

**HYDROGEOLOGIC ASSESSMENT AND GROUNDWATER  
RESERVE EVALUATION IN PARTS OF  
THE DUN VALLEY AQUIFERS OF CHITWAN,  
INNER TERAJ**

**A DISSERTATION  
(GEO. 619)**

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The dissertation entitled "**HYDROGEOLOGIC ASSESSMENT AND GROUNDWATER RESERVE EVALUATION IN PARTS OF THE DUN VALLEY AQUIFERS OF CHITWAN, INNER TERAI**" submitted by Mr. Rajendra Neupane has been accepted as a partial fulfillment of the requirements for the completion of Master's degree of Science in Geology.

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### **LETTER OF RECOMMENDATION**

This is to certify that Mr. Rajendra Neupane , a M.Sc. student of the Central Department of Geology , Tribhuvan University, Kathmandu has worked enthusiastically with sincere interest during the completion of this dissertation work under my guidance and supervision. The dissertation entitled "**HYDROGEOLOGIC ASSESSMENT AND GROUNDWATER RESERVE EVALUATION IN PARTS OF THE DUN VALLEY AQUIFERS OF CHITWAN , INNER TERAI** " embodies the candidate's own work . I hereby, recommend the dissertation for approval.

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## ABSTRACT

*The Chitwan Valley is one of the largest Dun Valleys in the Himalayan foothills. The Siwalik Domain was affected by neotectonic movement in the last 1.6 m.y. the stream impoundment of sizeable volumes of gravel filled up in the lakes forming intermontane flat stretches called Duns. The Dun gravels perhaps deposited in the late Pleistocene to very early Holocene about 22,000-7000 yr. B.P. Classification of river terraces in the study area are into six groups. Higher and highest terraces are related to during Pre-last interglacial time. Formation of many wetlands and oxbow lakes occurs in the flood plain of Khageri—Rapti—Narayani River. Westward shift of present Narayani River is clearly evidenced by the continuation of wetlands parallel to main river course. These depressions belong to an old abandoned channel revealed the ramification of Naryani in west Chitwan. The study area lies in the western part of the Valley and is covered with alluvial deposits. The grain size of the alluvium gradually decreases from the north to the south.*

*In the sub-surface, clay, silt, sand and gravel layer with different proportion have been noticed, the sediments distribution is relatively homogeneous. Principal aquifer materials are sand, gravel, pebble; even cobble and boulder are found in unconfined and semi-confined or leaky aquifer condition.*

*Annual Potential Evapotranspiration (PET) at Rampur (cropland surface) is 1.68 mm/day and that at Devghat (water surface) is 2.37mm/day are found. Annual precipitation recorded at Rampur station is 2214mm, area of recharge is about 70.8 km<sup>2</sup>. An average water table fluctuation in 98 dug wells over the study area is 2.21m. It ranges from 0.1 m to 6.85 m. Therefore estimation of total groundwater storage in the study area on both confined and unconfined condition is 87.31 MCM per year and potential recharge by applying Duba's estimation is 48.60 MCM per year. The study area comprises single to multi layer aquifer horizons. The thickness of aquifer varies from 2m. to more than 30m. The potentiality of shallow and deep aquifer of the study area possess good. Geophysical Studies shows that the area bears a good groundwater potential for both shallow and deep aquifer. The deeper aquifers are recharged by the inflow of Narayani River and deep seepage losses by sedimentary rocks in Siwalik Region and shallow aquifers are recharged by annual precipitation.*





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## List of Abbreviation

APP	Agricultural Perspective Plan
AWWA	American Water work Association
CBS	Central Bureau of Statistics
DHM	Department of Hydrology and Meteorology
DIO	Department of Irrigation
DMG	Department of Mines and Geology
DTW	Deep Tube well
DW	Dug well
GWIP	Groundwater Irrigation Project
GON	Government of Nepal
GWRDB	Ground Water Resource Development Board
mamsl	meter above mean sea level
mbgl	meter below ground level
MBT /MBF	Main Boundary Thrust/ Main Boundary Fault
MCT	Main Central Thrust
MFT	Main Frontal thrust
MT	Mahabharat Thrust
SWL	Static Water Level
STDFS	South Tibetan Detachment Fault System
DWSS	District Water Supply & Sanitation
STW	Shallow Tube Well
TU	Tribhuvan University
UNDP	United Nation Development Program
V.D.C.	Village Development Committee
VES	Vertical Electrical sounding
WHO	World Health Organization

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