Chapter 1

Introduction

Rivers have been called as life lines for the humanity because of their life giving utility and have been worshiped by man since mythological times. Most major civilizations in the world have emerged on the banks of major river systems. As a result, rivers have occupied a very prominent place in every stage of human development. Over thousands of years, these rivers have not only provided water for domestic needs and irrigational purposes, but have also enabled people to navigate along their banks. Along with the transport of goods, cultural exchanges also have taken place and have helped to spread civilization during medieval times. Even today, rivers actively serve mankind and their waters are regarded as the most important natural resource for humanity and honored as the nature’s primary wealth.

However, rivers have also caused misery, deaths and destruction to millions of people when they are in flood and have destroyed lives and property. Today, rivers are continuously used as a source of water for drinking, irrigating the land, generation of electricity, as well as, means of transport and fishing. Unfortunately, rivers are also used for waste disposal, discharge of domestic and industrial effluents and run-off of overused fertilizers in agriculture.

The lake Wular in Kashmir is the largest of all wetlands of the Jhelum basin. It is perched in the midst of the lofty Himalayan mountain chains and is blessed with lush meadows, a beautiful climate and pure and transparent water bodies. It has inspired countless philosophers, poets and scientists who have visited its heavenly environs.
The Jhelum basin is a bowl-like depression within the northwestern complex of the Himalayan Mountains. Its complex structure, geology and evolution have intrigued many scientists even today. Its geomorphology is marked with unusual relief variations and drainage modifications. Due to its rich flora and fauna, the snow-capped hills, pleasant weather and sky blue waters, its countryside has been known a PARADISE, for the stressed city folk.

However, there is a flip side to this paradise. In the past and even today, the valley is threatened with immense destruction of life and property due to floods, earthquakes and famines. These three natural disasters revolve around the important natural component of the environment of the Kashmir valley - the Jhelum Basin.

The Jhelum basin is dotted with wetlands which play an important role in maintaining the hydrological balance of the entire valley. Dal, Anchar, Manasbal and Wular Lake are some of the largest wetlands of the basin. Extensive marshes also exist in the lower areas of the basin through catchment drainages, particularly between Srinagar and Sopore. Major marshes include Rakhs, Asham, Nowgam and Malgam and recently a large portion of these has been drained and reclaimed for agriculture and settlements.

The lake Wular, along with its associated swamps, plays a critical role in maintaining the uniformity of water flow in the River Jhelum. During the peak summer months, these wetlands store the excess river water and thereby prevent the valley from floods. During lean flow season, from November to March, these wetlands and marshes release the stored water. As a result uniformity of flow in the River Jhelum is maintained within the valley.
The present study has been undertaken to review the environmental status of the Lake Wular. This wetland is also an important habitat for migratory water birds, along the Central Asian Flyway, which supports its rich biodiversity. The lake is a major fishery resource in the valley, supporting a large population living along its fringes. It also generates revenue to the state government through fisheries and auctioning of water chestnut, fodder and other economically important products. The catchment of the lake supports coniferous forests and alpine pastures, adding to the natural beauty and biodiversity of the wetland area.

Recognizing the importance of Lake Wular for its biodiversity and socio-economic values, it was designated as a **Wetland of International Importance** under the **Ramsar Convention** in 1990.

Presently, the lake Wular is being heavily silted due to natural erosive processes, as well as, by man’s activities. The valley of Kashmir has also been constantly threatened by earthquakes and floods due to its location in the midst of a tectonically active Himalayan terrain. These two natural threats and man-made interference has endangered the human settlement in the valley.

In view of these facts, the need has arisen to systematically study and assess the causal factors for the floods and the pollution hazards and look for their minimization. The major crisis of siltation is, therefore, been dealt in the present study.

**1.1 Aims and Objectives:**

In the light of a past history of floods and their disastrous effects, it was decided to study the causes for floods in the Jhelum Valley, especially in the vicinity of Lake Wular. Therefore, this study aims to find out the relation between the geomorphological
and environmental factors which bring about the erosion of the terrain. This will help in understanding the mechanism of the siltation processes. The study of the geomorphological features of the Wular catchment was undertaken, with the help of geological and geochemical investigations, aided with morphometric analyses and remote sensing techniques. Its main objectives are as given below:

1) To study the geomorphological characteristics of the Wular lake.

2) To study the landforms of the region around Wular lake and also understand the impact of geology, the regional slope, structure, climate and also the human influence, on the siltation process within the lake.

3) To study the nature of the silt being deposited within the lake.

4) To find out the current landuse pattern of the lake and study the relationship between landuse modifications and siltation.

5) To understand the environmental threats associated with the lake with regard to geomorphology, structure, climate and man-made causes.

1.2 Methodology:

1. The geological field work was carried out to delineate the catchment of the lake and various controlling factors such as geology, structure and regional slope in relation to siltation within the lake.

2. In order to study the siltation of the lake the major catchments were taken into account which included Erin, Madhumati and the Jhelum River.

3. Slope maps of the catchment area and drainage lineaments were studied with the help of toposheets.

4. Lineament maps of the catchment were prepared.
5. Structural lineament fabric of the region around the Wular Lake was constructed using drainage, slope, lineament maps and geological toposheets.

6. The silt and surface water samples within the catchment of the lake were collected and analyzed.

7. The effects of encroachment resulting from the conversion of vast catchment areas into agricultural lands were studied through field visits and previous literature.

8. The data so obtained was collated to assess the mechanism related to siltation of the lake.