WEB BASED INFORMATION SYSTEM FOR MAJOR AND IMPORTANT LAKES IN INDIA

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INTRODUCTION

Lakes are an inherent part of the ecosystem. They have traditionally served the function of meeting water requirements of the populace for drinking, household uses like washing, for agriculture, fishing and also for religious and cultural purposes. Apart from these functions, which involve direct use of the lake water, lakes are also known to recharge ground water, channelize water flow to prevent water logging and flooding. They host to a wide variety of flora and fauna, especially birds. India is well known for the huge variance in its lakes. There are tens of hundreds of lakes of varying socio-economic significance in India, both natural and artificial. Natural lakes are mostly concentrated in Himalayas and the manmade lakes in the arid and semi-arid regions. All the lakes, all over the country, without exception, are in varying degrees of environmental degradation and need to be studied scientifically. The main cause for continued degradation of lake environment has been public apathy and government indifference. The situation has changed in the last decade due to public awareness of the need for sustainable environment in general, not of lakes alone. This awareness has led to public protestations, legal interventions and also public participation in restoration actions.

Although India has a history of lake research of well over a century now, unfortunately the data availability, storage and management is not very encouraging. Long term data are not available, except for a few lakes which have been systematically studied. In general natural lakes of high latitude Himalayas, particularly the lakes of Kashmir and Kumaun, have received more attention by researchers than other lakes. Of the low altitude tropical lakes, studies have concentrated on some specific regions for example lakes of Udaipur, Hyderabad, Bhopal, etc. As far as other lakes are concerned, only sporadic and preliminary studies have been reported. In many cases, these studies are scattered at different sources, often not easily accessible. As such there is a need to bring the various findings and data together. The progress and quality of research depends upon the availability as well as quality of data. Systematic storage and management of data and creations of data banks for lakes are also needed for proper planning and management.

An attempt is now being made by the National Institute of Hydrology, Roorkee to develop a digital information system for lakes in India. Information related to as many lakes as possible is being added to the system. It is also proposed to update the system frequently. It is hoped that the system will be helpful for the users working in the area of research related to conservation and management of lakes in India.

WWW TECHNIQUES

Hydroinformatics supports the water resources engineers by utilizing the modern Information and Communication Technology (ICT). It combines the data with tools to produce information in a form that helps decision-makers in taking improved decisions. For decades mathematical modelling has been the core activity for hydroinformatics systems and traditionally software systems are designed for single-user application. Recently, software systems are being designed to support multi-user operation and net based access from remote web based user interfaces. The adoption of World Wide Web (*WWW*) technology is an important paradigm shift in hydroinformatics.

WWW technology is an innovative part of modern ICT and is based on an open unstructured distributed hypermedia information system. It consists of non-linear, flexibley linked HTML (Hyper Text Media Language) documents, in which different types of *WWW* objects can be embedded. This allows interactive components to be integrated, besides multi-media objects like images, videos and audio sequence. In this way, the *WWW* provides new possibilities and features for information presentation, documentation and exchange and sharing and enables new ways of collaboration.

SYSTEM DESIGN CONSIDERATIONS

WEBLIS is being designed and developed to consolidate information about lakes of India obtained from different sources, to arrange to the information between the time-spaces, and to share them to the researcher and the local residents in an understandable way. It has been designed with the following viewpoints :

- **User interface**   : Even a general user who doesn't have the knowledge of the system can operate it. The main and drop down menu allow the user to interact with the system more easily.
- **Function**: Information has been arranged between the time-spaces, and it is possible to share, to search, to display, and to output it.

ABOUT THE SYSTEM

The system has been developed in HTML and java script language and. Users can use the software with the help of a web browser. The information has been collected and organized diverse information relating to the lakes of India from many different agencies and organizations. The main screen of the software is shown in Fig.1.
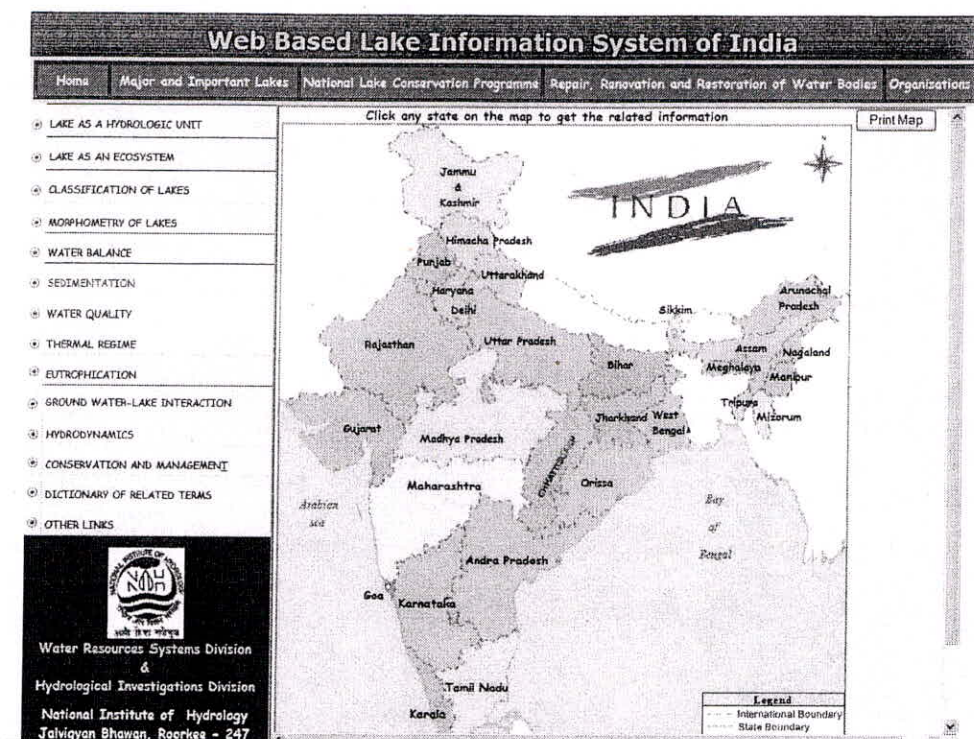
Figure 1 : Main Screen of WEBLIS

The WEBLIS provides tools for rapid retrieval of tabular and maps. Geographically distributed information has been organized into individual state maps. It uses "Point and Click" navigation to navigate around the site. A list of the states is provided for easy geographic access to spatial data. To view the state information the user may select a state by clicking the hyperlink or just by clicking the state on the map of India. It will display the thematic data for the selected state as shown in fig.2 as well as relevant statistical information in tabular format for each of the pre-selected data themes (fig. 3). The user can easily navigate to other basins from within the river basin display page by clicking on the "Go Back" which will return the user to the previous page.
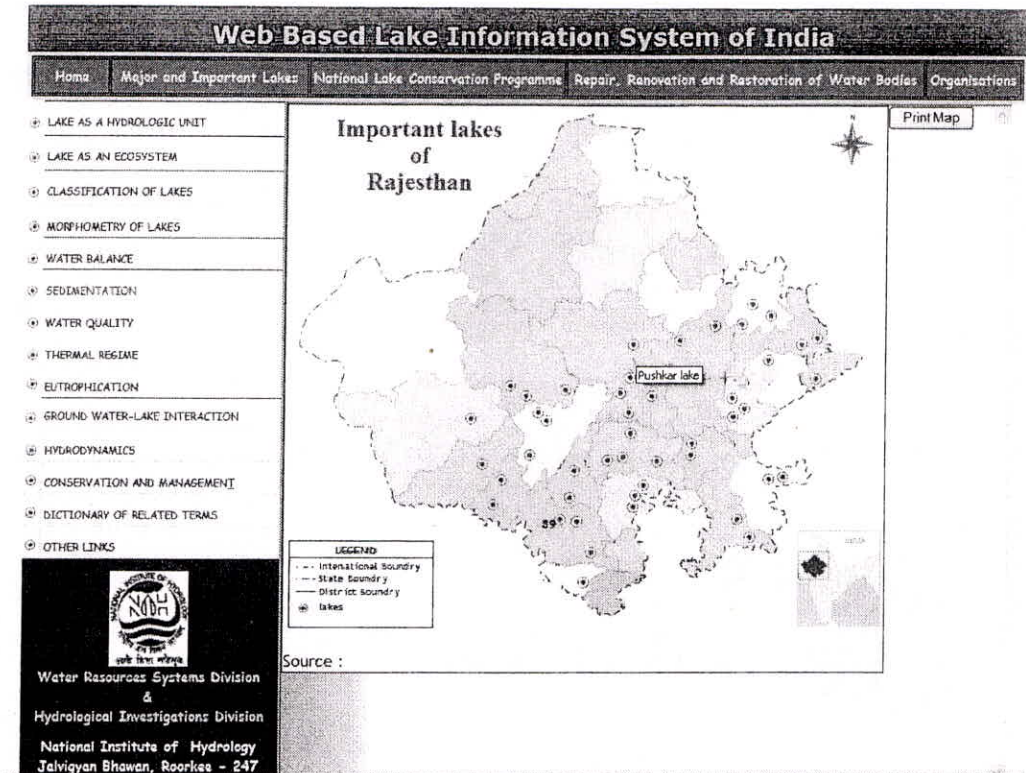
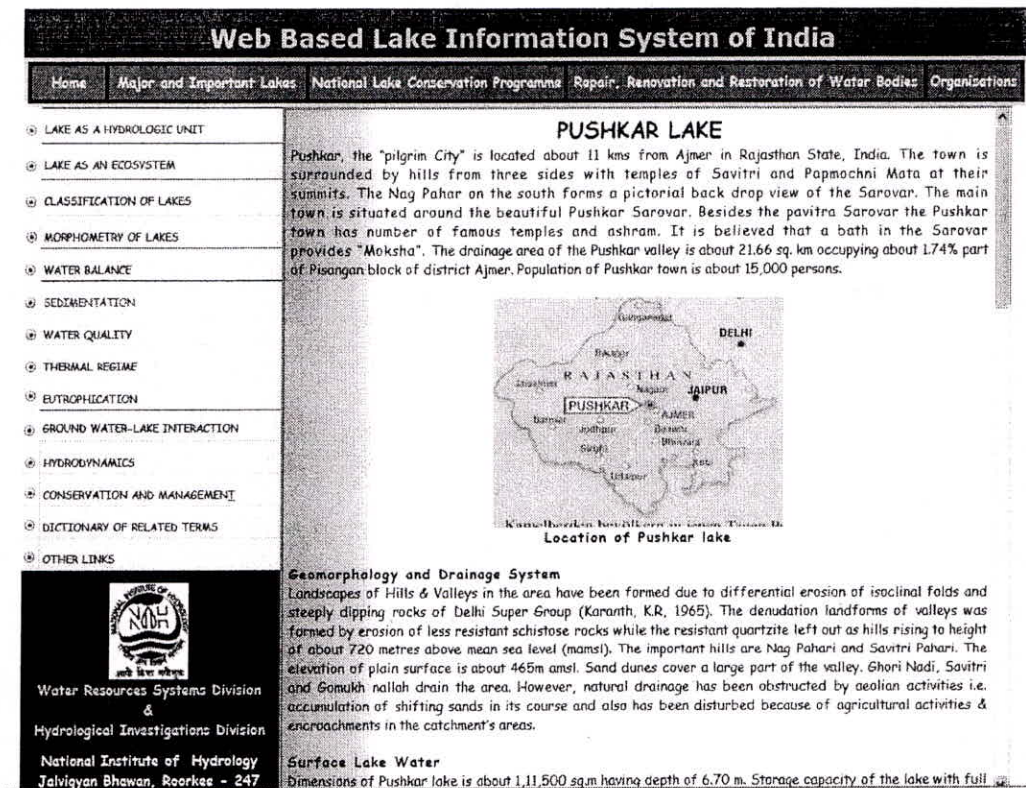**Figure 2 : Lakes of Rajasthan**

Figure 3 : Details of a Lake

THEMATIC CONTENTS

The main design objective of WEBLIS is to provide a common, integrated, and quantitative geo-spatial framework for providing the hydrological information of India over a variety of domains. Major and Important Lakes, National Lake Conservation Programme, Repair - Renovation and Restoration of Water Bodies, Organisations, Lake as a Hydrologic Unit, Lake as an Ecosystem, Classification of Lakes, Morphometry of Lakes, Water Balance, Sedimentation, Water Quality, Thermal Regime, Eutrophication, Ground Water - Lake Interaction, Hydrodynamics, Conservation and Management.

Further a dictionary of lake related terms is being planned to be incorporated in the system. .

ADVANTAGE AND LIMITATIONS OF WEBLIS

- Platform independent.
- No Installation required
- Thin client; maintenance is minimized.
- Quick and timely access, anytime, and from anywhere in the world
- Larger access to the products in a more structured manner

However, the limitation of such applications is they need of internet connectivity, data security aspects, virus and unautherised access. The main feature of WEBLIS package is to improve information access; to help make it more accessible and useable to research community and other interested users. This kind of software systems are representative for modern software systems in hydrology and free and wide spread sharing of the developed software among hydrologists will enhance the application of web based techniques.