# IMPROVED WATER CONSERVATION PRACTICES USING RAIN WATER HARVESTING IN THE WET AND INTERMEDIATE ZONES OF SRI LANKA

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This dissertation was submitted in requirements for the Master of Engineering degree in Water Resources Engineering and Management.

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Sri Lanka.

September 2004

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## ABSTRACT

Fresh water is a limited and precious resource that is often taken for granted. However many areas of the developing world suffer a lack of safe water. Therefore, water bome diseases account for an estimated 80% of all illnesses in developing countries. In addition, millions of women and children walk several kilometers every day just to fetch a minimum quantity of water for their families. Furthermore, the Sri Lankan government also faces many problems in finding safe water sources to meet the growing water needs of the entire population. Roof rainwater harvesting is the only feasible option in some parts of the country, to deal with this issue to a certain extent where no other water sources are available.

The research is targeted to study the water conservation practices using Rainwater Harvesting in the wet and intermediate zones of Sri Lanka. To analyze performance of a selected roof rainwater harvesting system, thirty years (1968-1998) of daily rainfall data from Galle, Rathnapura, and Kurunegala districts have been used. The roof sizes considered were 50 m2,75 m2, 100 m2 & 200 m2 and tank capacities considered were 1 m3, 2 m3, 5 m3 & 7.5 m3 for family size of five members. The daily water demand is taken as 120 liters per capita per day.

The results show that there is a 79% probability of success in the Galle district for supplying 300 liters of water per day per family (i.e. 50% demand fulfillment) by using a 5 m3 tank with a roof catchment area of 75 m2. The equivalent result for Rathnapura is 93% while for Kurunegala it is approximately 71%. Hence, the results clearly show that rainwater harvesting is an excellent alternative option for the partial fulfillment (50%) of daily domestic water demand within the wet and intermediate zones of Sri Lanka.

Finally, it can be concluded that roof rainwater harvesting is a very promising alternative solution for increasing water demand of the country. However, the research also shows that during a few months in the year, domestic users will be unable to survive comfortably only with rainwater harvesting.

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**SEPTEMBER 2008**

## DECLARATION BY THE CANDIDATE

I declare that the work included in the dissertation, in part or whole has not been previously presented for any other academic qualification at any institution for a higher degree.

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Eng. R.K.W. Kalum Ranasinghe

*September 2008*

## ACKNOWLEDGEMENT

I would like to express my sincere gratitude to the Director, Post Graduate Studies for giving me the opportunity to carry out this research study at the University of Moratuwa

I wish to express my heartiest admiration and appreciation to my supervisor Prof. S.S. Wickramasuriya, for his precious advice, guidance and encouragement throughout this study.

I also would like to express my sincere and deep gratitude to Mr. R.S. Liyanage (Assistant General Manger – Uva region) from National Water Supply & Drainage Board) and Mr. Abu Ubeidha, Chief Engineer from consultancy firm in Sri Lanka for them consent in undertaking the supervision of my research for giving invaluable advice and encouragement throughout the study. Moreover, I want to thank to the present General Manager (Mr. K.L.L. Premanath), Assistant General Manager (Rural Water Supply), (Mr. W.B.G. Fernando), Chief Sociologist (Mr. A.H. Gunapala), and Mr. K.S.K. Ranasinghe (Assistant General Manager, Co-ordination) from National Water Supply & Drainage Board for their advice, financial assistance, encouragement and guidance.

Finally but not least, I give my special thanks to my dear wife Eng. D.M.C.S. Kumari and my loving parents for all encouragement and supports.

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Fresh water is a limited and precious resource that is often taken for granted. However many areas of the developing world suffer a lack of safe water. Therefore, water borne diseases account for an estimated 80% of all illnesses in developing countries. In addition, millions of women and children walk several kilometers every day just to fetch a minimum quantity of water for their families. Furthermore, the Sri Lankan government also faces many problems in finding safe water sources to meet the growing water needs of the entire population. Roof rainwater harvesting is the only feasible option in some parts of the country, to deal with this issue to a certain extent where no other water sources are available.

The research is targeted to study the water conservation practices using Rainwater Harvesting in the wet and intermediate zones of Sri Lanka. To analyze performance of a selected roof rainwater harvesting system, thirty years (1968-1998) of daily rainfall data from Galle, Rathnapura, and Kurunegala districts have been used. The roof sizes considered were 50 $m^2$, 75 $m^2$, 100 $m^2$ & 200 $m^2$ and tank capacities considered were 1 $m^3$, 2 $m^3$, 5 $m^3$ & 7.5 $m^3$ for family size of five members. The daily water demand is taken as 120 liters per capita per day.



The results show that there is a 79% probability of success in the Galle district for supplying 300 liters of water per day per family *(i.e. 50% demand fulfillment)* by using a 5 $m^3$ tank with a roof catchment area of 75 $m^2$. The equivalent result for Rathnapura is 93% while for Kurunegala it is approximately 71%. Hence, the results clearly show that rainwater harvesting is an excellent alternative option for the partial fulfillment (50%) of daily domestic water demand within the wet and intermediate zones of Sri Lanka.

Finally, it can be concluded that roof rainwater harvesting is a very promising alternative solution for increasing water demand of the country. However, the research also shows that during a few months in the year, domestic users will be unable to survive comfortably only with rainwater harvesting.

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# ABBREVIATIONS

| | |
|---|---|
| *NWS&DB* | *- National Water Supply and Drainage Board* |
| *RW* | *- Rainwater* |
| *RWH* | *- Rainwater Harvesting* |
| *RRWH* | *- Roof Rainwater Harvesting* |
| *RRWHS* | *- Roof Rainwater Harvesting System* |
| *RWHS* | *- Rainwater Harvesting System* |
| *RWT* | *- Rainwater Tank* |
| *Lpd* | *- Liters per day* |
| *Lpcd* | *- Liters per capita per day* |
| *TC* | *- Tank Capacity* |
| *CWSSP* | *- Community Water Supply and Sanitation Project* |