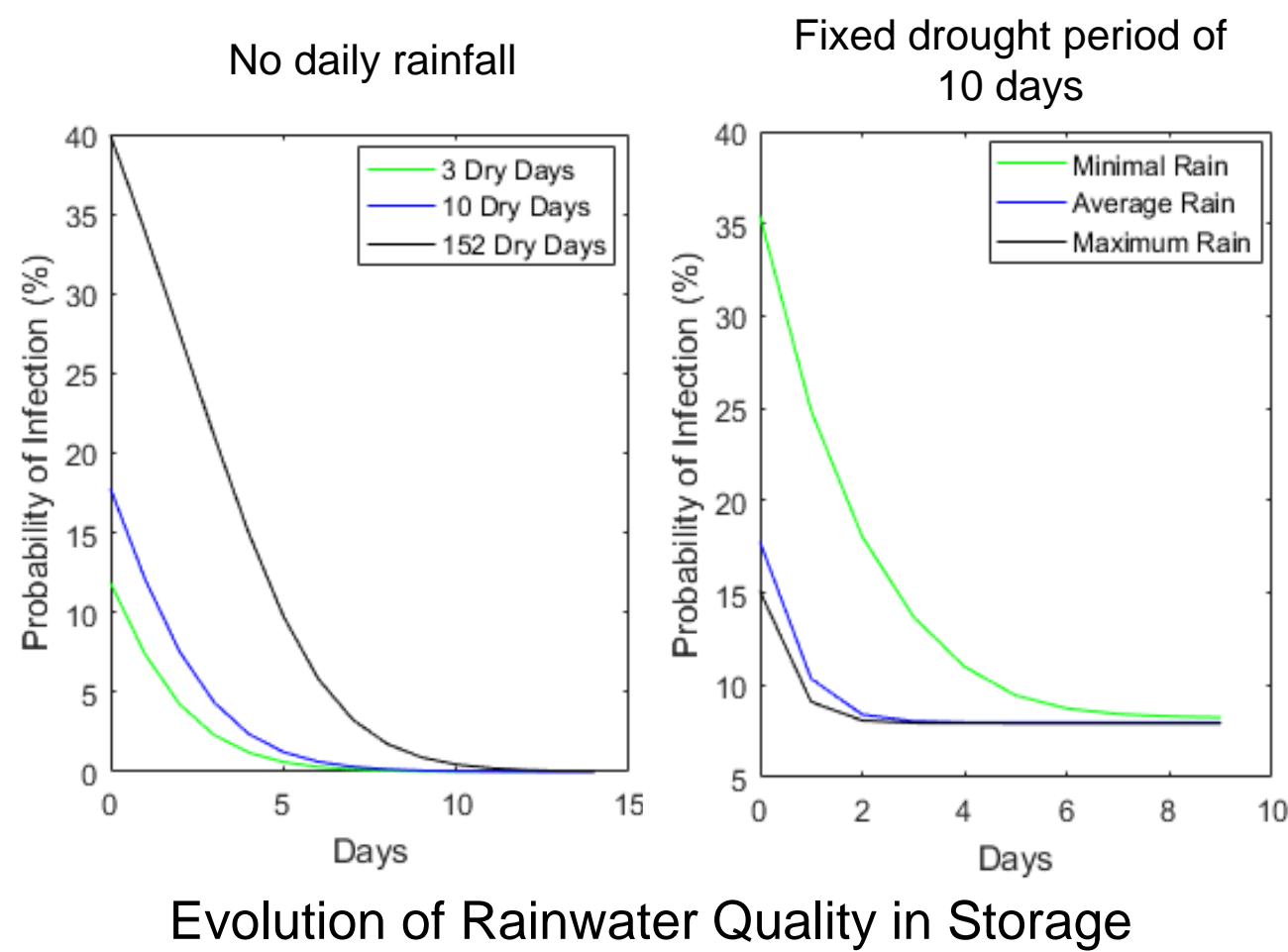
ACKNOWLEDGEMENTS

I would like to thank my project supervisor Dr. Matthew Greetham for his guidance throughout this research project

RESULTS AND RECOMMENDATIONS

Operation

A set of simulations were run varying the antecedent drought period and daily rainfall volume. One of the most interesting results was that roof catchment systems were found to provide water that is particularly polluted when the drought period before the rainfall event was over 10 days long. This effect was amplified as the volume of water collected decreased.



In case of an extended drought period, it is recommended to:

- Disconnect/Cover the tank until the next rainfall event
- Wait 5 to 7 days before using the collected rainwater
- Use the rainwater exclusively for household uses, and obtain drinking water from an alternative water supply
- Disinfect the collected water e.g. boiling

Infrastructure

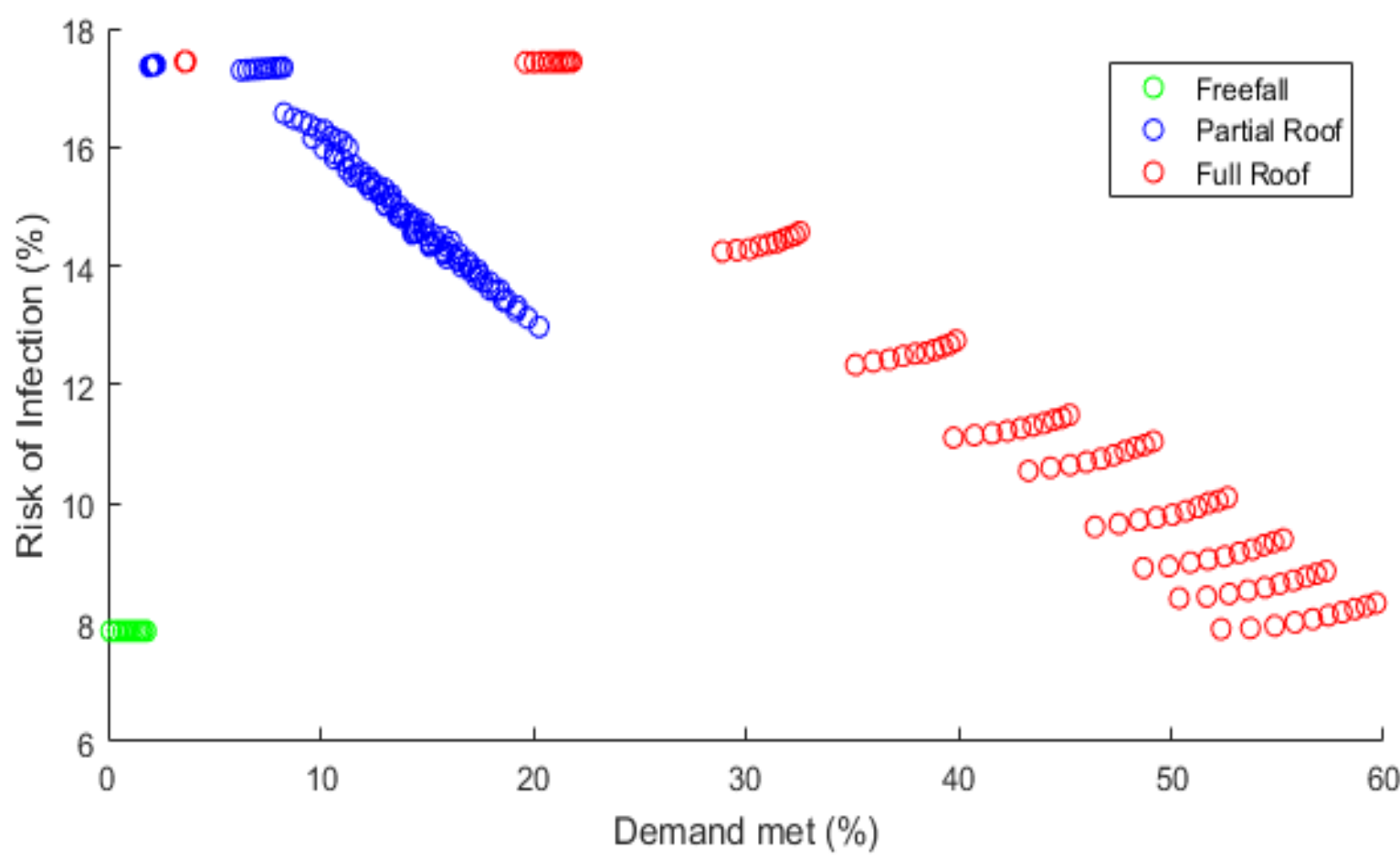
The type and size of rainwater system used influences its performance.

Reliability depends on:

- Catchment surface area
- Storage volume.

Water quality varies according to:

- Bacterial decay
- Deposition
- Dilution (proportion of freefall to runoff collected water)



Performance of all Rainwater Harvesting Systems Considered

	Effects of Increase in Tank Size	Effects of Increase in Roof Size
Freefall Collection		
- Reliability	+ 2%	N/A
- Risk of Infection	- <1%	N/A
Partial Roof Collection		
- Reliability	+ 18%	+ 6%
- Risk of Infection	- 4%	- 1%
Full Roof Collection		
- Reliability	+ 56%	+7%
- Risk of Infection	- 9%	- <1%

It is recommended to:

- Invest in a large tank as a priority
- Fit a gutter to the roof which leads the rainwater into the tank
- Avoid using partial roof collected water for drinking purposes

Maximum Benefits from Variation in Infrastructure for all Tank Sizes, Roof Sizes, and Catchment Modes Considered