

C  
10.22  
KUD

**USE OF GIS IN ESTIMATING THE POTENTIAL OF  
GROUNDWATER AVAILABILITY IN KOGGALA COASTAL  
AQUIFER - SRI LANKA**

**A PROJECT REPORT PRESENTED BY**

**CHAMINDI KUDAHETTY**

to the Board of Study in Earth Sciences of the

**POSTGRADUATE INSTITUTE OF SCIENCE**

in partial fulfillment of the requirement

for the award of the degree of

**MASTER OF SCIENCE IN GEOGRAPHIC INFORMATION SYSTEM (GIS) AND  
REMOTE SENSING**

of the

**UNIVERSITY OF PERADENIYA  
SRI LANKA  
2007**

**PERMANENT REFERENCE  
FOR USE IN THE  
LIBRARY ONLY**

# **USE OF GIS IN ESTIMATING THE POTENTIAL OF GROUNDWATER AVAILABILITY IN KOGGALA COASTAL AQUIFER - SRI LANKA**

**Chamindi Kudahetty**

Postgraduate Institute of Science (PGIS)

Faculty of Science

University of Peradeniya

Peradeniya

Sri Lanka

Geographic Information Systems (GIS) have become a powerful tool in hydrogeology in the recent years and it could be a very effective and efficient method to determine the hydrogeological conditions of the subsurface. However, application of GIS is very limited in this field in Sri Lanka.

This report highlights the application of GIS in estimation of potential groundwater availability in Koggala coastal aquifer in Sri Lanka. The study area has an area extent of 2.5 sq. km. This aquifer is isolated from the mainland and the marginal water bodies of this area are highly saline. Industries in the Koggala Export Processing Zone and Koggala airport obtain their water requirement from the Koggala aquifer using individual shallow tube wells. With high water demand, more and more water is being pumped from the coastal aquifer. But if this process continues without any monitoring, it may cause vast damage to the fresh water aquifer in this isolated land by changing fresh water -saline water interface.

The GIS analysis is mainly based on the two dimensional spatial analysis using ArcGIS, ArcView, ArcInfo software packages. The operations are mainly done using digital and analog information. The study mainly consists of field observation, respective data collection, data conversion to digital format, spatial analysis and statistical analysis. Analysis is mainly done through GIS operations specially using spatial interpolation and overlaying operations. The results obtained from the GIS analysis are used in a statistical analysis for interpretation.

According to the results, it is noticed that, aquifer conditions vary according to the season but stay close to critical conditions. The water consumption is slightly high and has an increasing trend. But occasional high rainfall made it sustainable by decreasing the EC. But proper management cannot depend on such random events. Sustainable water extraction quantity can be recommended less than 135.0 cubic meters per day. If more development is going to be allowed in this area, this valuable fresh water aquifer will be at risk in the future if there is no proper monitoring and controlling system.