INTRODUCTION

Running waters are important for the planet and human life. These lotic systems constitute an insignificant part (0.1%) of the land of which 0.0001% of water is in river channels (Wetzel, 2001). In-spite of these low quantities, running waters fundamentally shape the planet and human life. The lotic systems not only provide us with essential goods and services such as clean drinking water, fisheries production, power, irrigation, industry, conservation and biodiversity values but also aesthetic and culture values as well (Meyers 1997; Binns and Eiserman, 1982; Jha et al., 2012). Water from hilltops coalesces downhill into rivers and finally into oceans. Certain rivers and streams may have a same resolution at one level (or are same) and in some cases they all differ. But all lotic water bodies are snow-fed which eventually run down a slope to tributary, or a lake or stream of any order (Vannote et al., 1984).

Emphasis on biodiversity has increased owing to drastic alteration in both terrestrial and aquatic ecosystems. Wilson (1988) explained that “Biological diversity must be treated more seriously as a global resource, to be indexed, used, and above all, preserved.” Freshwater fish biodiversity in recent times have been altered due to following threats grouped under five interacting categories that are overexploitation, flow modification, destruction of habitat by anthropogenic & natural processes and habitat invasion by exotic species (Welcomme, 1983 & 1985; Naiman et al., 1988; Allan and Flecker, 1993; Hawkins et al., 1993; Brierly et al., 1999; Angermeier and Winston, 1999; Brierly and Fryirs, 2000; Thomson et al., 2001; Gibbs 2000; Jackson et al., 2001; Bunn and Arthington, 2002; Malmqvist and Rundle, 2002; Saunders et al., 2002; Turner and Rabalais, 2003; Fryirs, 2003; Abell et al., 2008; Araujo et al., 2009). Sala et al. (2000) suggested that freshwater ecosystems are the most threatened ecosystem and are directly or indirectly affected due to human population. Fish have been used as an indicator organism for pollution of water bodies (Karr 1991; Moyle 1994; Schneider et al., 1993; Pease et al., 2011) and fish assemblages are dependent upon biotic and abiotic determinants that fluctuate spatio-temporally (Vogl, 1980; Lobb and Orth 1991; Dettmers et al., 2001). This account highlights the importance of lotic aquatic ecosystems and fish as its important biotic component.
India has 113 total major and minor rivers with principle tributaries (Pandey and Gopal, 2003). India also has vast resources of freshwater fish (Devi and Indra, 2012) listing 667 species. Out of it 62% fish species belong to cyprinids.

Rivers of India play an important role in the lives of Indian people. Jhingran (1982), classified Indian rivers into five major river systems covering and accounting for 85% of the surface water flows: The Ganges river system, the Brahmaputra river system, the Western river system, the Eastern river system and the Indus river system. The Ganges river system, the Brahmaputra river system and the Indus river systems have rivers originating from glaciers or are snow fed making them perennial (they have a continuous flow throughout the year). These three river system together constitute the Himalayan river system. During summer and monsoon months, these rivers discharge maximum amount of water, causing frequent floods. The Indus rises near Manasarowar Lake in Tibet Plateau (China) and is bounded by mountains on its three sides (Himalayas on east, Karakoram and Haramosh on north and Sulaiman and Kirthar ranges on west side (CPCB, 2005). The Indus river system has 5 major rivers namely Sutlej, Beas, Ravi, Chenab and Jhelum. Most part of three rivers i.e. Sutlej, Beas and Ravi flows through India whereas Chenab and Jhelum originates from India but flows mostly through Pakistan.

Being a transboundary river (International waters), the water quality and fish fauna of this river is of great concern (Payne 2004; Sarkar et al., 2008, 2010). The river Ravi in India has not been extensively explored till date from the point of view of making an inventory of biotic resources but a considerable study was carried out in Pakistan side (Mirza, 1989). Allan and Castillo (1995), Allan and Johnson (1997) highlighted that as the biodiversity is fast declining in streams & rivers, and therefore, it is important to develop a system to evaluate and understand the North Eastern Himalayan streams and rivers. This will help us in designing conservation and restoration programmes (Johal, 2005). By using statistical tools, we can interpret the large cluttered chemometric data into cost effective sampling model approach to predict relationship between water quality and fish assemblages (Gorman and Karr, 1978; Frissell et al., 1986; Schlosser, 1987 & 1991; Brown and Maurer, 1989; Tonn, 1990; Poff, 1997; Fausch et al., 2002; Shrestha and Kazama, 2007).
Use of chemometric methods provides effective method to classify river water quality and as a tool for using representative sites for rapid water quality assessment. This will help us to establish and understand the association between biotic & abiotic variables responsible for fish assemblages and to draft suitable conservation and restoration measures.

The present study entitled “Ecological status of river Ravi with special reference to fish diversity” is aimed to understand spatio-temporal predictions in freshwater environments that affect fish diversity, distribution and abundance. This will help to formulate plans for management of lotic systems by determining the overall health of aquatic environment. Keeping in mind the current status and the importance of the issue the objectives of the present study are:

- To investigate the fish faunal diversity & assemblages of river Ravi.
- To study fish catch composition of different streams falling into Ravi.
- To study physico-chemical structural details of river Ravi and streams associated with the river system.
- To apply multivariate statistical analysis for describing occurrence of fish species and associating them to environmental variables in Ravi River basin, India.