

**USE OF REEDS ON
HORIZONTAL SUBSURFACE FLOW CONSTRUCTED
WETLAND FOR THE TREATMENT OF
WASTEWATER**



**BY:
MENUKA BASNYAT**

**A DESSERTATION PAPER
Submitted for the fulfillment of
M.Sc. Degree in Zoology
(Ecology)
2063/2007**

**Central Department of Zoology
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LETTER OF ACCEPTANCE

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ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to my respected supervisor Lec. Hari Prasad Sharma Central Department of Zoology, T.U. for his perpetual advice and invaluable inspiration through out the study period.

I would like to thank sincerely Prof. Dr. Tej Kumar Shrestha, Head of Department of Zoology, T.U. for providing me essential facilities. Also would like to acknowledge all the teachers of Central Department of Zoology with sincere thanks for their academic supports.

My heartfelt gratitude goes to Associate Prof. Er. Manoj Kumar Pandey Department of Civil Engineering, Institute of Engineering, Pulchowk, T.U. for his advice, instruction and help during my study.

I am very grateful to BASP for providing space for construction of wetland and for providing laboratory facilities. I would like to thank all the staffs of BASP.

I express my special thanks to my friend Durga Sharma who was there with me through out my study period. Also, my sincere thanks go to my friends of Engineering College, Safal Subedi, Hemanta Bhatt and Sujan Maharjan for their help during study period.

Last but not the least, I am indebted to my family members, my father Kalyan Kumar Basnyat, my mother Rupa Basnyat and my brother Karun Basnyat for providing support and encouragement during my study and for being my inspiration.

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ABSTRACT

Horizontal Flow Subsurface Constructed Wetland was constructed in an open field inside Bagmati Area Sewerage Project which is located near the Pashupati temple at the bank of Bagmati River on the northern eastern part of the Kathmandu city. The sites consisted two horizontal beds of equal area and depth (6m (length) x 2m (breadth) x 0.6m (depth)). Bed₁ was planted with local reed, *Phragmites karka* and Bed₂ was unplanted and treated as blank. The aim of study was to evaluate performance efficiency of planted and unplanted beds on removing various pollutants. Systems were fed with wastewater drawn from grit chamber of oxidation ditch and collected in settling tanks. Performance efficiencies of beds over various flow rates were also determined. Removal efficiency of planted and unplanted horizontal subsurface flow constructed reed beds were compared over four different flow rates (i.e. 0.464m³/d, 1.56 m³/d, 2.26m³/d, 3.05m³/d). Planted bed showed enhanced BOD₅, COD, TSS and FC removal in comparison to TKN, NH₄-N and TP removal. Removal efficiency was obtained high at low flow i.e. 0.0464m³/d. Removal percentage of planted bed at flow rate 0.0464m³/d was 79.38% BOD₅, 81.85% COD, 44.16% TKN, 58.9% NH₄-N, 34.27% TP, 84.41% TSS, 89.8% FC. DO was measured along inlet, 1st sampling port, 2nd sampling port and outlet. DO increase along the bed after first sampling port. The constructed horizontal subsurface red beds exhibited good efficiency for improving water quality from polluted waste water.

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ABBREVIATIONS

BASP	Bagmati Area Sewerage Project
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CW	Constructed Wetland
DO	Dissolve Oxygen
FC	<i>Fecal Coliform</i>
HFPB	Horizontal Flow Planted Bed
HFUB	Horizontal Flow Unplanted Bed
MPN	Most Probable Number
NH₄-N	Ammonia Nitrogen
SSF	Subsurface Flow
TKN	Total Kjeldahl Nitrogen
TP	Total Phosphate
TSS	Total Suspended Solid
UV	Ultra Violet